Capital reef

The Amazing Reef Aquarium of David Saxby

text and images by John Clipperton

Although I've visited and imaged dozens of reef tanks over the last couple of decades, I'll admit that I was nervous about visiting David's tank. After all, it isn't every day you get invited to shoot an aquarium owned by someone who is both a reef-keeping legend, and MD of a prestigious global reef-keeping brand. Add the fact that the brand in question is the "Rolls Royce" of the hobby, is a major advertiser with the mag, and the owner's multimillion pound residence is just a stone's throw from Buckingham Palace and Westminster, and I think I'd have been less intimidated if I was dropping-in at the Palace for a brew! In the few weeks before I visited, I frantically scrabbled for as much info on the tank as possible to prepare. Thankfully there are already a myriad of excellent videos and articles that have been created on this iconic tank (albeit many are now a little out-dated). This did present something of an unexpected challenge though as I realised that I'd have a job producing something that did the tank similar justice, let alone being "original". No pressure then!I spent many sleepless hours contemplating clever angles and insightful questions that I might pose to both impress David and enlighten readers but in the end, I realised… I'd just have to wing it!

The day of my visit started early as I had quite a drive from South of the Mersey to central London and I did NOT want to be late. I'd decided to drive myself because I'd be taking most of my arsenal of imaging equipment and previous train journeys with so much kit had proven let's say… messy. I calculated that, after a 4-hour drive, I'd have about 3 hours on-site to get the material I needed. In short, no room for schoolboy errors such as forgetting to put a memory card in the camera (yes, I've done that!). So, down the M6 I went and thankfully everything proceeded smoothly. The M40 was the same story and, although progress became slower as that motorway transitioned into the A40 into central London, I soon found myself cruising alongside Hyde Park with time to spare. Finding a parking space amongst gleaming Bentleys, Porsches and Mercedes, I gathered my gear, took a deep breath and rang the bell.

I'm sure many of you will have seen the reasonably recent video on David's tank, made by American YouTuber "Coralfish12g" and pals. Well, unlike them, I'm not quite flush enough to drop several hundred quid on a sharp suit for the occasion. So, on entering David's sumptuous home, I felt a bit like a fish out of water. To be fair, the riches evident here are enough to make anyone weak at the knees, from the stunning 16th century tapestry adorning the lounge wall to David's beautiful garden and terrace, replete with waterfall and pond, all just a stone throw from Hyde Park. I'm not sure if the figure is right but from what I'm told, securing a parking space in this area for a single year alone costs more than my house is worth, so I can't even imagine the wealth involved here. Having said all that, David was very down-to-earth and welcoming, and we soon relaxed into chatting about the tank over a cup of tea, as he showed me various aspects of its design.

Now, I'm not going to go into super detail on the tank in this part of the article. Instead, I'll relay my personal impressions and leave the details for a tank profile a bit later. So, after a short walk along a soft-lit corridor, lined with columns, mirrors and glass fronted niches filled with assorted treasures, part of the tank comes into view on my left. It's absolutely amazing… literally jaw-dropping… a roughly 4-foot square window into a blue-hued world with swirling clouds of fishes and a towering reef structure festooned with all kinds of colourful, exotic invertebrate life. The corals are huge… SPS, LPS and gorgonians immediately standing out. Before them, a range of Surgeonfish genera circle at eye-level; *Naso, Ctenochaetus, Acanthurus, Zebrasoma* (including 2 rare and desirable "tricolour" scopas tangs). There are literally dozens of tangs in this tank, most of them very large. There are also many wrasse species including an *Anampses femininus* pair, plus some beefy *Anthias* and a large *Coris* wrasse. Other individuals of immediate note include a copperband, longnose butterfly and a huge rabbitfish… the list goes on. David tells me that he has actually lost count of exactly how many fish are in this system, although around 400(!) is the estimate. What also really strikes me alongside the sheer number is the large size and particularly girth of these fish! David feeds his fish several times a day and they show

The tank comes into view on the left as I walk down a corridor. This is just one "end" of the L shaped tank... a 4 foot square window into a watery world. Dozens of reef fish species swarm before a naturalistic reef sctructure. There's a large central cleft and tunnel going right through to the other side.

Above: David gets his trusty ladder out to feed the fish (you can watch this in the video on our YouTube channel). Below: a massive female *Genicanthus watanabei* shows evidence of the "good life".

it. He shows me exactly how hand feeding is achieved by nimbly ascending a battered stepladder and popping open one of the glossy coloured-glass flaps that conceal the tank rim (I try to keep my hand steady to film at this point as the fish form an almost dizzying clamour of colour, a frenzy of fins, awaiting the arrival of their meal). With evident relish, David slowly pours in the mixture of frozen foods; mysis, krill, brine, rotifers etc. It's fascinating to watch the evident pecking order as the large tangs take control while smaller species dart from the periphery or stay low in the cloud. Mixed in with this concoction is food of a small particle size, specifically PolypLab Reef-Roids. This is clearly fuelling the growth and colour of the corals in the vicinity including a number of non-photosynthetic species. Indeed, as well as a healthy sea fan, there are numerous sponges and colonies of *Tubastraea* underneath ledges,

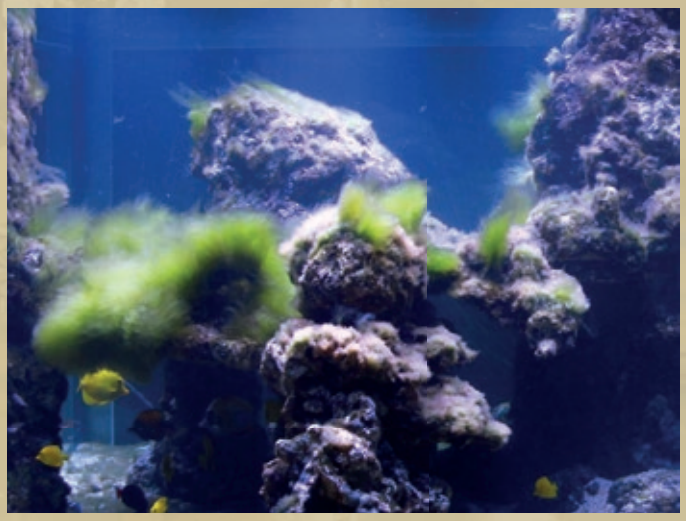
the latter having settled from larvae. Possibly one of the less obvious major features of this part of the tank is a large central cleft that forms a tunnel low in the reefscape. It's even possible to see right through this tunnel to the other side of the tank and the fish evidently enjoy it as an access route around the tank.

With their appetites sated for now we move on, turning left to walk through internal double doors into David's sumptuous lounge (to get a picture in your mind, think of this tank as a backward "L" shape if viewed from above… also see the captions on the images). Just before we enter that space though, I notice it's possible to look through an end panel right along the full 3m length of the long part of the tank that looks out onto the lounge. Again, this view is simply astounding; the vista, mirrored by the physics of total internal reflection seems endless, and shimmers with the shier fish species that clearly prefer to shun the feeding furore and dine passively. Species evident include various *Anthias* (including a shoal of *P. evansi* and a few *P. ventralis*), a swarm of ghost cardinal fishes, plus a variety of damsels, wrasses and a tilefish.

The tank looks most impressive from Davids's lounge in my opinion indeed even in such an opulent setting it commands the room. Like the tapestry that it off-sets, it's an intricate work of art, sublime yet imposing at once. While other views put you quite close to the tank, from this viewpoint it's possible to stand back and really take in the overall picture. The size of the corals now really stands out, particularly the huge *Goniopora, Alveopora* and football-sized *Fimbriaphyllia* whose fleshy polyps ripple gently in the currents. While these species sit near the substrate, they are crowned with all kinds of SPS corals ranging from high-colour signature pieces, to species more notable for their interesting growth form. The scale of it really sinks in. I wouldn't be surprised if the contents of this system alone top the million GBP mark.

Above: having walked around through the double doors and into the lounge the full length of the reef is revealed. There are some truly massive corals in this system, like the football-sized Frogspawn coral below.

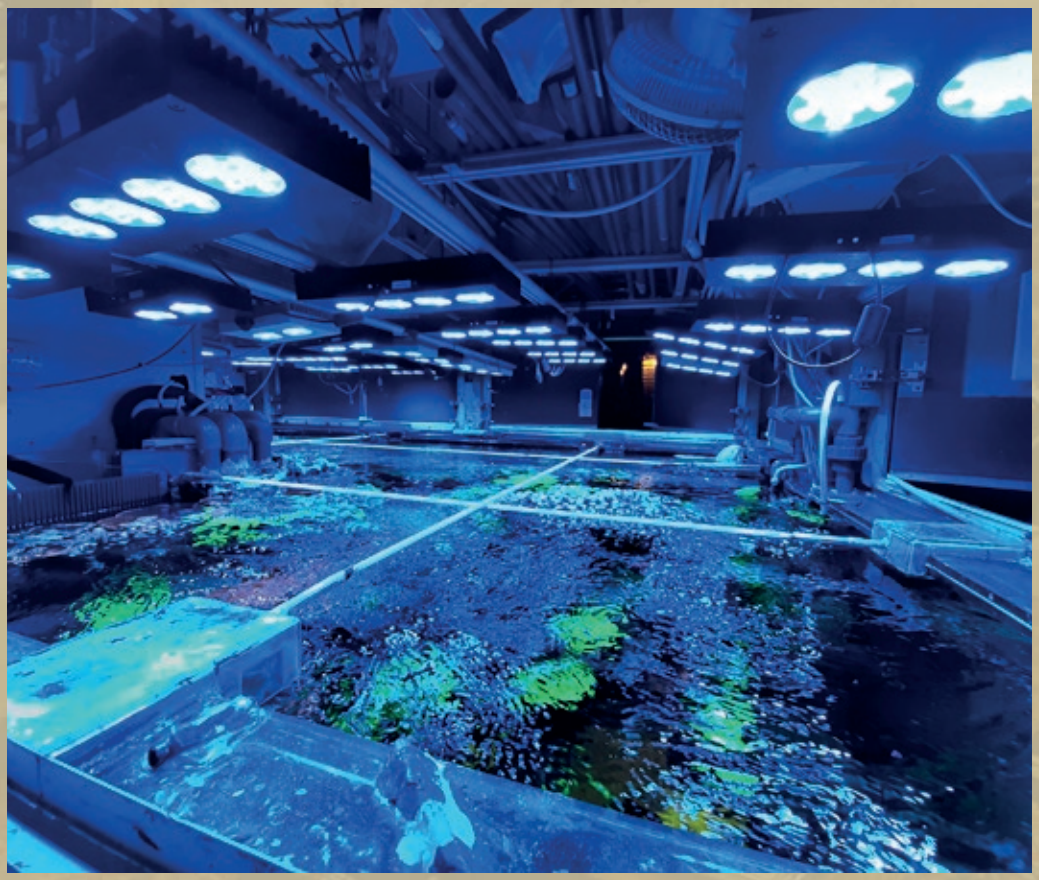
After admiring the tank and discussing its inhabitants for some time, David shows me some of the clever design features that make it all work. Just before that though it's interesting to know that this system is around 15? years old



"Before and After" - David experienced a massive algae bloom after introducing the rock but erradicated it by using Rowpahos (images courtesy of David)

but has, like any tank, gone through various iterations… some by choice and others coming from necessity. David has even had the front panel on a previous incarnation of the tank fail resulting in 2" of standing water on his floor. The tank isn't without ongoing issues either having gone through most of the common pest problems that afflict many of us. On this subject, David is proponent of biological controls for such issues indeed the inclusion of butterflyfish species and Harlequin shrimp is done for a reason. Back in time, David even used an Octopus to rid the tank of numerous mantis shrimp which came in with the 1+ tonne of liverock. The tank came close to disaster on a separate occasion due to a pesky bristleworm boring through the silicone joint between glass panes.

On the technical side, David shows me a number of schematic diagrams that illustrate some of the key design features required for a tank of this size, and the bracing is the first. In light of the large pressures involved with a tank of this depth, as well as being constructed from inch thick double laminated toughened glass, a bespoke system of galvanised cables stretch across the top of the tank. Attached to glass plates that in turn attach to double laminated 12mm glass bracing, this system keeps the walls from bowing while doing away with any ugly glass straps across the top of the tank that could ultimately interfere with light penetration. This system hasn't been without issue though indeed a rogue steel component meant that one of the cables failed recently, necessitating a hasty and somewhat nerve-wracking repair!



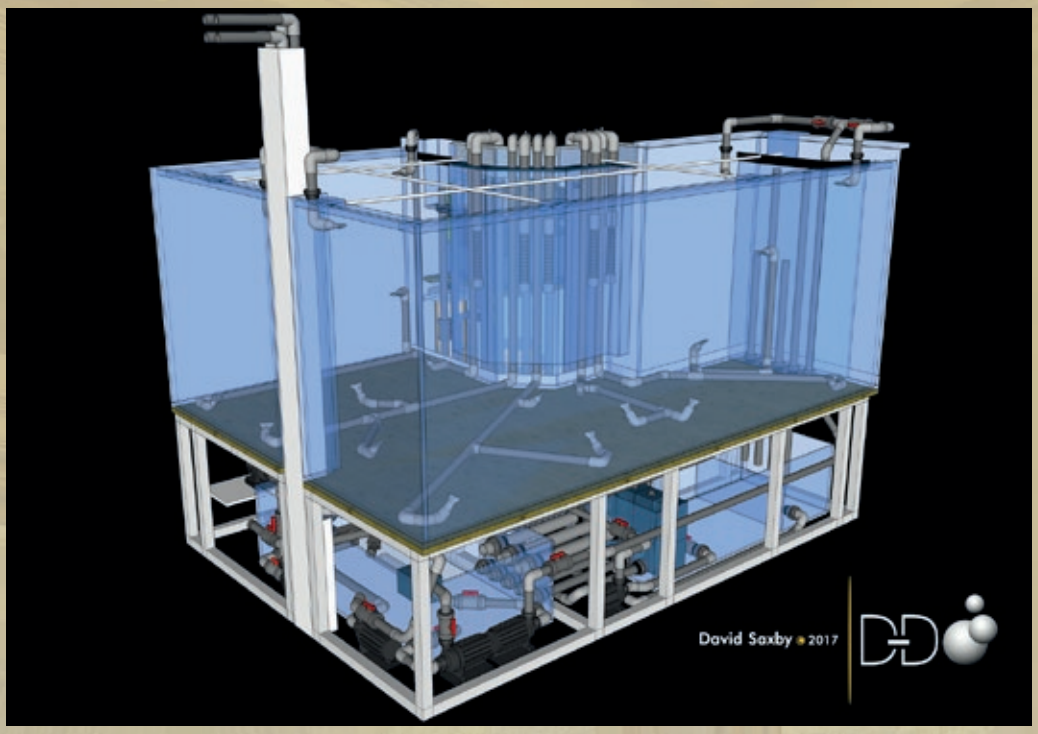
Opening the glass flaps to the top of the tank I can see the unique steel brace bar system and 28 AI Hydra LED lights. The amount of water movement in this size tank is amazing. Corals are growing out of the water, most of them measure "feet" across.

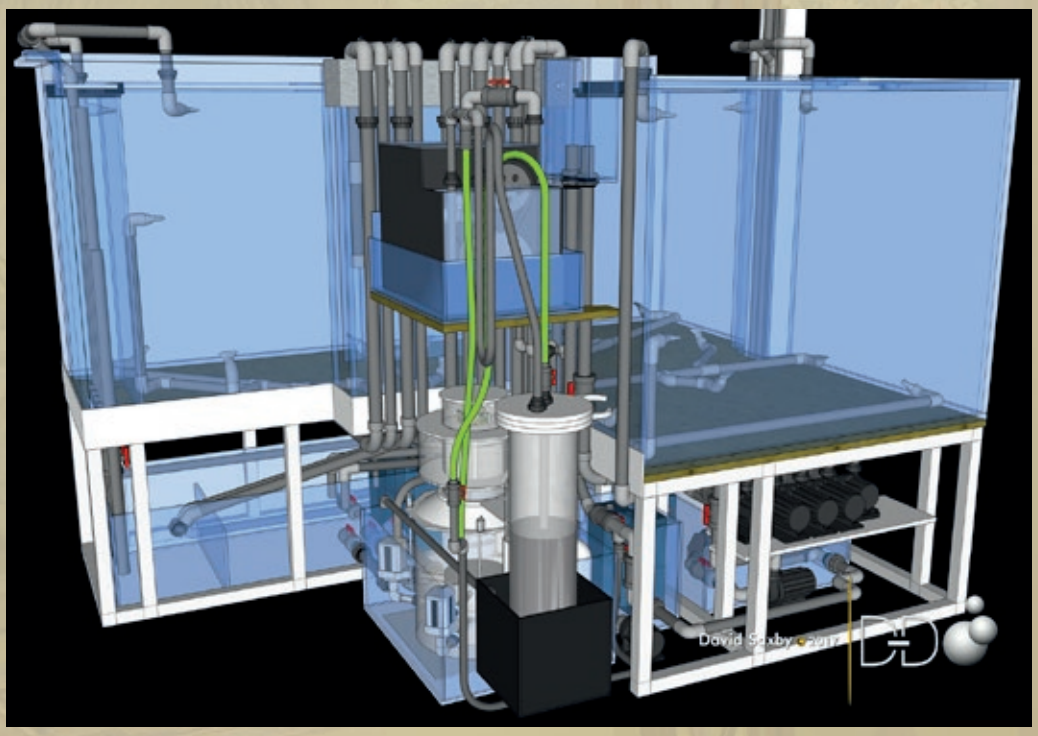
Opening up the pelmet flaps I get a good look at the bracing and this also reveals the lighting system which consists of a staggering 28 AI Hydra LED units of varying type (I believe that the yearly electricity bill for this tank was around £12k per year, and that was mid 2021). From here it's also possible to see the weir which is especially notable for the closed loop system that comes up and over, providing flow while remaining cleverly hidden. As with many of the other systems, this flow system is particularly innovative. With 15 outlets, some under the sand, and some at high level, it is powered by 5 Abyzz

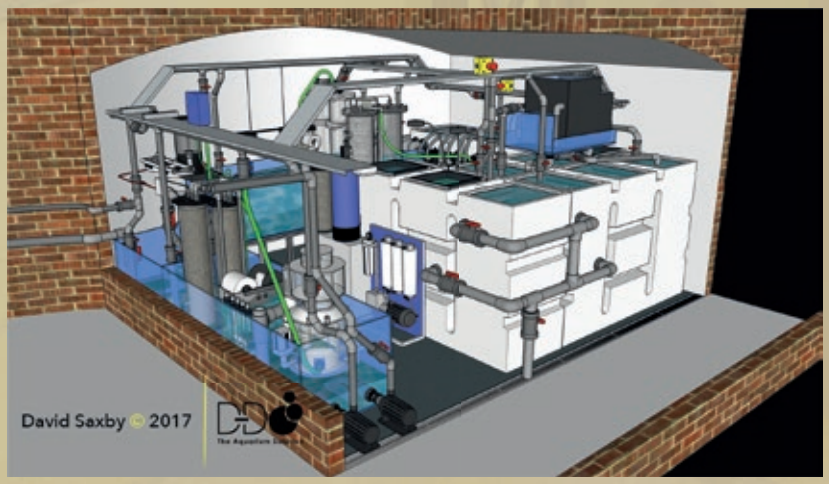
pumps which are dry-mounted underneath the tank for easy access and maintenance. Each of these is on a surging flow pattern and this produces prodigious flow throughout the tank with zero evidence of equipment on show. David pointed out a couple of outlets, but I must admit I just nodded even though I couldn't see them at all.

Another very clever feature comes in the form of a secret door that is part of the wall at the end of the entry corridor I already described. Pulling this section of wall reveals a hidden cavity where the outer rear of the weir is located on the inside corner of the L shape. Here we have a roller mat filter, large Deltec skimmer sited below the tank is a sump section, and a Rowaphos reactor. There's also a tall bank of control interfaces which show the status of the Abyzz pumps powering the loop. This tank has sometimes been referred to as a tank of two halves and it's from the sump under the tank that pipes rise and pass hidden over the internal partition door we'd walked through. These pipes head off on a journey through flexible pipe to the filter room which is located 25m away from the tank in a 19th century vaulted wine cellar (albeit this sits on the same level as David's residence). Exiting the residence, we follow the pipes to see the "guts" of this amazing system.

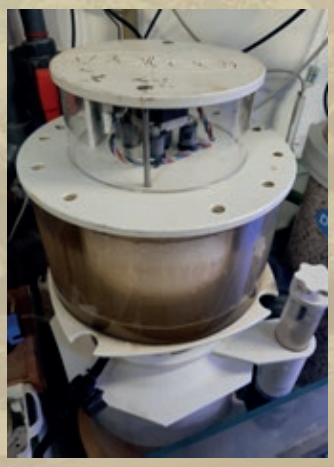
Flow to and from this remote sump room is monitored electronically and, along with tank temperature, flow status is displayed on a small control screen in David's hallway. This is critical as the life support systems in the sump room are extensive. In a nutshell, water enters through a huge roller mat filter (in addition to the one we already saw by the tank) and is then routed around several large vats.

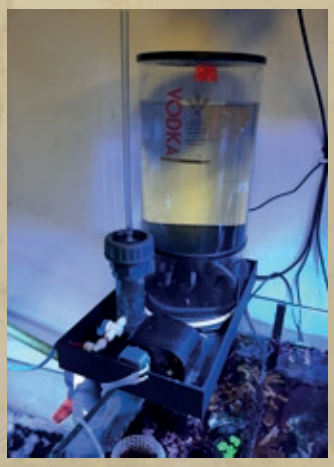


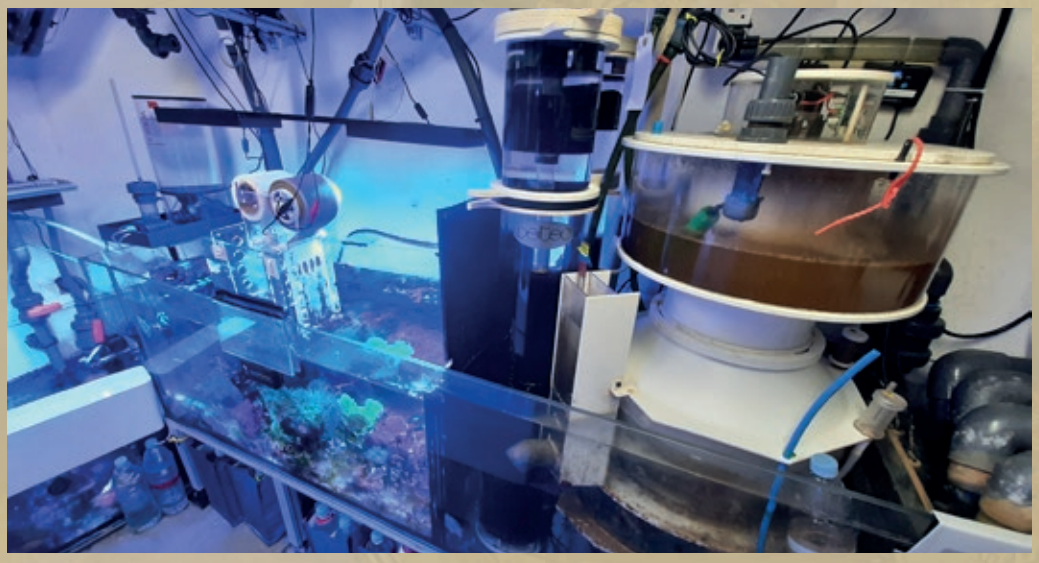




Top: the closed loop system via a view from the lounge side (similar to page 42 image). Middle: the view from the hall (see page 40 image). Equipment is hidden in the secret wall compartment. Bottom: the remote filter room. Note the pipes to and from this room in the top image... rising on the left hand side.







The filter/sump room. Top image shows the main entry way into the left side of the room although sliding doors allow it to be accessed from the front right also. There's all kinds of equipment in here... massive Deltec skimmers, dosing pumps, reactors etc. It's actually sited under the road outside David's residence and was originally a wine cellar. David uses this area to test equipment so it's something of a "mad scientist's laboratory"!

Water then passes around the outside of the cellar in an anti-clockwise direction passing through a myriad of different compartments including frag/isolation tanks for corals from the main tank. These frag tank hold as many corals as the largest collection I've ever kept. The corals are clearly doing very well too, even though the AI lighting that illuminates them is a few feet above the water surface. During its journey, water is treated with a further 2 massive Deltec skimmers, a nitrate reactor (running on Vodka, and producing 1000 litres per day), banks of UV bulbs for water clarity and parasite control, and 4 D-D reactors which fluidise Rowaphos for phosphate removal. Most of these latter items of equipment are sited in a log glass sump that runs the length of the final wall. In terms of mineral replenishment, there's a massive, fully-automated Deltec Twintech calcium reactor and an array of dosing pumps delivering everything from magnesium to strontium. David rarely does water changes nowadays, but when he needs to, he has 3000 litres on hand in a separate area. While he tests manually for certain parameters, weekly ICP tests are also used to keep track. Most notably, KH is maintained at a stable 7.3 to 7.5dKH while David's pH runs at around 8.0. It's a lot to take in and I'll admit that I've had to run over this section quickly. If you are interested, I highly recommend viewing David's Livestream on ReefBum's YouTube channel as this was very detailed and quite recent.

So that's it folks! After around 4 hours which seemed to pass in a matter of minutes, I scrabble to gather my far-flung equipment conscious of not outstaying my welcome and a rapidly approaching parking space deadline. I bid David a fond farewell and I'm soon

negotiating the now darkened streets out of central London. Reflecting as I drive, the one thing that I found perhaps the most surprising and wonderful about this visit was that David, despite keeping marines from the age of 28 (around 45 years ago), is still clearly in love with the hobby and lives it every day. I have to say that I felt equally amazed and alarmed when he started unplugging and dismantling things in the filter room purely as the owners of similar "high end" tanks that I've visited wouldn't even dream of getting their hands dirty. Watching David, it was refreshingly clear that he knew exactly what he was doing though, and the realisation that he has the knowledge and experience to design and run a tank of this complexity and value for so long is humbling to say the least. For someone like me who has never generated a particularly large income, it would be easy to look at David and think "well, if you've got the money, it's not that hard". Well, having seen this system first hand though I don't think this is the case at all. While I came up with the "Capital Reef" title of this article to reflect not just the geographical location of this tank, but also the undeniable monetary aspect, I'd like to close with an alternative idea that I had. That is, David and his amazing tank really are… "A National Treasure".

Above: David tends to some of the electrics. Below: I didn't get chance to take many actinic shots but I hear the tank looks amazing under deep blues. I hope to get to see and share this some day!

David has been an aquarist since the age of 8. His first care was a goldfish which he received as a reward for "good behaviour". Besotted with this aquarium he went on to keep tropicals, including Discus. He single-handedly maintained his current system until he turned 65 which was a few years ago. Since then he has employed staff to help with certain tasks, although he still very "hands-on" and keeps an eagle-eye on proceedings! .

TANK PROFILE

Shape and Dimensions: L shape tank - measures 3 x 2 x 1.5m/10' x 6.6' x 5' and depth is 1.2 m/4', Braced with stainless steel rods

Total Sytem Volume: whole system is around 12'000 litres

Filtration Overview: 3 x Large Deltec Protein Skimmers (one beside the display aquarium and two in the remote sump room), Deltec Fluidised Media Reactors running Rowaphos to control phosphate levels, A large Deltec Nitrate Reactor (sump room), 2 x large Fleece Filter Units (one beside the main aquarium, one in the remote sump room), Large array of U.V Sterilisers (Sump Room)

Lighting: Aquaillumination Hydra 52 HD x 19, Aquaillumination Hydra 26 HD x 9

Flow: Multiple Abyzz A400 and A200 pumps supplying a bespoke internal (up and over) closed loop system, pumps are set to create random flow dynamics within the aquarium

Supplementation: Calcium and Alkalinity are maintained by the use of a large Deltec Twin-Tech Calcium Reactor. Aquarium Alkalinity 7-8dkh , Calcium 440- 450 pm

Nutrient Control: Nitrate is kept at a level of around 2ppm by the Deltec Nitrate Reactor whilst Phosphate levels are controlled by Rowaphos at a level of 0.018 mg/l

Left: a control screen and indicator lights in the hallway show critical temperature and flow information. Right: This one of David's frag/isolation tanks in the sump room. The corals are doing very well even though the AI Hydra is a few feet above the water surface.

Livestock Gallery - there's nowhere near enough space here to show all the images I took at David's! For all the images, head over to **ultramarinemagazine.co.uk** where i've created a special gallery so you can view them all :)