The Mysteries of Buoyancy

Imagine you find yourselves, through a mistake in universal spatiotemporal mechanics, having to explain to a Pharaoh of 4500 years ago what happens if buoyancy control is lost during a dive. Sporting your water-skin made from a goat's stomach and a belt with metal plates on it, you would be hard-pressed to describe to Cheops the workings of the wind machine you carry on your back; taking a risk that could either grant you the role of High Priest or… a sound whipping.

4500 years later: the descendents of Cheops (and of Genghis Khan) have now taken to diving. Though the difficult task of explaining the issue of buoyancy, even to a licensed and trained diver, remains the same to this day. Well, you might say, no human is born swirling on their flippers with a supply valve in their mouth. It's true, if this were to happen, midwives wouldn't call DAN, they would call the nearest UFO centre! Buoyancy control is learnt, it's not innate, but not all divers give the right attention to weights, nor the to the BC. You know those seabeds littered with nylon belts and weights… or with those black nylon bags, part of the weight belts, which can be often mistaken for mutant nudibranchia? Well, most of those objects are dropped by divers at the surface, either whilst getting ready to get into the water or whilst getting back into the boat. But that's not all…

I have seen things you people wouldn't believe… A lawyer make an uncontrolled ascent from thirty metres, whilst his weights, falling into the blue, just missed a magnificent acropora in the Red Sea.

I have seen a barber deflate his BC and roll around on the bed, encroaching on the territory of a stonefish. Seeing these things makes you shudder, and even when you've been brought up in the light of 'positive reinforcement' you might resort to more subtle methods: make them repent. Thus, you give the lawyer a nice speech about the two-meter acropora disk that takes at least a century to grow that big. You tell him that just a little damage would kill the whole colony… and you convince him that the life of that immense complex of small molluscs who watch sharks go by and witness the mating of all endemic species is far more interesting than his own… The barber instead couldn't be bothered: he didn't care at all about the well-being of the poisonous fish.

I saw a diver plunge straight down to the sandy seabed. Whilst I asked myself if he had had time to compensate, a cloud rose like the ones Wile E. Coyote makes when he lands on the bottom of a canyon. In fact, I had noticed the diver don too much weight for my tastes, but I hadn't said anything. He was our guide.

Now – amongst the various problems presented, we have established that losing bits and pieces along the way is, above all, environmentally unfriendly, and what more, as recounted by the last issue of Alert Diver (Read it; if you haven't already.), they can cause traffic problems in hyperbaric chambers, or worse, in morgues. How can we avoid it?

Just doing what we always do; check ourselves. We regularly check to make sure that we have our keys or wallet with us before leaving the house, and we check our flies before leaving the bathroom of a restaurant. These slightly neurotic habits would do us well underwater, along with some other measures. At twenty meters, if you dive with a thick suit, the weight belt starts dancing the hula hoop. To writhe among rocks and wrecks is like being on public transport full of pickpockets: if we manage to check that we have our wallets on us on the subway of a large city, why not check that the buckles of our weight belts are still closed?

Making an uncontrolled ascent, I swear, can bring many more problems than being deprived of one's cash,

credit cards and ID. My personal nightmare is not being robbed, but a half-open buckle – or a pocket-full of loose ballast weights.

Buoyancy problems and their attempted solutions don't stop here. An unaccountable number of divers weigh themselves down like a kamikaze. Ideology? Depression? No. They find it hard to descend. To break the water's surface and go down below is never a question of weight, but of breathing. You have to be patient: empty your lungs properly and wait for the water to fill the semi-dry suit, relying on the fact that nature abhors empty spaces. This principle works for many other things in diving, too. I'll spare you with the Latin and get straight to the topic: lung volume. Litres of air can be compared to the weights you have on your belt when wearing a thick suit. Breathing in gasps or trying to descend with your lungs full of air (and water is very adept at dejecting those who breathe too forcefully, just as it is with those empty spaces) is equivalent to cancelling out the weights on your belt.

Let's now look at the devil's real tool: the BC. In the beginning it aroused suspicion. Divers used to regulating their buoyancy with their lungs and a plastic bag didn't trust it. If you read the label on a BC you wouldn't blame them: WARNING! – a triangular sign with an exclamation point – followed by the list of misfortunes which could strike you following its improper use, including death. It's certainly more eco-friendly than lead weights (you don't find that many BCs on the seabed), and using it sounds more dangerous than hanging around a reef habitually bombed by poachers. What dangers does this strange instrument have in store for us? First, one of the biggest misunderstandings in the history of buoyancy control from the plastic bag onwards: the inflation and deflation buttons are to be used NOT like the buttons on an elevator. It's no laughing matter. People do this. Buying a 10.000 Euro BC does not protect you from the consequences of this mistake, or other misunderstandings. There are those who have survived the improper use of this infernal instrument…

A couple from the Cayman Islands discovered their computers blocked. They hadn't been diving for months, yet their computer screens flashed an SOS message. They sent their computers off for servicing, and found that the data in their memory revealed numerous rapid dives with rocket speed ascents.

It had been the couple's kids: twelve and fourteen years old. In their parents' absence, they had been borrowing the equipment and crashing down to the seabed. With the belt weights of adults. The only thing they had to fear was the depth: there beneath them existed one of the deepest trenches in the world. They were then surfacing by inflating the BCs. Fortunately those BCs had overpressure relief valves, otherwise they would have busted, sending the kiddos back to the bottom of the Cayman Trench, in the eternal company of very rare white spirographs and bacteria.

There is another thing I didn't tell you about BCs: They can inflate and deflate by themselves; underwater! It's no worse, if not better, than losing your belt. There is a solution (at least until you reach the surface)… as long as you take notice, that is. However, there's nothing to be done about the loss of your weight belt. Even with a thin suit three divers can't keep you down. Thus, we come to one of the most underestimated items of equipment that changes volume: the wet suit – a shortie of 3 or 7 mm wet suit, semi-dry or dry suit, or what have you. Many buoyancy problems come from changing from a thin to a thick suit. It's like going from driving a scooter to a lorry. Switching from a wetsuit to a dry suit without any training or practice is a folly with no positive outcomes.

Equipment or no equipment, the secrets of buoyancy would be much easier to explain to an ancient Pharaoh than to modern man. Good control of breathing, of its rhythms, and mainting calm and quiet observance in all that happens to us underwater, is what make divers (and coral) safe from potential problems. Making the right choice in weights, BC balancing, and carrying out continuous checks will allow

you to enjoy one of the most beautiful things a human can experience: diving. Even today, the death of a diver is often portrayed by the media as the consequence of challenging a foreign environment where humans cannot and should not venture. In ancient Egypt, where the tens of thousands of deaths of labourers would have never made the Papyrus chronicles, the builders of pyramids would have thought the same. We, on the other hand, don’t.