Volume 4, issue 6

June 4th, 2008

Bottom Bunch Dive Club Sea Tales Newsletter

Buoyancy Check

The king asked Archimedes how much gold was used in making his crown. The king suspected the goldsmith cheated him by replacing some of the 5lbs of gold with silver and keeping the extra gold for himself. The crown of coarse could not be destroyed, so Archimedes had a problem to solve.

Archimedes decided to take a bath and think about the problem the king had given to him.

He yelled, "Eureka!" when he stepped into a bath and noticed that the water level rose – he suddenly understood that the volume of water displaced must be equal to the volume of the part of his body he had submerged. This meant that the volume of irregular objects could be calculated with precision, a previously intractable problem. He is said to have been so eager to share his realization that he leapt out of his bathtub and ran through the streets of Syracuse naked.

Archimedes' insight led to the solution of a problem posed by Hiero of Syracuse, on how to assess the purity of an irregular golden crown. Equipment for weighing objects already existed, and now that Archimedes could also measure volume, their ratio would give the object's density, an important indicator of purity.

The density of the immersed object relative to the density of the fluid is easily calculated without measuring any volumes:

Density of the object/Density of the fluid = Weight / Weight—Apparent immersed weight

Let me give you an example of a specific situation. Approximately how much water must be displaced to bring a 900lb object to the surface if the object displaces 10cuft? The objects lies in 132ft of seawater. The equation to use: Wcuft = Wair—V(64),

Where Wcuft is the water displacement in cubic feet and Wair is the weight of the object.

Wsub = 900lb—10cuft(64lb/cuft))

Wsub = 4 cuft

The water depth has no bearing on this problem. A 900lb object that displaces 10cuft displaces 4cuft of water no mater what depth. The 64lb/cuft is the weight of one cubic foot of seawater.

According to Archimedes Principle, "Any object wholly or partially immersed in a fluid is buoyed up by a force equal to the weight of the fluid display by the object, not the weight of the object.

Many of you I know have tried to recover weight belts lost in the kelp forest. The guideline is that a lift bag should be used anytime the object to be recovered is more than 10-15lbs negatively buoyant. Trying to bring an object heavier than this to the surface using your BCD is foolish because of the danger of an uncontrolled ascent should the object be dropped. Also, if the object is very heavy you will likely need to hold it with both hands. This makes manipulating your BCD very difficult. No object is worth endangering your life. If you aren't properly equipped to raise the object, mark it with a buoy and return later.

Ask any dive pro what skill separates the novice diver from the tec-diver, and you'll almost always get the same answer: buoyancy control.

Divers who master buoyancy control move through the water gracefully. They seem to ascend, stop, hover and descend at will with hardly a fin kick or hand wave—as if they think it, and it happens.

Sea Tales Index

Wednesday
June 4th , 2008
at the Casa Machado,
Montgomery Airfield Admin Building,
6PM meet/greet,
MEMBERSHIP PARTY -PRIZES-RAFFLES-BALLOONS-CAKE-PLEASE COME AND ENJOY THE PARTY

Bottom Bunch Members
Please Stand-Up and Be Counted as a BB Member! Renew your Membership in June 2008!

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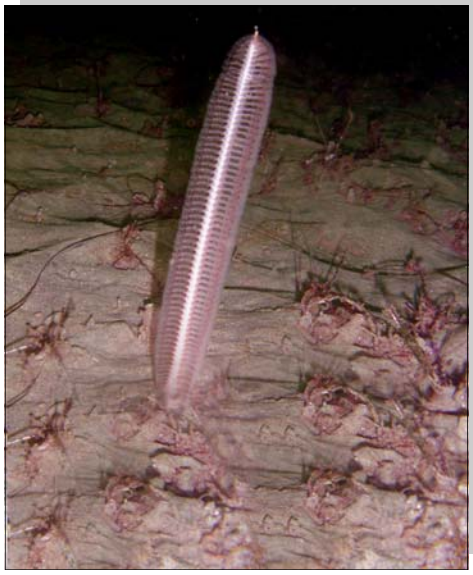


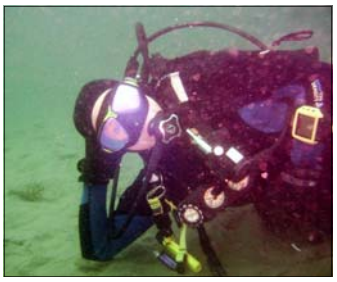
White Sea Pen, is a slender, plume-like gray lateral branches. Each of the tiny feeding polyps has eight tentacles. Image

By Mark Pidcoe diving La Jolla Shores © 2008

Buoyancy Check

By contrast, those without such control constantly kick, fight the water to stay down and constantly adjust their BCS's, and expend great effort to stay at any depth. Knowing buoyancy control means that you will be saving air, saving your energy and ultimately you will have more fun underwater.

If everyone was the exact same size and wore the same wetsuit and the same tank size, estimating the amount of weight you need to carry would be easy. But the fact of the matter is that everyone is not the same height or weight, you wear different exposure gear depending on the dive location and plan. For example, if you are diving in water 55 degrees and below, wearing a drysuit is really recommended. If the water temperature is above 70 degrees, then a 5mm wetsuit will be ok. The weight difference between a drysuit and a 5mm wetsuit can be measured in pounds of weight, so it is a lot. Suppose you weigh 155lbs and you plan to dive in a 5mm two piece wet suit using a 80cuft aluminum tank in salt water. You'll start your buoyancy check with 15lbs weight in salt water, plus 5lbs for the AL tank. This probably gets you close. However, always perform a buoyancy check prior to descent with the new equipment.



Five Step Buoyancy check.

Actually, I would use a tank with 500psi are less,

1. **Enter the water fully equipped for the dive.**
2. **Go to water too deep to stand in. If you're using your dry suit, open the automatic exhaust valve all the way.**
3. **Hang vertical and motionless holding a normal breath.**
4. **Add/substract weight until you flat at eye level while holding a normal breath.**
5. **As your final check, you should slowly sink when you exhale.**

It may take a few tries to get your weight exact. With practice, you'll have a good feel for how much to add or subject based on how much you float/sink.

During the dive, you use air from your tank, which makes it lighter. Although different cylinders have different buoyancy characteristics by themselves, the cyclinder and its volume become part of your total mass and displacement when your gear up, so your buoyancy will increase as you consume your air, no matter what type of tank you're using.

So, because your buoyancy will increase by about 5 lbs, that is why I suggest you do the 5-Step Buoyancy Check with a tank that is almost empty. Just allow yourself enough air to check your weight. What you don't want to happen is to float to the surface at your 15ft safety stop.

The best way to check your buoyancy while underwater, is to do a fin-tip buoyancy check. Lie down flat face-first on a flat sandy area and have your buddy hold your fins down. Then, just breath. When you inhale, you will rise off the bottom, when you exhale, you will sink to the bottom. This happens because when you inhale, you increase your displacement and buoyancy, and tend to rise slightly. When you exhale you tend to sink. Once you're neutrally buoyant with your BCD or dry suit, you make minor buoyancy changes by timing your breathing and breathing with somewhat full or somewhat empty lungs as you need to—but never holding your breath. With practice, this becomes automatic and you do it without thinking.

Typically, you want to distribute weight so you swim as horizontally as possible. This minimizes drag as you swim, saving you energy and keeping your feet off the bottom.

As a rule of thumb, you want your weight forward, toward your sides and stomach, which helps maintain a neutral swimming position.

To find out what your "trim" is, become neutrally buoyant and hover in shallow water and then relax completely. Just let your body turn however it will. You may end up on your back or upside down. It doesn't matter– you're trying to find out how to redistribute weight for maximum comfort and minimum fatigue.

If you're wearing a lot of weight, such as with a full wet suit or drysuit, you may opt for multiple weight systems, such as a weight integrated BCD and weight belt. Or a weight integrated BCD and weight harness. This gives you more options in weight distribution and eliminates a single, massive, hard to handle system.

Deep Oceans by Dr Bert Kobayashi

The oceans cover more than 70% of the surface of the earth, some 143,000,000 sq miles in area. The average depth of the oceans is 4000m. This means that the total available living space of water in the oceans is 145,000,000 cu km, or 3.62 x10 to the 20th gallons.

We know that plants need light so that only the upper 200m (actually only the upper 80 meters) is able to be inhabited by plants. However, animals can live throughout the water column, but there are some obvious shortcomings once these animals start getting into those depths that we call the DEEP Oceans. A fancy name for the depths is bathypelagic, which means deep waters.

The major areas oc concern for the inhabitants of the bathypelagic realm are: oxygen concentrations: food availability, and reproduction. This talk intends to note how some fish species, and one of the major groups of animals found in the depths, deal with these problems.

The characteristics of the deep oceans are:

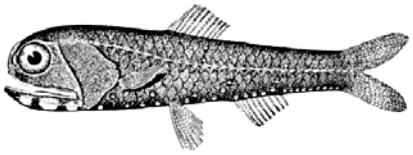
- Low levels of light, down to 500m detectable with the human eye, and below 1000m, no sunlight detectable by photo
- Cold Temperatures, mostly right around 4 degrees Centigrade (39-40degrees F), but very uniform and stable, especially below 500m. The upper 500m have a more or less mean temperature of 9.5 C (except in polar regions, where temperature are considerably cooler.)
- Lots of space in which to inhabit, including that dimly lit waters between 200-500m of depth, the almost no-light areas but lots of bioluminescence between 500-1500m of depth, and then the perpetually dark areas between 1500m to right off the bottom, not matter what the depths. Then there is the benthic, or bottom-associated, animals, which have to deal with the light that is produced by bacteria, and eyesight once again becomes a factor.

All of these facts/factors combine to make life in the deep oceans not real easy, but probably very exciting in short bursts of activity, and thus, not very many species of animals are found there. Those that are found have some bizarre adaptations which can be noted by observation of the fish specimens on display.

Those forms of animals in the deep oceans have peculiarly adapted to be able to address the problems of existence noted above in a more or less successful manner. In fact, one of the most numerous fishes in the world, the genus *Cyclothrone*, lives in the depths of 300-3500m.

The recent years, work with submersibles, deep cameras, and the like have revealed communities of benthic animals living around the edges of the thermal vents, with chemosynthethic bacteria (using sulfur/hydrogen sulfide as the energy source) supporting giant forms of worms, clams, sponges, and the surrounding fish community. These giant forms are 3-5 times larger than the closely related shallower-;living species.

Reference: NB Marshall, 1954. Aspects of Deep Sea Biology, Philosophical Library, NY



California headlightfish (*Diaphus theta*), a species of lanternfish.

Humpback anglerfish (*Melanocetus johnsonii*), a species of black seadevil

The fish of the deep sea are among the most elusive and unusual looking creatures on Earth. In this deep unknown lie many unusual creatures we still have yet to study. Since many of these fish live in regions where there is no natural illumination, they cannot rely solely on their eyesight for locating prey and mates and avoiding predators; deep sea fish have evolved appropriately to the extreme sub-photic region in which they live. Many deep sea fish are bioluminescent, with extremely large eyes adapted to the dark. Some have long feelers to help them locate prey or attract mates in the pitch dark of the deep ocean. The deep sea angler fish in particular has a long fishing-rod-like adaptation protruding from its face, on the end of which is a bioluminescent piece of skin that wriggles like a worm to lure its prey. The lifecycle of deep sea fish can be exclusively deep water although some species are born in shallower water and sink on becoming adults.

Due to the poor level of photosynthetic light reaching deep sea environments, most fish need to rely on organic matter sinking from higher levels, or, in rare cases, hydrothermal vents for nutrients. This makes the deep sea much poorer in productivity than shallower regions. Consequently many species of deep sea fish are noticeably smaller and have larger mouths and guts than those living at shallower depths. It has also been found that the deeper a fish lives, the more jelly-like its flesh and the more minimal its bone structure. This makes them slower and less agile than surface fish.

In Memory of Hugh Bradner—Inventor of the Wetsuit

Hugh Bradner, renowned physicist and professor emeritus at Scripps Institution of Oceanography, UC San Diego, died 5 May 2008, in San Diego, Calif. after a prolonged illness. He was 92 years old. Bradner's scientific career incorporated both science and ocean exploration to design many notable ocean technologies, including the first neoprene wetsuit. He has been affiliated with Scripps since 1961 and was professor emeritus at the Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics (IGPP).

During his distinguished career as a nuclear physicist, Bradner worked at the U.S. Naval Ordnance Laboratory in Washington D.C. and the Lawrence Radiation Laboratory at UC Berkeley. He was also one of the founding scientists of the Los Alamos National Laboratory working on the Manhattan Project and a faculty member at Scripps Institution of Oceanography and UC San Diego. It was at Los Alamos that he met Marjorie Hall, his wife of 65 years.

Bradner had a lifelong passion for the ocean. He enjoyed diving and sailing and was one of the first Americans to make a deep-water SCUBA dive. In 1951, while working at UC Berkeley, he decided to spend some 'weekend time' improving diving equipment for navy frogmen, which began his pioneering research on the wetsuit. Bradner focused on the design of a wetsuit for military underwater swimmers and developed a foam wetsuit using a unicellular material known as neoprene.

'He was an adventurous man who enjoyed travelling,' said Walter Munk, professor emeritus and director of IGPP during Bradner's tenure at Scripps. 'He built a successful career by combining his geophysical work with his South Pacific adventures.'

Bradner collaborated with scientific divers at Scripps Institution of Oceanography who were experimenting with the new SCUBA regulator invented by Jacques Cousteau and Emile Gagnan. Scripps divers first tested his wetsuit designs at their SCUBA training classes held in the pool of the La Jolla Beach and Tennis Club.

'Brad's neoprene wetsuit was a tremendous contribution to scientific diving,' said James Stewart, professor emeritus at Scripps. 'He was a great guy and a lot of fun to work with.'

Bradner was well regarded for his collaborative approach to science, evident in his reluctance to claim himself as sole inventor of the wetsuit. He continued to consult for the military throughout his scientific career. His other research endeavours led to novel diving equipment, including underwater contact lenses, a single-hose regulator and a decompression meter. Bradner even developed a loop system for quickly extracting U.S. Navy SEALs from the water via inflatable boats.

Bradner enjoyed life to the fullest. He was an avid outdoorsman hiking in the Sierra Nevada Mountains, swimming in the La Jolla Rough Water Swim, and travelling all over the world to enjoy the oceans. He turned scientific inquiry into fun. He was a true teacher. His greatest joy was to watch as he guided students, family and friends to the discovery of something new. He was a painter, a photographer, a jeweller - a creator of new visions, be they intellectual or artistic.

Bradner graduated from the California Institute of Technology (Caltech) with a Ph.D. in physics, where he coached the swimming and water polo teams. Bradner received his undergraduate degree from the Miami University in Ohio and received the Miami University medal in 1960 and an honorary doctorate in 1961.

He is survived by a daughter, Bari Bradner Cornet of Berkeley, Calif., three grandchildren and a great granddaughter. His wife, Marjorie Hall Bradner, passed away on 10 April 2008.

The family requests gifts in his memory to The Hugh and Marjorie Bradner Endowment at Scripps Institution of Oceanography. A memorial service for Hugh and Marjorie Bradner will be held at Scripps Institution of Oceanography at a later date.

The following by: Bert Kobayashi

As a scuba/snorkel diver for many years, dating back to my early days at Scripps, I owe Dr. Bradner much gratitude for "keeping me warm" through the more than 8000 scuba dives that I have made in my career, especially in these chilly waters off southern California. I can recall after getting certified, buying a sheet of neoprene (cost $35 in 1960), securing a master pattern from Jim Stewart, my diving instructor and hero, and cutting the neoprene and glueing the pieces together with neoprene cement (not unlike what is used for plastic sprinkler pipes nowadays). That neoprene was smooth on both sides, so that getting into that top (the suit was of 2 pieces, a pants bottom and a pullover top) was quite a trick. The Diving Locker at Scripps had a large 50-gallon tub of cornstarch which we used to coat the inside of the top before donning it. You could always tell a diver before he went into the water as his hair was white with the cornstarch. Getting out of the top after the dive was a mean trick, either having someone else pull it off or getting into the shower and rolling the bottom part up and holding a roll of water around the waist. Then, in one jerking motion, pulling the bottom up over the head, all the while bending at the waist in order not to "drown" while doing this maneuver. But, thanks to Dr. Bradner, the wet suit kept me from getting overly cold and allowed me to make all those dives!

Bottom Bunch Dive Club
www.bottombunchdiveclub.com

E-mail your newsletter submission to:
hgruenha@nethere.com

Safety first then Fun!

The Bottom Bunch dive club started out as a Chula Vista Club more then 20 years ago. The Club motto is safety first then fun. The club loves to dive and loves to be safe too. Weekly dives are planned as well as Channel Islands boat trips, beach picnics, yearly Christmas party and many other activities. Please come and join the Bottom Bunch Dive Club and meet year next dive buddy who loves to dive as much as you do!

We meet the 1st Wednesday of each month at the Casa Machado on the Montgomery Airfield in Kearny Mesa. Bottom Bunch Dive Club yearly dues are only $24 per person.

Committee Members:

Guest Speaker: Volunteer
Entertainment: Volunteer
Black Beards: Mark Pidcoe
Sales/Audio: Al Barnes
Welcoming: Steve Gardner
Historian: Karin Filijan
Newsletter: Herb Gruenhagen

Web Site: www.bottombunchdiveclub.com

2008 Officers:

President: Greg Morris
Vice Pres: Rickie Kean
Treasurer: Karin Filijan
Secretary: Tracy Mues
Local Dive Coordinator: Mark Pidcoe

Save Water today, so you will have water tomorrow

San Diego is facing a water crisis. We currently import nearly 90 % of our water from the Colorado River and San Joaquin Delta, a strategy that is not sustainable. Our main source of water—the Colorado River—is drying up, not to mention the population explosion in the southwest.

What can you do now to save water is this:

1. Replace your lawn with native, drought tolerant plants. If you must have a lawn, water only when necessary.
2. Install a water-efficient drip irrigation system for trees, shrubs, and Flowers to get water to the plants roots more efficiently.
3. Don't water the sidewalk, driveway or gutter. Adjust your sprinklers so that water lands on your lawn or garden where it belongs.
4. Water only before 6AM and after 8PM to reduce evaporation and interference from wind.
5. Fix leaky faucets and plumping joints.
6. Do not run the hose while washing your car. Use a bucket of water and a quick hose rinse at the end. If possible, wash your car on the lawn.
7. Install water-saving shower heads or Flow restrictors.
8. Run only full loads in the washing machine and dishwasher.
9. Shortening your showers by even two minutes save up to 700 gallons per month.
10. Turn off the water while brushing your teeth.
11. Use the garbage disposal less and the compost.
12. Dispose of hazardous materials properly. One quart of oil can contaminate 250,000 gallons of water.

Each of these suggestions will save water and you money too. Please save water today, so we all will have water tomorrow.