



'Leyland to focus capex on alternative fuel tech'

Aim to boost portfolio across all categories, says Ashok Leyland's Hinduja

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NEW DELHI

Ashok Leyland, a Hinduja Group flagship company, will channel its capital expenditure towards developing various alternative fuel technologies for commercial vehicles over the next 18 months, even as it works on lowering development costs with partners, executive chairman Dheeraj Hinduja said.

The company, known for its trucks and buses, has earmarked a capex of ₹600-700 crore for this financial year, and a significant part of it will be directed towards creating products with alternative fuel systems, such as hydrogen fuel cell buses, hydrogen-powered internal combustion engine (ICE) trucks, electric intermediate-trucks, as well as vehicles running on compressed natural gas (CNG) and liquefied natural gas (LNG).

Leyland's net-zero emissions subsidiary Switch Mobility has rolled out a range of electric light commercial vehicles (the IeV range) for last-mile transportation. Separately, Leyland is also investing in developing a sub-two-tonne commercial vehicle category.

"Our capex requirement for this year is in the range of ₹600-700 crore, and a lot of it is going to this alternative fuel development. Our major capex programme happened a few years ago when we developed Avatar Modular range, and Bada Dost. Now, we are looking at the sub-two-tonne truck but in this financial year and the next 18 months or so, the focus is on alternative fuel types. We have jointly developed a product with NTPC—a hydrogen fuel cell bus. We have developed a hydrogen ICE truck with Reliance Industries," Hinduja said.

"In many respects, we are looking at partnerships where customers require a product and we develop the product with them as well. This not only improves our overall



Dheeraj Hinduja, executive chairman, Ashok Leyland.

development cost, but we get the customer to use the product immediately. I do see this number (capex) growing over the next few years as we go forward," Hinduja added.

"Our competitiveness depends on these alternative fuel vehicles. We don't want to put a (capex) number for it right now, as it might appear that we're spending so much on development, whereas the requirements

GREENER HORIZON

ASHOK Leyland has jointly developed a product with NTPC—a hydrogen fuel cell bus

THE firm is looking to build a "complete" portfolio of light commercial vehicles to fill gaps

IT also sees a chance to be a significant global player with export volumes rising steadily

should be a lot higher. One key aspect that we always see to is how we can develop in the most cost-effective manner, and that's where the innovation and agility that Ashok Leyland is known for come into play. That's why a number in terms of investment might not be reflective of our true effort."

In its 75th year of operations, Ashok Ley-

land is also looking to build a "complete" portfolio of light commercial vehicles to fill gaps where it is not currently competing, he said. The company also sees opportunities to be a significant global player with export volumes rising steadily, Hinduja added.

"Our ultimate goal is to ensure we have a product for all segments of this market. So, right from a sub-two-tonne truck to the

55-tonne segment, wherever there are pockets we have thus far not been able to fill, that is our first requirement. Beyond that, we are very actively working toward making sure our LCV range becomes a complete portfolio."

"Although (LCV) volumes might be declining, they're still very high.

We've got close to 35% of the market. Being a commercial vehicle manufacturer, wanting to have products available in all categories, we need to be focused on large volume of vehicles. I would say the secret is that India will always be a very cost-competitive market, and our approach aligns with it," Hinduja said.

DOUG LENAT AND THE SEARCH FOR AI



A MATTER
OF NUMBERS
DILIP D'SOUZA

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Many contribution to the Cyc project—an artificial intelligence (AI) project for comprehensive ontology—was vanishingly small, and some 32 years on, I have no idea if it persists. It was a piece of code in the Lisp programming language. It was set in motion when you clicked on an object on screen and moved it around using your mouse. In short, it made it easier to visualize that motion.

I had written code like that before, so I knew how to write it here. Now I had to show it to the Cyc guys. I walked across the atrium to the office of the man whose brainchild Cyc was, Douglas Lenat. He and a colleague, Ramanathan Guha, came back to my office wearing looks of serious scepticism. I barely knew them, I wasn't part of the Cyc team, so I could almost hear the question buzzing in their minds: "What's this dude going to show us about our own effort that we don't already know?"

But they were charmed by my little utility. To their credit, they looked at me with newfound respect, thanked me and said they would incorporate it into Cyc. For the next several months, until I quit the company we all worked at, MCC, I'd get a cheery "Hi" from them every time we crossed paths.

It's been three decades, and I have lost touch with Lisp, MCC, Cyc, Guha and Lenat. Still, I felt a distinct pang on hearing that Douglas Lenat died on 31 August, at nearly 73.

AI is all the rage these days, of course, astonishing people, raising worries, showing up everywhere. For just one example: as I write these words, I'm occasionally checking highlights from the ongoing US Open tennis tournament. To my surprise, these clips are embellished with commentary that's clearly AI-generated. I'll say this: it's only about adequate. There are giveaways that the speaker and the words aren't actually human. First, the slightly wooden voice. Second, the slightly awkward turns of phrase—like "at the crucial moment, Sinner drops the match point", or "Sinner loses the first set after Zverev's electrifying ace". No tennis observer speaks like this.

This strain of AI (usually called "generative") builds on so-called Large Language Models: vast databases of text and rules about how text and speech are constructed. As the tennis commentary and many other examples show, these LLMs do a pretty good job of mimicking humans, of showing us what looks very much like intelligence. Until they don't—for which the tennis commentary, again, is itself an example. The reason we sometimes find our brows furrowing while reading or listening to something produced by ChatGPT is that while it can look reasonably convincing and persuasive, it often is not quite right.

Here's another example. I had this exchange with ChatGPT just now:

Me: "My bedroom has three people in it. I walk in to say hello. How many of us are there?"

ChatGPT: "If your bedroom initially had three people in it, and then you walk in to say hello, there would still be three peo-

ple in the room. You walking into the room does not change the number of people who were already there."

As you see: it's a perfectly constructed answer that is also totally wrong—one that you would never get from a human. So what happened? As Lenat and Gary Marcus explained in a recent paper ("Getting from Generative AI to Trustworthy AI: What LLMs might learn from Cyc", <https://arxiv.org/pdf/2308.04445.pdf>, 31 July 2023), ChatGPT's failure here is in deduction. "A trustworthy AI," they write, "should be able to perform the same types of deductions as people do, as deeply as people generally reason."

And in fact, it's not just deduction. Lenat and Marcus list 16 different "desiderata" that they believe "a general AI which is trustworthy" must have. Deduction is one; explanation, pro and con arguments, and analogy are three more. As you can tell, Lenat and Marcus set great store by that word "trustworthy". For ChatGPT to be truly intelligent in a human sense, you have to be able to trust its responses just as you would a human's.

As Lenat and Marcus write: "humans possess knowledge and reasoning capabilities (unlike) today's generative AI."

These ideas about AI emerged from the nearly four decades that Lenat and his team have worked on Cyc—that name excerpted from the word "encyclopaedia". Cyc builds intelligence on top of a vast store of information, too, but it is profoundly different from LLMs in the way it approaches AI. It seeks to "explicitly articulate the tens of millions of pieces of common sense and general models of the world that people

Human intelligence is far deeper, more profound, than the AI we see today

have (and) represent those in a form that computers can reason over mechanically (and) quickly."

In short, human intelligence is far deeper, broader, more profound, than the AI we see today.

Still, this is not the place to tell you more about that, nor about Cyc's innards. Lenat and his colleagues started building Cyc in the late

1980s at the Microelectronics and Computer Technology Corp. (MCC) in Austin. I worked at MCC in those years, in another AI programme. There were both tenuous links and a relatively friendly rivalry between the programmes. I say "relatively" because Lenat also attracted his share of critics and doubters. Look up the term "microLenat" sometime, enough said.

Yet the truth is that he was an AI pioneer in his own right. Something about the way he approached and built Cyc was, to him, more "right" than the ChatGPTs of today. It may seem that way to you too. After all, do you go about your life by calling on and analysing vast amounts of data? Or because you apply common sense to the world around you? Think about it.

In 1994, Lenat started a company, Cycorp, to continue building Cyc. It was never a commercial success. But as Marcus remarks in a tribute, it is still operational all these years on, and there are hardly any other AI firms that can say the same. In their paper, Lenat and Marcus suggest that future work in AI will need to "hybridize" the LLM and Cyc approaches.

So Cyc lives on. That's Doug Lenat's legacy. And someday, perhaps I'll find out if my own tiny contribution lives on too.

Once a computer scientist, Dilip D'Souza now lives in Mumbai and writes for his dimmers. His Twitter handle is @DeathEnds-Fun.

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NIT No. 71/Proc./MPJN/2023-24 Bhopal, Dated : 05.09.2023

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NIT No.	Tender Name	PAC (Rs. Cr.)	EMD (Rs. Lakh)	Cost of Tender Document (Rs.)	Duration (months)
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PROJECT DIRECTOR

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(A)

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SATURDAY, SEPTEMBER 9 2023

THE MAN WITH THE ACCENT

Restaurateur Rohit Khattar talks to Lounge about his iconic restaurant Indian Accent, his love for collecting all things old, and how he prefers to create something new rather than replicate concepts

SEE PAGE 12



MODI, BIDEN VOW STRONGER LINKS | PAGE 16

AT HOME IN THE REEF

THE GREAT BARRIER REEF IS ONE OF THE GREATEST NATURAL WONDERS OF THE WORLD. LOUNGE TAKES A TRIP TO NORTHERN QUEENSLAND TO EXPLORE ITS MAGIC



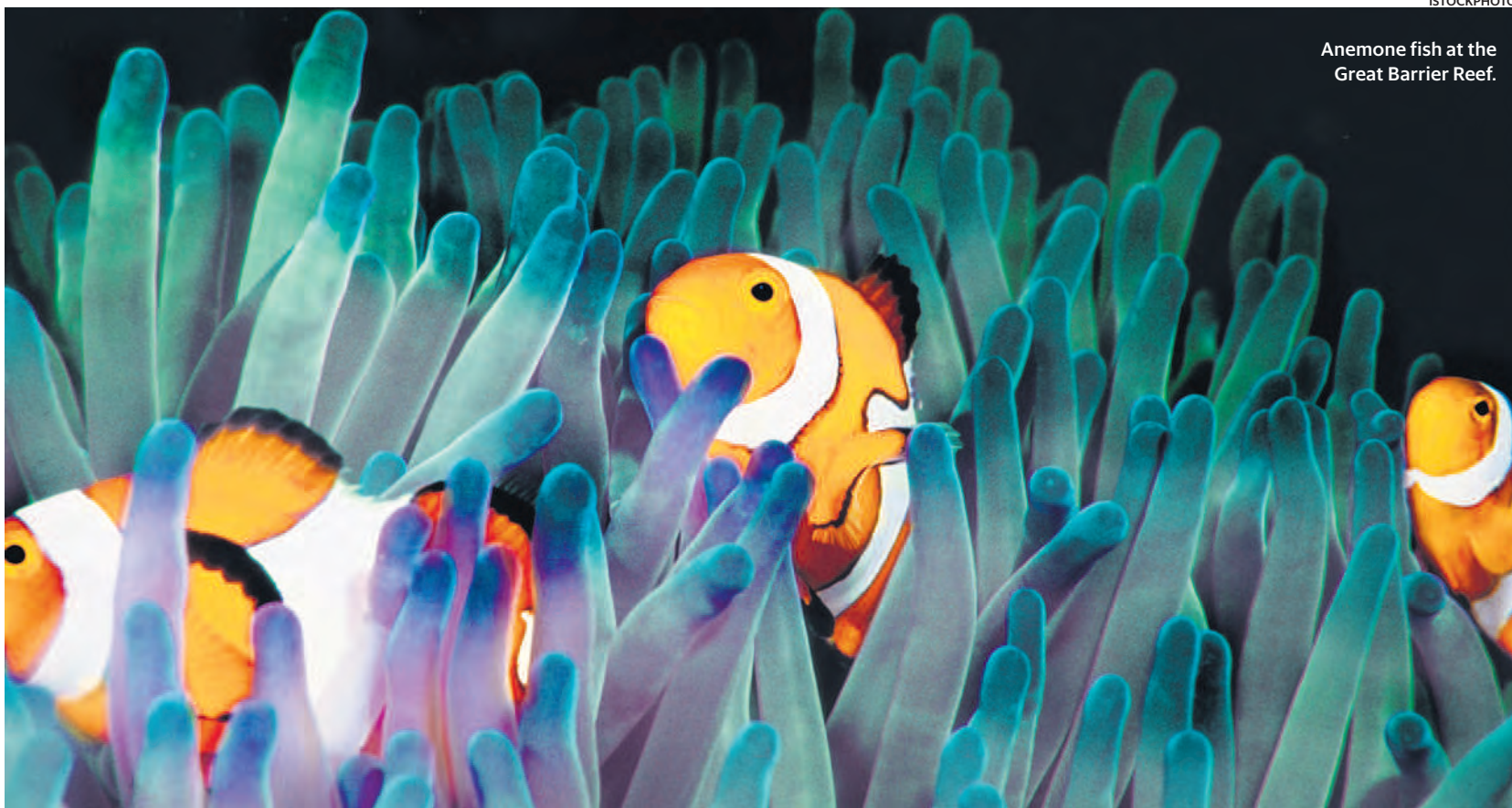
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ISTOCKPHOTO
Anemone fish at the Great Barrier Reef.

At home in the reef

The Great Barrier Reef is one of the greatest natural wonders of the world. Lounge takes a trip to northern Queensland to explore its magic

Bibek Bhattacharya
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When I wake up on a crisp morning in late April, the rising sun over the Coral Sea is a giant fireball. The remains of a storm system that had been sweeping along the northern Queensland coast are huddled as dark clouds over the jutting headlands of the Great Peaks National Park. As I look out at the scene from my balcony of the Crystalbrook Riley in downtown Cairns, the Great Barrier Reef hovers like a promise somewhere beyond the straight line of the far eastern horizon, where the golden waters give way to slate grey. Today is the day I go to see the corals.

But this wouldn't be the first time I would be seeing the GBR, as the Australians like to call it. I had flown over it the previous day, in a chartered helicopter out of the town of Port Douglas, further north, where the ancient Daintree Rainforest meets the Coral Sea. My group of fellow travel writers from around the world had hopped on to a pretty fancy Airbus H130 helicopter to cruise over the Batt Reef. It was one of those pinch yourself moments. Am I really flying over the Great Barrier Reef?

The large sandy reef squatted like a green and turquoise jewel amidst the light blue of the shallow waters of the lagoon and the azure of the deep ocean beyond the continental shelf further east. As the helicopter took long, arching passes over the reef, a manta ray suddenly appeared, swimming in the shallows, going about its business. On the mainland, to the west, loomed the mountains of the Great Dividing Range and the Daintree Rainforest and the fringing mangroves of the coast. Here we were, suspended under one of the great planetary ecosystems, an ancient interconnected habitat ranging from the forest to the reef. I could scarcely believe it.

CASTING ANCHOR

In these days of easy global travel and the ubiquity of heavily edited #travelgram images on social media, it's easy to become blasé about new experiences. The wide open spaces of Queensland's "Wet Tropics" were a welcome reminder that the world is a lot richer and magical than the claustrophobic portrait mode of a phone would have you believe. I was in the land Down Under as a guest of Tourism Australia, to attend the Australian Tourism Exchange (ATE), the famed annual mega tourism jamboree that the country organises. Along with my group of journalists (from Malaysia, South Africa, England and Germany), I got to experience coastal Queensland's natural wonder before the ATE event in Gold Coast.

By the time we got to Cairns for our GBR adventure, we had already spent a few days in Daintree, luxuriating in a five-star lodge in the forest, going walkabout with members of the Kuku Yalanji people, floating down a forest river and checking out the culinary delights of the nearby Atherton Tablelands. Oh, and that fantastic helicopter ride.

The Great Barrier Reef was the designated jewel in the crown of the trip though. On Reef Day, thanks to the meteorological gods, the persistent stormy weather had abated, the sun was out and the conditions were perfect. Our host for the day was Passions of Paradise, a Cairns-based GBR tour operator, running a large and fast diving catamaran service to the reefs near Cairns.

At 7am, the Cairns marina was humming with activity as locals and tourists bought their tickets for the several boats heading out to the reefs for the day. We were met by



Exploring the Great Barrier Reef from the Passions of Paradise catamaran.

Passions of Paradise's resident Master Reef Guide Russell Hosp, given our anti-seasickness pills, plenty of water, and loaded into the two-tiered 30m-long catamaran *Passions III*. Soon, we were jetting off from the marina, Cairns shrinking into the background, a perfect mini rainbow framing the catamaran's spray.

We were to sail for a couple of hours to reach Hastings, the first of our two reefs for the day. The 348,000 sq. km extent of the GBR is actually made up of a string of about 2,500 individual barrier reefs of varying sizes, apart from over 900 islands. The one we were headed to was part of a large cluster that made up the lower end of the northern GBR, in many ways quite distinct from the reef system further south.

Chatting with Hosp was a fantastic way to get to learn about the reefs, the major corals and animals, and, most importantly, the Great Barrier Reef's sophisticated citizen science initiative. Hosp is actually American, from Denver, Colorado, but he has been living and working in the Cairns area for over a decade. He's the environmental manager with Passions of Paradise and a member of the first batch (from 2019) of the Master Reef Guide initiative, created by the Australian government's Great Barrier Reef Marine Park Authority (GBRMPA). He's also an essential cog in the wheel of the Australian Institute of Marine Science's (AIMS) "Eye on the Reef" programme. It is very expensive to have scientists monitoring the GBR at all times, so some of the data collection on the health of the reef is outsourced to tourists and fishers through this initiative. Another cool way to experience the reef is through the Be a Marine Biologist for a Day programme.

"What we do with the Be a Marine Biologist for a Day programme, with the clients and guests, is that we teach them how to perform a rapid monitoring survey. Rapid monitoring is just the snapshot," Hosp explains to us.

Then he whips out a laminated form attached to a waterproof grease pencil. The form is to be filled up during a 10-minute swim survey, with tourists first noting down and then tallying some of the indicator species of reef wildlife, as well as specific types of corals. You could spend hours in the water but unless you are heading out into a new area, 10 minutes is all you get to tally, in order to rule out multiple counts of, say, the same fish. "If you are swimming out for two hours, you may see 2,000 fish, or you may see the same fish 2,000 times," he says wryly.

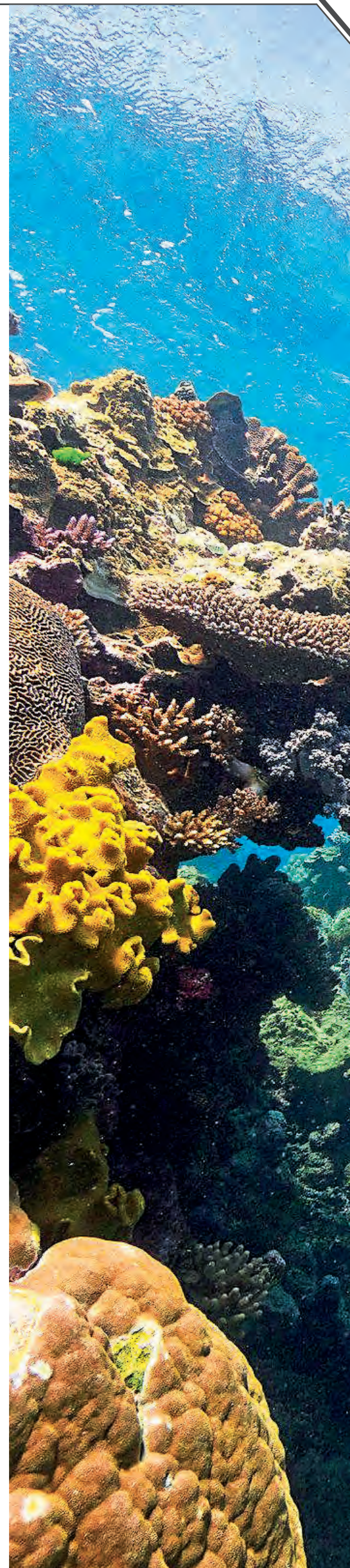
INTO THE DEEP

The rest of the ride is pleasantly dozy, with tourists sunbathing on the upper deck, and those with diving licences doing a quickfire rundown with the boat's dive instructors. As we head into reef country, the boat becomes a hum of activity, for it's time to slip into the wetsuits and clean out the snorkelling kits. The boat slows down as it weaves past patches of reef, which you can make out from their distinctive colouring. Imagine underwater islands that don't quite make it above the sea level and you will get a sense of how the reefs look from above.

I get kitted out, grab a pair of prescription goggles and stick close to Hosp, since this is my first attempt at open-water snorkelling. The crew goes through the drill. We will be in water for 30-40 minutes; then, lookouts on the boat will whistle, at which point we are to return to the catamaran.

Finally, *Passions III* comes to a halt near Hastings Reef, which is pretty huge. For a while, I just sit and watch while the divers splash over backwards into the sea. It's surreal to see, this far out to sea, distant breakers crash over the reef in the far distance where it meets the deep ocean, as if we are on a submerged beach. In a sense, we are.

The divers having dived, now it's time for the snorkel-



HOW TO GO ABOUT IT

HOW TO DO IT: Sign up for Passions of Paradise's full day Great Barrier Reef Tour, 8am-5pm; A\$240 (around ₹12,720) per person, inclusive of lunch. For a more mindful experience, try the Be a Marine Biologist for a Day programme with a reef master guide; A\$390 per person; passions.com.au

WHERE TO STAY: You have a pick of places to stay in Cairns, from budget to luxury. One great option is the Crystalbrook Riley on the Cairns Esplanade; from A\$450 per night for two; crystalbrookcollection.com/riley

WHAT TO SEE & DO: The main attraction is a trip to the Great Barrier Reef. But there's much else to do in Cairns as well.

You could take a helicopter tour over the GBR and the Daintree Rainforest; from A\$399 per person (minimum two passengers); nautilusaviation.com.au

Cairns is an excellent city for restaurant and bar hopping. One sure-fire recommendation is the CC's Bar & Grill at the Cairns Steakhouse. The grills and wine pairing is a highlight.

For an in-depth understanding of the Great Barrier Reef, visit the Cairns Aquarium; from A\$52 per person; cairnsaquarium.com.au

Finally, for your shopping fix, definitely check out the Cairns Night Markets, open from 4.30pm daily.

Snorkelling among
the corals of the
Great Barrier Reef.

ISTOCKPHOTO

The Great Barrier Reef is home to six species of sea turtles.

lers. I slip into my fins and gingerly lower myself into the cold sea. Never a swimmer, I fight a few moments of sheer panic. A swell hits me smack in the face, followed by another, and I am in fight or flight mode. For reassurance in an alien world, I gaze at my good old Seiko dive watch, strapped over my wetsuit-ed wrist. Its familiar sight calms me a little, until the next swell hits.

Then I remember what someone on the boat told me—it's easier if you just dunk your face under water. I do that, and there's an immediate sense of tranquillity. The waves don't hit me any more, rather, they just sway me gently as they pass. Hosp is nearby in his bright yellow Master Reef Guide vest and a bandana. There's a tangle of underwater arms and legs as other snorkellers pass and bubbles from the oxygen tanks of the divers float up. The scrub clears as people branch out, and then, my goodness, there's the reef, below me, beside me, all around me!

The sun is high in the sky at this point, so there's no

dearth of light. Reef towers rise out of the dark depths of the ocean like towers, fringed with corals shimmering in the refracted light. The colours are vivid in this giant underwater cathedral of ancient coral. Shoals of tiny, bright fish flit by, as do some other, equally colourful fish that I don't know the name of. Far below, deeper among the corals, a small white tipped reef shark slithers by; parrot fish nibble on algae patches on the corals.

This is, to me, an environment that could well be on a different planet, and my brain and body take time to settle, alternating between wonder and sudden waves of panic. When the latter hits, I jerk my head out of the water, only to be hit by a wave or two. So down I go again.

I try to make a mental tally of all the creatures I am seeing because in my ungainly attempts at snorkelling, I have long abandoned the marine biologist form. Poor Hosp is gamely carrying it.

After a little while, I start to actually enjoy the feeling of



PHOTOGRAPHS COURTESY TOURISM AND EVENTS QUEENSLAND

Creating coral gardens as part of the Coral Nurture Program.

EXPLORING TROPICAL NORTH QUEENSLAND

The 'wet tropics' of northern coastal Queensland are a biodiversity hot spot



THE KUKU YALANJI EXPERIENCE

The brainchild of Juan Walker, a Kuku Yalanji man, Walkabout Cultural Adventures is immersive travel at its best, and a great way to get to know the truly ancient ways of the Kuku Yalanji, one of the main Aboriginal people of the Daintree area. The main areas of interest around the ancient Daintree Rainforest are the Mossman river that flows through it and the Mossman gorge that it creates. Walker and his team will take you through parts of the forest, pointing out various medicinal plants (and stones!), tell you Kuku Yalanji stories of creation myths, local animals and plants, as well as an oral history of his people.

Because the Kuku Yalanji experience of this habitat includes the Coral Sea and the fringing mangroves, the tours also take in important coastal sites around Mossman, including Cape Tribulation, Cooya Beach and Newell Beach. From how to eat fire ants, to the various uses of a mangrove, to learning to throw a spear, going walkabout with Walkabout Cultural Adventures is an absolute pleasure. You can book full day (A\$1,470, or around ₹77,910, for six people) or half day (A\$1,140 for six people) tours. Walkaboutadventures.com.au.



FLOATING DOWN THE RIVER

A really fun way to experience the Daintree and Mossman is to hook up with Back Country Bliss Adventures. This group of funsters, who call this the best job in the world, will take you snorkelling and floating down the Mossman River, through the dense rainforest. Whether wading through the undergrowth as the guides tell you stories about the trees and their functions, or floating down the many rapids of the lower Mossman, it's an experience like no other. The feeling of floating on your back as the rainforest canopy drifts by overhead is just magical. Apart from this, you can also go for day-long forest walks with them. From A\$139 per adult for the two-hour river drift snorkelling package. Backcountrybliss.com.au.



THE LUXURY RAINFOREST EXPERIENCE

If you would like to make your stay in the Daintree area truly memorable, check out the Silky Oaks Lodge, a luxury eco lodge tucked away in the rainforest. One of Australia's oldest and most famous resorts, Silky Oaks Lodge is an architectural feat, seamlessly slotting into the surrounding forest. With 40 luxurious tree houses spread around the property, it makes for a tranquil retreat. You can have your pick of spa treatments, enjoy delicious gourmet meals, check out the forest walking trails or go swim in the local billabong. Or you could just while away the time on a hammock or soak in a bathtub and listen to the sounds of the rainforest. The resort offers several packages, including the Signature Silky package that includes a four-night stay, an A\$250 lodge credit and other standard inclusions. From A\$1,170 per night. Silkyoakslodge.com.au.



weightlessness and paddle further in, often losing all sense of direction as vistas of swaying coral drift by below me, along with the occasional diver. Whenever I need to reorient, I look around for Hosp's bright vest. Far behind me, I see the ghostly outline of the catamaran's dive platform. Evidently, I am not as far in as I think I am.

And then the lookouts blow their whistles to return to the boat. Has it been half an hour already? And here I was just getting started, feeling comfortable in this wondrous underwater garden!

MAKING A SPLASH

Once everyone is aboard, the catamaran sets off, headed south-east for the next dive site, Flynn Reef, which lies closer to the edge of the continental shelf. Wetsuits come off and are tied along the boat's railings. Fins are deposited, snorkelling goggles are retained, and everyone stretches out for a snooze, or huddles together to compare notes, or makes a beeline for the boat's photographer for underwater photographs.

I go out and sit in the prow of the boat, enjoying the rolling swells now that I have got my sea legs. The pill we took earlier in the morning is working just fine. People who have decided not to venture into the water during the next stop (and also some that ultimately do) are already breaking out the beers. The ship's PA system plays a great selection of rock and pop hits. I bob along to Weezer's *Island In The Sun* and have a, yes, beer as we sail past a series of reefs. The sun is high, the air is warm and breezy and all is good.

About an hour and some later, we stop at Flynn, a much smaller reef located on the Outer Reef. Flynn may be smaller than Hastings, but, as I find out when I am back in the water, it seems even more biodiverse. Now that I am better acclimatised, Flynn proves to be a better experience. I have been brushing up on my coral knowledge on the boat and this time I can recognise a pretty, brown stag-horn coral when I see it branching off a pinnacle, or a beautiful organ pipe coral.

But Flynn has further surprises up its sleeve. Between swaying anemones, I spot a school of the elusive, gorgeous clown fish, flitting in and out, their distinctive red and white colouring shining in the sub-aquatic light. A little while later, amidst some boulder corals, I see the endangered Maori wrasse, with its distinctive head-hump. A little while later, another find: a giant clam! Mossy green in the light and with the distinctive wavy lips, I recall that Hosp had described it as an indicator species of the GBR. To find one is to know that the local water quality is good.

It's quite amazing just how "threatened", "vulnerable" and "endangered" most of the reef ecosystem is. But this isn't surprising, given the havoc that climate change is wreaking on coral reefs worldwide. The GBR itself has been subject to repeated and widespread coral bleaching events over the past few years due to marine heatwaves. But the GBR is holding its own, for now. According to the *AIMS Annual Survey Report On Coral Reef Condition* for 2021-22, published in August last year, the northern and central portions of the GBR showed a record increase in hard coral cover. The corals in the southern portion, though, are decreasing.

As I gaze on the tall spires and pinnacles of the reef, I am reminded of the GBR's history. It's hard to imagine that all this area, some 60km out to sea from Cairns, was actually land about 10,000 or so years ago. At the end of the last Ice Age, as glaciers melted and global water levels rose, the sea moved in, and reefs began to form. Australia is a geologically ancient landmass, driven by plate tectonics and volcanism. Yet, there was a time in human memory, as recorded by many oral stories of the Aboriginal Peoples, when the GBR didn't exist, sometime at the beginning of the Holocene era.

As the whistle to return blows, I paddle back after a fond look and a kiss blown at the reef. I think of a story told by the Gimuy Walubara Yidinji people, one of the four traditional Aboriginal groups of tropical coastal Queensland, that I had read on the *ABC News* website. According to the story, a renowned hunter went spear fishing in the ocean with his two wives. He broke a taboo, laid down by the creator god Bhiral, against attacking a black stingray. Incensed, Bhiral cast hot rocks and lava down from the sky. This made the sea levels rise and the cooling lava led to the formation of reefs. Thus was the Great Barrier Reef created.