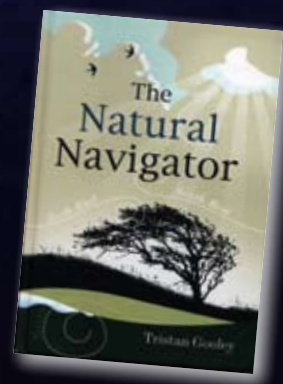
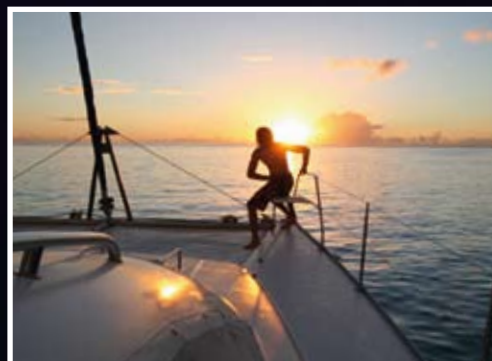


Nature's sat-nav

Who needs GPS with nature's own signposts in the sky and sea? Tristan Gooley, a detective of direction-finding, tells Paul Gelder about the lost art of natural navigation



Migratory routes of birds, like these geese, have been used by navigators



The sun is the most fundamental tool for the natural navigator on the ocean



The colour of the sea offers clues for navigators – especially in coral seas



The way stars twinkle helped ancient navigators forecast rain



For the sensuous sailor, the smell of land or sound of waves can aid a safe landfall

When it comes to 'natural navigation' the simplest set of sailing directions ever issued must be the advice for crossing the Atlantic to the Caribbean: 'Sail south until the butter melts and then turn right.'

Some people have a natural gift – a 'sense of direction' – and can instinctively find their way with an accuracy that totally defeats others. Others are so dependent on technology and electronics that they've totally lost their natural connection with nature.

'We live in a world of screens, checklists and never-ending acronyms,' says Tristan Gooley, author of a new book, *The Natural Navigator*. With the death of American adventurer Steve Fossett, Tristan is now the only living person to have both piloted a plane solo and sailed singlehanded across the Atlantic Ocean. 'Over the years,' he says, 'I've become familiar with GPS, AIS, VHF, UHF, SSB...the list runs on. It's a world I needed to understand, but not one I wanted to live in.'

When he took off in a single-engine aircraft from Goose Bay, Newfoundland, in May 2007, he had two compasses, three GPS units and about half a dozen other radio navigation aids. 'But it was the white glow above a vast dark blue to the north-east that made sense of the direction for me. This is what I remember vividly, not the dials and screens.'

It's his sense of connection – 'the contact with the world around me' – that excited Tristan and led him to research the subject of instrument-free navigation.

'Everyone who has gone a few weeks or months without wearing a watch will have noticed that their "inner clock" starts to run more accurately,' he says. →

DO YOU HAVE A MAGNETIC PERSONALITY?



Is GPS blinding our natural instincts?

In 1979, Dr Robin Baker, a member of Manchester University's zoology faculty, conducted an experiment with blindfolded student volunteers driven to unknown destinations. Some had magnets attached to their heads, others didn't. At their destination, the blindfolds were removed and they were asked to orientate themselves. Those who had been wrapped in magnets fared significantly worse than those who hadn't been. The results convinced Baker of a human magnetic sense of direction which had been thrown off by the presence of the magnets.



'I'll never forget the sweet, fragrant and lightly spiced smell of St Lucia in the Caribbean after my first Atlantic crossing,' recalled Tristan Gooley

Our five senses make natural navigation entirely possible, he argues. At sea, the feel of the wind on your face and sight of changing clouds, plus the movement of sun and stars, are vital clues. Ancient Polynesian navigators looked at the way stars twinkle to help them forecast rain and wind.

Intuition and 'sixth sense'

Feeling the rhythm of the sea can also be used to shape a course. There's the story of a skipper who awoke suddenly in the middle of the night, in the middle of the Pacific and rushed on deck, ordering his crew to heave-to. Next morning a reef was spotted less than a mile away. The changing wave pattern had awakened this lucky skipper's intuitive, natural senses.

Then there is a sailor's sixth sense. How many times have you, as skipper or crew, woken in your bunk from a deep, exhausted sleep, sensing a change of motion of the boat, perhaps because the helmsman has gone off course, or the crew have changed tack?

The smell of land, carried out to sea on an offshore wind, has forewarned sailors of a dangerous landfall long before the advent of GPS waypoint alarms. 'I'll never forget the sweet, fragrant and lightly spiced smell of St Lucia in the Caribbean after my first Atlantic crossing,' recalls Tristan. Sailors over the ages have savoured the scent of rosemary off Spain, peat off the Falkland Islands and orange groves off the islands of Cape Verde.

Natural navigation is a skill not just for survival, when our lives are in danger. Tristan believes it's a way to enrich a sea voyage, without feeling the need to throw all the electronics overboard.

These days, he says, it's easy to pass your RYA Yachtmaster exam without any real understanding of natural navigation skills. 'It doesn't mean modern skippers are less capable or more at risk, but many will undertake voyages across much duller and more two-dimensional seas than our ancestors.'

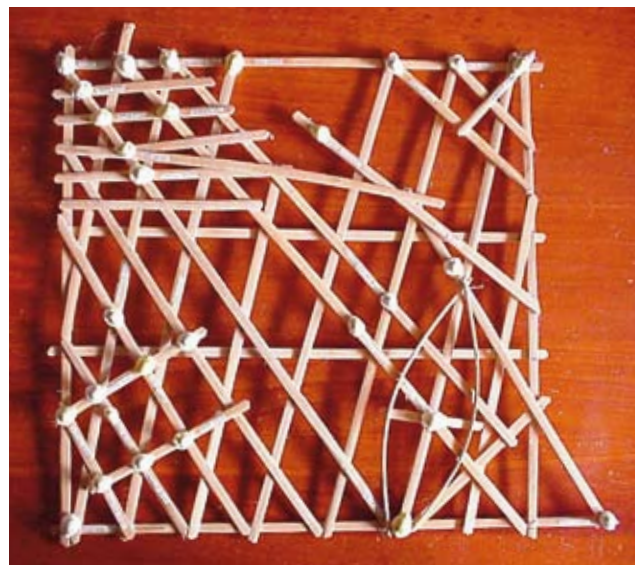
Pacific voyagers

Long before the days of compass or chronometer, the Polynesians were master navigators over huge expanses of ocean, explains Tristan in his new book. Less than one per cent of the Pacific is land, with thousands of islands and atolls scattered across the ocean. Early navigators created 'stick charts' using curved twigs to represent wave patterns around atolls, with shells or coral pebbles indicating islands.

Navigators would also memorise a 'star path' – a sequence of stars for each course sailed between islands. Some navigators could remember hundreds of 'star paths'. Not surprisingly, Captain James Cook was profoundly impressed by the Pacific islanders' skills and their best navigators enjoyed a status in the social hierarchy not far below that of a priest.

Signs in the sky

'There is nothing about the movement of the sun that cannot be understood by



Stick charts, made from palm trees and coconut fibre, showed wave patterns around islands, with shells indicating islands

putting a stick in the ground and watching its shadow,' says Tristan. Wherever you are in the world, the shortest shadow from a stick will always form a perfect north-south line at midday.

Clouds can also help navigators find their way and spot low-lying islands beyond the horizon. Since the sun heats the land more quickly than water, warm air rises, causing moist air to condense and form a cloud.

The flights of birds is another of nature's signposts. 'Most coastal birds like to set out in the morning and return to land at night, so it's fair to assume that a flock of such birds heading in a uniform direction at dusk are likely indicating the direction of land,' says Tristan.



Legend has it that a blind Polynesian navigator smelled his way between islands and gauged latitudes by using his hand to feel sea temperature

The route used by the Maori fleet that sailed from Tahiti to New Zealand in the 14th century is the same as that taken by the long-tailed cuckoo each September. Irish monks in the sixth century made regular journeys between Ireland and Iceland, following the migratory routes of Brent Geese. 'It's highly likely these flight paths acted as navigational pointers,' Tristan says.

Read the sea

Apart from signs in the sky, natural navigators 'read' the surface of the sea for clues. All sailors look for the ripples that reveal wind direction, and cat's-paws, indicating a breath of wind in a calm.

'A gale blowing offshore can create smaller waves than a much lighter wind

that has blown across hundreds of miles,' says Tristan. 'Like the motion of a whip, a wave travels all the way down the whip carrying a lot of energy. It can travel more than 800 nautical miles.'

Waves travel in the same direction as the wind but swell, which continues across or even against the wind, is a more dependable sign for natural navigators. Identifying the difference between waves and swells can be difficult.

'Lying on deck is a common method for detecting the rhythm in which the boat is moving on the swell,' says Tristan. 'Balance comes into play, too, but learning to tap into the physical sensation goes further and deeper than that. An experienced Pacific island sailor, Captain Ward, reported that a man's testicles were

the best apparatus for assessing swell. For others, a change in motion might be detected when seasickness arrives after many hours without a problem. 'This is because our inner ears are more sensitive to certain motions than others,' Tristan explains.

The colour of the sea, though partly influenced by the reflection of the colours of the sky, also offers lots of clues. For sailors navigating in areas of coral reefs, the lighter the colour, the shallower the water. Light blue to off-white sea usually represents a sandy bottom and dark patches could indicate a reef. In the Pacific, the Caribbean and even parts of the Mediterranean, some of these shoal areas may not be indicated on a chart.

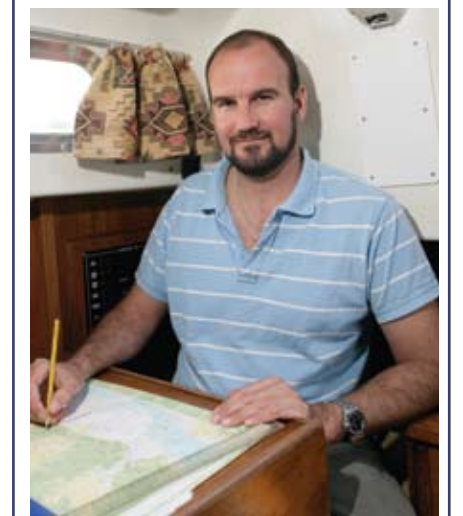
For landlubbers, Tristan has a whole new set of nature's 'signposts' – from the direction in which satellite dishes point to which side moss grows on trees and the migrating routes of city commuters.

GPS is not the enemy, stresses Tristan, but technology is blindfolding our natural instincts. In our 21st century virtual world of computers, robots and avatars, natural navigation is a way of plugging ourselves back into our natural humanity. W

↓ BIOGRAPHY

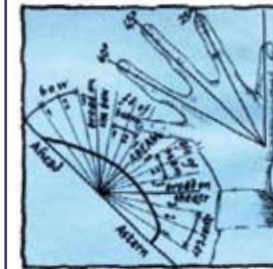
Tristan Gooley

Tristan has led expeditions in five continents, climbed mountains in Europe, Africa and Asia, sailed small boats across oceans and piloted small aircraft to Africa and the Arctic. He was awarded the Royal Institute of Navigation's Certificate of Achievement by the Duke of Edinburgh for becoming the only living person to have both flown solo and sailed singlehanded across the Atlantic. The former manager of the adventure tour company, Trailfinders, Tristan (36) is a lifelong sailor and a fellow of the Royal Institute of Navigation. He now teaches the lost art of natural navigation, on land and sea. His next courses take place at the Royal Geographical Society on 27 May and 8 July and West Dean College, Sussex, on 26 June. For more details, see his website: www.naturalnavigator.com.



DES SLEIGHTHOLME'S NATURAL NAVIGATION METHODS

An extract from *The Skipper's Thumb*, a collection of tips for the chart table by YM's former editor



HANDY DEGREE GUIDE
A rough indication of angles in degrees can be found by using the back of the hand thumb in line with the arm and aimed along the centreline of the boat towards the bow or stern. The right or left hand is used according to whether you're taking a bearing to port or starboard. By looking down on the back of your hand with all fingers extended, the index (longest) finger indicates 45° and the little finger 90°. First and third fingers are at 25° and 60°. It is also useful to mark off degree sightings from mid-companionway by sticking adhesive tape at suitable points on guardrails and the cabin top.

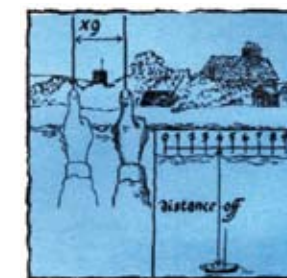
ROUGH DISTANCE OFF FOR ANCHORING
To judge how far off the shoreline you are, stretch out

one arm to full extent with the thumb sticking up. Sight past it to any object ashore through one eye only, then close that eye and open the other: the thumb will 'jump' a certain distance along the shore. Visualise this 'jump' distance multiplied by 9 and your distance off will be approximately the same; it is easier to judge a distance seen thus at right angles. The trick assumes that the ratio of width of eyes to outstretched thumb is 1:9. Best check up on your own eyes and thumb.



BEARINGS FROM A STEERING COMPASS
If the steering compass is sited too low down for bearings of objects to be taken from it, proceed as follows: take any length of string or signal halyard and, holding it taut,

sight past it to the object with the string also cutting the centre boss of the compass. A rough bearing can then be read.



DISTANCE JUDGING
50 yards: a person's eyes and mouth are clearly distinguished.
120 yards: a person's eyes and mouth become dots and a dash.
200-300 yards: a person's face is distinguishable but not their features.
400-500 yards: movement of legs walking, or arms rowing, is distinguishable.
600-800 yards: individual becomes a vertical dash
1 mile - 1 1/4 miles: portholes of large ships and small buoys are distinguishable.
2 miles: large navigation buoys – but not their shape or colour.