



**OCEAN OASIS:** Tristan da Cunha is the most remote inhabited island in the world [main photograph, opposite]; crayfish exports form the largest part of the island's income [1]; Tristan is beset by storms [2]; local octopus [3]; seven gilled shark, known locally as a rock sharks [4]; starfish [5]; endemic anemones [6]; cloud cover over the island [7]; giant kelp [8]; diver amid kelp [9]



# ATLANTIC INVADERS

The world's most isolated island community, Tristan da Cunha recently hit the headlines when a respiratory illness hit its human population. However, its unique undersea environment is facing a threat that is just as insidious, as *DIVE's* marine biologist Sue Scott reports

I WAS in my usual pose – on the sea bed, nose in the fascinating seaweeds – when something large bumped my tank. I assumed my buddy, Paul, was having buoyancy problems, but then spotted him away in front of me, camera pointed in my direction. I looked slowly around – straight into the gummy grin of a 2m rock shark, resting with its tail across my legs. Having never encountered one of these before, I had no idea how it would behave, but I was acutely conscious that Paul had forked out for a shark zapper (range 4m, he was 10m away), and I hadn't. I froze.

The shark soon got bored and swam off, but came back several times for another close look. Rock sharks, the local name for broad-nosed, seven-gilled sharks *Notorhynchus cepedianus* (called cow sharks in South Africa), look curiously primitive, with broad, gummy mouths but no visible teeth. They eat mainly carrion, and hang around penguin rookeries like the one we were diving off, waiting for casualties. It probably thought I was one. But we didn't know that at the time. After the shark had gone, I finned over to Paul, signalled 'Whew!' and stayed close to him (or more correctly, his shark zapper) for the rest of the dive.

Our nerves were undoubtedly heightened by where we were diving, far out of range of conventional sources of diving help. Tristan

da Cunha is a small volcanic island in the middle of the South Atlantic, just on the South African side of the mid-Atlantic ridge, about mid-way between South Africa and South America. Tristan is the most remote inhabited island in the world, with around 275 people but only seven surnames – a mix of British, American, Dutch and Italian descent, with some African and a few other nationalities thrown in. The two satellite islands of Inaccessible and Nightingale are about 30km away, and the island of Gough, 350km to the southeast, is part of the same British Overseas Territory.

Tristan is a classic cone-shaped volcano, about 12km across, with the peak 2,060m above sea level. The seas around Tristan are around 3,000m deep. Still geologically active, the island is producing small secondary lava flows and cones every 300 years or so. Tristan came into the consciousness of Brits in 1961, when an

eruption very close to the only settlement on the island resulted in the islanders being evacuated for safety. The exiled Tristanians soon decided that living in Britain was definitely not preferable to living on Tristan, and the majority opted to return home two years later, as soon as it was deemed safe.

You need plenty of time to dive Tristan. Just getting there is a five or six-day sea crossing from Cape Town (depending on the weather; 13 days is the unenviable record – sometimes it is not possible to land at all), and it's not exactly a regular ferry. Fishing and research ships do the round trip around eight times a year, and passenger numbers are limited, with Tristanians taking priority. You can either travel for 12 days to be there for between seven and 14 days, or stay the month or two until the next ship, with no absolute guarantee that you will be able to get on or off the island (more chance from the research ship, when passengers disembark by helicopter). And ships have been delayed by as much as three weeks, so an open-ended plane ticket is essential!

Once on Tristan, all manner of things conspire to delay or prevent diving. It's a very windy place and, although being an island, there is always a lee side, getting out of the tiny and shallow harbour where waves break right over the wall is often impossible. There is no safe mooring, and the small Tristan boats are all craned out of



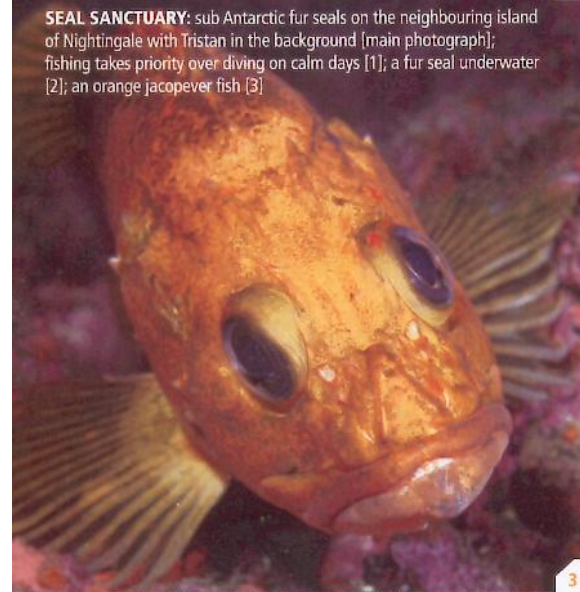


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**SEAL SANCTUARY:** sub Antarctic fur seals on the neighbouring island of Nightingale with Tristan in the background [main photograph]; fishing takes priority over diving on calm days [1]; a fur seal underwater [2]; an orange jacobever fish [3]



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the water at the end of the day. On calm days most of the boats are in use because the islanders need to go fishing, plans for the day being made at about 6am each morning – never in advance because of the unpredictable weather. Over two trips, a total of 24 days' sailing there and back and 86 days on Tristan, we managed 21 dives!

Was it worth it? Of course! Very few divers have ever visited Tristan, and diving virgin territory is always exciting. For a biologist, the marine life is fascinating, with many animals and seaweeds unique to these extremely isolated islands. Tristan is a one-off – there are no other remote islands with similar water temperatures in the Southern Atlantic; the nearest island of Gough, 350km to the south, is considerably colder and the marine life is different. The water temperature around Tristan varies between 13°C in winter and 20°C in summer – a touch warmer than the UK. The visibility is usually good, and the water usually a deep oceanic blue, although it can be murky after storms.

We soon discovered that the underwater

lava was either (above 12m) covered with fascinating seaweeds, or (below 12m) pink and urchin-grazed. To my disappointment, we could rarely reach the fascinating seaweeds because of constant swell above 12m. The most interesting places to head for were deep vertical walls and overhangs, which the urchins find harder to graze. These were covered with bubblegum-pink and blue spiky sponges and orange jewel anemones, although never in St Kilda-like carpets. There were scattered trumpet anemones, soft corals and purple starfish, with the occasional orange jacobever (a bony local fish rather like our father lasher) posing in a crevice entrance. Most striking of all were the crayfish – dozens of them, like overgrown locusts, clinging to the rock faces and tucked into crevices.

The abundance of crayfish around Tristan is extraordinary. A baited trap left on the sea bed can have as many as 30 crayfish in it a couple of hours later. Crayfish exports provide the major part of the Tristanian income, and the fishery is carefully controlled, by minimum size, quota and

protected breeding season. Baby crayfish hide among the seaweeds in shallow water, where they are less likely to be eaten by the hordes of fish or the huge octopus.

The satellite islands of Nightingale and Inaccessible are largely undived. We managed two dives on Nightingale, the first a sheer wall from the surface to boulders at between 30 and 40m, very dramatic scenery but heavily grazed by urchins. Our second dive was in kelp at less than 10m, but much more fun as we were joined by athletic sub-Antarctic fur seals, snaking around us and through the kelp then dashing off to play in the surf. In March there were many black pups around, just at the inquisitive stage, honing their swimming skills in the big rock pools which were one minute calm, the next a seal jacuzzi as another big ocean swell rolled in.

Once, in a rock pool on Runaway Beach, we found a hard hat, which had drifted for months across the vast Southern Ocean from some distant land, carrying a fuzz of tiny seaweeds which we hadn't seen on

**DUMPING GROUND:** this oil production platform became grounded on on Tristan's southeast coast (main photograph); alien species found on the rig included urchins, crabs and barnacles [1]; a shoal of porgy (sea bream) was also found amid the wreckage [2]; surveying invertebrate marine life on the wreck [3]



Tristan. Perhaps we were witnessing an alien introduction. This is always a worry on islands as remote as Tristan, where animals and plants have evolved in extreme isolation for thousands of years, resulting in a unique assemblage of species, in balance with each other and their environment. Of course, such chance arrivals have always occurred naturally; indeed, this is the way that much of the shallow-water life of Tristan has arrived. However, man-made debris has increased dramatically in the last century or so, and the coast is littered with plastic bottles and fishing buoys, often encrusted with marine life. These arrivals from foreign lands may be benign, fitting in with the local life, but some of this marine life can cause chaos, out-competing native animals and plants for space and food. The prospect of invasive marine life is particularly important for the Tristanians, with crayfish their main source of income.

The latest bit of human debris to arrive on Tristan was rather more dramatic, and much more worrying. In March 2006, an oil production platform, on tow from Brazil

to Singapore, broke loose in an Atlantic storm. After several weeks drifting, 100 square metres of floating metal managed to become grounded on the southeast coast of Tristan, a bit of a shock for the islanders – used to shipwrecks, but not on this scale! Initial talk of salvaging the useful bits was soon tempered by worries about what alien life the wreckage might be carrying. Above water, there were few signs of pests such as rodents and insects, and those few found were dead.

Below the water line was a different story. We found the rig legs and cross-members covered with marine life, all alien to Tristan. Coming from the tropical waters of Brazil to a chilly Tristan winter, most of the dense covering of corals had perished, but hiding in the coral skeletons was a host of tiny crabs, worms, urchins and starfish, while barnacles, oysters, mussels and other bivalves, whelks, seasquirts, anemones and seaweeds also grew on the legs, all still alive. There were even two species of fish that had come across with the rig – a small blenny that lives in dead barnacle shells,

and a shoal of porgy (American silver bream) that had swum all the way across the South Atlantic with the rig, a distance of some 2,100 miles. In all, we reckoned there were more animal species on the rig than we had seen on all our dives on Tristan. Some of these, like the mussels and barnacles, are known invasives and potentially a serious threat to the Tristan marine life and crayfish fishery.

The rig was subsequently towed off Tristan and sunk in deep water, where none of the shallow-water life left on it would survive. However, after being grounded for eight months, in rising sea temperatures, it's highly likely that some of the aliens have jumped ship. Hopefully most won't survive the rigours of life on Tristan, but already a porgy has been caught 12 miles from where the rig grounded, by a schoolboy fishing. A monitoring programme is being set up for early detection of aliens, so that efforts can be made to eradicate potentially troublesome species before they establish. Watch this space. ■