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IT WAS A PEACEFUL DIVE . A FEW BUTTERFLYFISH, A COUPLE OF STUNNING ARABIAN ANGELFISH WITH BLUE/CYAN BODIES SMEARED WITH A SHOCK OF YELLOW, A SMILING MORAY AND EVEN A BRIEF WAVE FROM A POUTING GROUPER. SUDDENLY THE HORDES ARRIVED. DOZENS – NO, HUNDREDS OF PERSIAN PARROTFISH – A SINUOUS WALL OF BROWN BODIES THAT BEHAVED LIKE A CONGA LINE OF BOISTEROUS PENSIONERS.

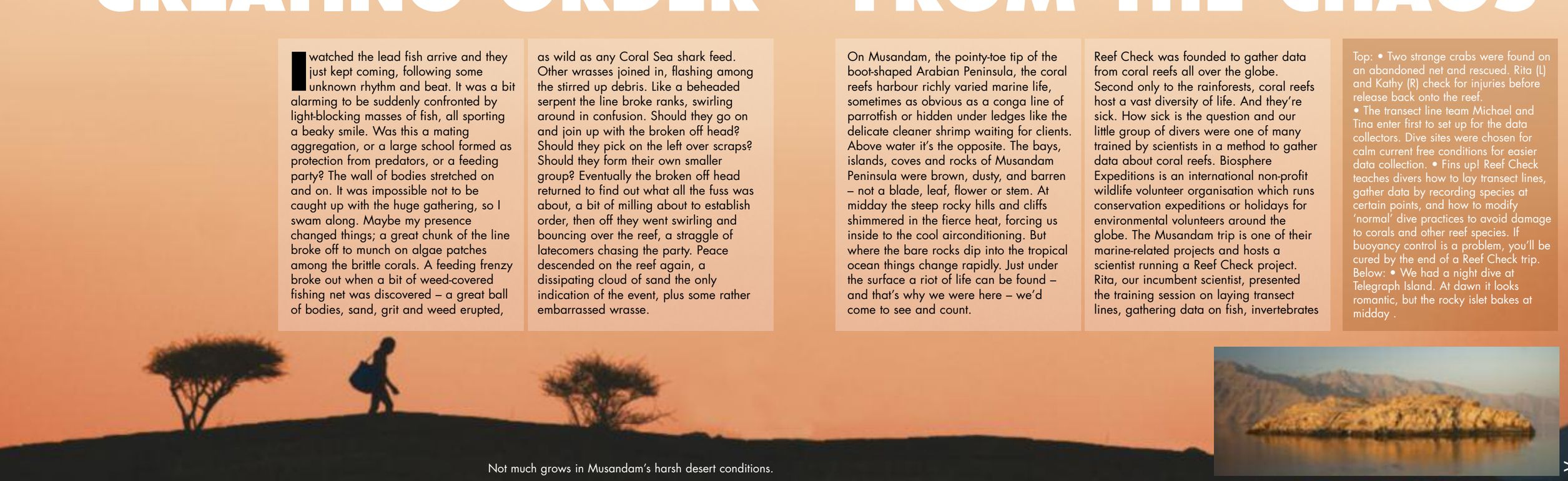
CREATING ORDER FROM THE CHAOS

I watched the lead fish arrive and they just kept coming, following some unknown rhythm and beat. It was a bit alarming to be suddenly confronted by light-blocking masses of fish, all sporting a beaky smile. Was this a mating aggregation, or a large school formed as protection from predators, or a feeding party? The wall of bodies stretched on and on. It was impossible not to be caught up with the huge gathering, so I swam along. Maybe my presence changed things; a great chunk of the line broke off to munch on algae patches among the brittle corals. A feeding frenzy broke out when a bit of weed-covered fishing net was discovered – a great ball of bodies, sand, grit and weed erupted, as wild as any Coral Sea shark feed. Other wrasses joined in, flashing among the stirred up debris. Like a beheaded serpent the line broke ranks, swirling around in confusion. Should they go on and join up with the broken off head? Should they pick on the left over scraps? Should they form their own smaller group? Eventually the broken off head returned to find out what all the fuss was about, a bit of milling about to establish order, then off they went swirling and bouncing over the reef, a straggle of latecomers chasing the party. Peace descended on the reef again, a dissipating cloud of sand the only indication of the event, plus some rather embarrassed wrasse.

On Musandam, the pointy-toe tip of the boot-shaped Arabian Peninsula, the coral reefs harbour richly varied marine life, sometimes as obvious as a conga line of parrotfish or hidden under ledges like the delicate cleaner shrimp waiting for clients. Above water it's the opposite. The bays, islands, coves and rocks of Musandam Peninsula were brown, dusty, and barren – not a blade, leaf, flower or stem. At midday the steep rocky hills and cliffs shimmered in the fierce heat, forcing us inside to the cool airconditioning. But where the bare rocks dip into the tropical ocean things change rapidly. Just under the surface a riot of life can be found – and that's why we were here – we'd come to see and count.

Reef Check was founded to gather data from coral reefs all over the globe. Second only to the rainforests, coral reefs host a vast diversity of life. And they're sick. How sick is the question and our little group of divers were one of many trained by scientists in a method to gather data about coral reefs. Biosphere Expeditions is an international non-profit wildlife volunteer organisation which runs conservation expeditions or holidays for environmental volunteers around the globe. The Musandam trip is one of their marine-related projects and hosts a scientist running a Reef Check project. Rita, our incumbent scientist, presented the training session on laying transect lines, gathering data on fish, invertebrates

Top: • Two strange crabs were found on an abandoned net and rescued. Rita (L) and Kathy (R) check for injuries before release back onto the reef. • The transect line team Michael and Tina enter first to set up for the data collectors. Dive sites were chosen for calm current free conditions for easier data collection. • Fins up! Reef Check teaches divers how to lay transect lines, gather data by recording species at certain points, and how to modify 'normal' dive practices to avoid damage to corals and other reef species. If buoyancy control is a problem, you'll be cured by the end of a Reef Check trip. Below: • We had a night dive at Telegraph Island. At dawn it looks romantic, but the rocky islet bakes at midday .



Not much grows in Musandam's harsh desert conditions.

and corals, or lack thereof. Plus the fun task of teaching what fish, invertebrates and corals can be counted and those that should not. A few practice dives were made laying out the tape reel and swimming each of the four marked 20m zones with buoyancy control being a vital skill for success.

Then the serious diving began. The water was blood warm; 28-29cdegrees C down to 20m, my deepest dive, and probably as warm further down also. Patches on the surface can exceed 30 degrees which makes snorkelling pleasant. Since the purpose of this week long trip was to gather data about the coral reefs, all the dives were in the shallows at only 3-12m. The 'counters' need to swim very slowly and deliberately to survey accurately, so shallow low current areas had been chosen. These same dive sites had already been surveyed three years in a row – this was the fourth year of data collection. If you're doing it right, each of the four 20m sections takes 6-8 minutes to traverse. For some, it was the first time they've taken the time to slow down and actually look at what's in, on, and under the reef. In general the corals were dense, rich and in good condition, mostly acropora and porites species, though many others as well. One pair of divers counted fish, another invertebrates, another coral, focusing on the condition and health at very precise intervals along the transect line.

To the uninitiated like myself, it seemed rather strange to say that at this particular point there is no coral as there happens to be a tiny patch of sand between dense coral heads, or that the coral is bleached when a small part of an otherwise healthy plate coral has a white dead patch under the tape. But living habitats are not absolutes, no straight lines or definite yes/no answers – they are a flowing, shifting, changing mass that needs a method to bring a form of order to the chaos.

When all the data is collected, the means and averages calculated, the numbers crunched, graphs drawn then all overlaid from the same process over a number of years, a picture begins to form. Secrets begin to seep through the dots and figures. Inclinations, trends and patterns emerge. The sharp edges of human mistakes, biases and inaccuracies blend and merge and soften under the burden of repeated surveys. Regardless of personal preferences and perceptions, divers use a methodology to produce sets of numbers which are merged and coalesced with the main database. Then more numbers are merged with others to form a brief snapshot of one reef on one piece of shoreline, in one gulf, part of one ocean which in turn is part of one planet.

• The blackspotted moray *Gymnothorax favagineus* or honeycomb moray is one of a number of species found in Oman waters. Like most moray species, they are quite curious if approached quietly.

• A tragic example showing why these rich reefs need protection. A ghost net in shallow water has been killing for weeks or months. In the process, algae has grown on the mesh and gregarious parrotfish have sauntered up for a free meal, only to be caught and slowly killed. A cruel way to die. Crabs coming in to feed on the carcasses are also caught and starve to death.

• A real heart stopper. A marbled torpedo ray *Torpedo sinuspersici* is the fish equivalent to the taser gun. Put your hand or knee down in the wrong spot and you'll be given a 'gentle' reminder to be more observant!

But it's not all hard slog and number taking. Besides the obvious contribution to the marine environment, divers can also enjoy the reefs on 'fun dives' with no data collection, exploring the coral labyrinth and realising that the newly-learned skills of looking and seeing have added a new dimension to their diving.

Many of us slept under the stars on the upper deck of our comfortable dhow as the night air fell to a pleasant 27 degrees and there were no mosquitos. We started every morning with strong Arabic coffee as we watched the sun rise and bathe the surrounding hills with apricot hues. After breakfast the rear deck became a flurry of muted excitement as divers signed the 'in the water' sheet pasted on the back wall, and began to kit up. Buddy pairs were sorted, jobs assigned and data slates clipped onto buoyancy vests. The first pair strode off the back of the boat to lay the transect line; next came the fish counters, then the invertebrate counters, and lastly the coral counters. My job was to record it the project but couldn't do their job properly if I hovered all the time. At times I drifted off to the reef slopes.

Deeper down it ended at a sand slope which extended past diving depths. I like the sand next to the reef as it conceals critters that specialise in camouflage. On a couple of dives the sand seemed to be alive with Moses sole. These flat shoe-shaped fish start life like any small juvenile, but as they develop one eye migrates across to join the other and the body flattens out into the distinctive pancake shape of soles and their cousins the flounders and halibut. Moses sole are known for the toxic milky substance they can excrete to repel predators such as sharks and moray eels. Their pretty speckling and pale colour help them blend so perfectly into the seabed that if I glance away I can only find them again by shuffling my hand through the sand.

An onboard fish ID book said a torpedo ray, able to produce a missive electric current to shock and stun prey or predators, could be found resting on sand under coral ledges during the day. I spent the first few days swimming around looking under ledges. On the third day I spotted a sandy mound and thought, "Oh, that's an electric ray." I swam on then did a double take. "Hang on, that WAS an electric ray!" With a little gentle fanning of the sand, the beautiful mottled pattern of a marbled torpedo ray emerged. Thinking it's sand covering and shocking defence system was keeping it safe, we spent a bit of time together before it suddenly realised its naked state and slowly flustered off into deeper water.

With air running low, I moved into shallow water near a massive porites coral mound. I'd seen squid on a few dives but they'd been elusive. Now a small school refused to back off. Something was drawing them to the coral – they'd inch in to insert their tentacles into the cracks and ledges. They didn't

• A bullethead parrotfish *Scarus sordidus* has backed into a ledge for the night. Their colour pattern changes and an hour or two after falling asleep, their skin sheds enough mucous to form a bubble around their body, possibly masking their scent from predators.

• The spectacular redtooth triggerfish *Odonus niger* has very distinctive cyan and blue livery and projecting red choppers. Common tropical reef dwellers in the Indo Pacific, they seemed to be more approachable in Musandam for some reason.

• The very pretty grey moray *Gymnothorax griseus* was common on the reefs we surveyed. A small species with a beautiful milky complexion, decorated with lines of small spots.

• Fluttering above a section of reef, the speckled pattern of the Moses sole no longer provides perfect camouflage. The sinuous swimming motion is used on a longish journey, otherwise just a quick flick and flash suffices.

• Bigfin reef squid *Sepioteuthis lessoniana* can be very flighty or completely indifferent, their mood dictated by their commitment to get a job done. When I kept still they'd surround me.

seem to be laying their leathery batches of white eggs so maybe some tasty morsel lured them.

Highly intelligent, short-lived and prey for predators ranging from small reef sharks to massive sperm whales, squid play an important part in the ocean's food chain. My squid school busily danced up to the coral and back, using their delicate, translucent wings to move back and forth. If I got too close they'd flush with colour or turn white, then return to normal if I held still, their oversized eyes telling me I was interfering with their activity. With air almost gone I had to leave them fluttering into the coral and out in a ritual only they understood.

Even the warmest tropical water can sap heat from your body so we tended to gravitate to the food and coffee on the front deck with its thick Persian carpet scattered with large cushions, Omani style. The heat helped us warm up as we chatted about the dive, jibed each other about buoyancy skills and accuracy of the count. In the main cabin Rita keyed data from the divers' slates into her database then the slates were cleaned off and hung up ready for the next dive.

Late in the afternoon we'd return to our anchorage offshore from a small village dominated by the minarets of two mosques. Situated at the back of a sheltered deep U-shaped bay and surrounded by steep cliffs, it must have been a furnace by day, particularly in summer. In the late 1800's a contingent of workers made base in Musandam while laying a telegraphic cable 'around the bend' of the peninsula. The heat, barren terrain and isolation gave rise to our colloquial "I'm going 'round the bend".

But we had an airconditioned dhow, cool drinks, fresh water showers and a comfy lounge. At dusk we could watch the burnt cliffs turn pink then apricot then blue as the sun departed, allowing the land to groan with relief. As night returned to the ocean and the phosphorescence shimmered off the stern, we relaxed around a bubbling *shisha* pipe, bonded by the Biosphere Expeditions Reef Check learning experience.

• This yellowmargin moray *Gymnothorax flavimarginatus* seemed rather goofy, popping it's head out with a huge puppet smile. Do moray eels have a sense of humour?

• A typical section of Musandam reef, with acropora corals jostling for space. Surveys checked coral species present, but also all the critters hiding in and around the reeftop.

• If just one Persian parrotfish *Scarus persicus* finds a morsel, the news spreads like wildfire through the massive school, producing a feeding frenzy worthy of a Hollywood movie.

• A thornback trunkfish *Tetrosomus gibbosus* is the clown on Musandam's reefs, it's triangular shaped body very evident from the front. This one seemed to like my presence. Or maybe it was just using me to keep other fish at bay while it snuffled through the sand looking for worms, crabs and shrimps.

Biosphere Expeditions run a broad range of 'conservacations' such as reefs- sharks-dolphins-turtles of the Pulau Tioman Marine Park, Malaysia, whales-dolphins-turtles around the Azores archipelago, coral reefs of Cayos Cochinos, Honduras and whale sharks on the coral reefs of the Maldives.

If you want a 'dry' experience you can study Snow Leopards in the Altai Republic, Central Asia, leopard-elephant-cheetah in Namibia, Africa, Arabian oryx, Gordon's wildcat and other species of the Dubai Desert Conservation Reserve, United Arab Emirates, jaguar-puma-ocelot-primates and other species in the Peru Amazon jungle, lynx-wolf-wildcat in the mountains of Slovakia or even marsupials in Western Australia.

All are non profit trips run by a small personable organisation committed to conserving and learning about each subject. The founder and Executive Director of Biosphere Expeditions, Dr. Matthias Hammer, is on many of the trips, taking a personal interest in the participants and results of each study group.

The primary purpose of each trip is to gather data on the subject(s), which includes training participants in data collection. What is collected is then used by scientists who specialise in the subject species.

You'll find more about the organisation, their work, ethics, philosophy and projects on **www.biosphere-expeditions.org**