



Animal Architecture

Journey through the architectural world of animals and explore the function of their constructions - whether for protection or attracting a mate, the results are diverse and extraordinary.

Images by Ingo Arndt

Homes play a vital role in animals' lives, revealing behaviour as well as contributing to their survival.



Ingo Arndt has documented these structures in great detail both in the wild and in studio setups, where the detail and precision of the constructions can be truly appreciated.



Birds

If asked to define the characteristics of birds four things spring to mind – they have feathers, they can fly (most birds), they lay eggs and they build nests.

It is fair to say that birds are practically synonymous with nests - from the rolled pebbles of some penguins, the tree caves of woodpeckers, and the mud nests of flamingos, to the saliva nests of cave swiflets and the classic nest of twigs, feather and moss; the diversity is truly extraordinary.



The explanation for this variety lies in evolution.
The nests that ensure the survival of their
occupants are the result of natural selection.

Birds whose chicks can leave the nest soon after
hatching can lay their eggs in fairly simple nests.

Other hatchlings remain in the nest for a longer
development period and are more vulnerable;
their nests need to provide protection from fall-
ing out as well as insulation while their feathers
develop.



WEAVERBIRDS

The nest of the weaverbird is constructed by the male, using strands of grass carefully wound together in an intricate web. Grass stalks are bitten off and used for weaving while they are still fresh and malleable. As time passes the sun dries the green blades and the nest hardens and changes colour.



Once complete the female will inspect it to see whether she deems it satisfactory to raise her future chicks. If she likes what she sees she will accept the male and the nest becomes a brood nest and nursery.

If the female is not impressed she will leave and the male begins again, often destroying the existing nest and starting again from scratch.



It is extremely important for male weaver birds to know how to create an elaborate and impressive nest, so 'training' nests are often seen where a number of young males can practice their skills.



BOWERBIRDS

For the bowerbirds of Australia and New Guinea the ability to build plays a role in sexual selection, and has little to do with the initial survival of the offspring.

There are eight different species of bowerbird and the males and females of each species build totally different constructions. The females build a simple bowl-shaped nest for themselves and their offspring, where they raise their chick without support from the male.



In contrast, the males' constructions can be viewed as pieces of art! Their sole purpose is to convince the female of the species that the builder is the best mating partner and therefore perfect father to their future offspring.



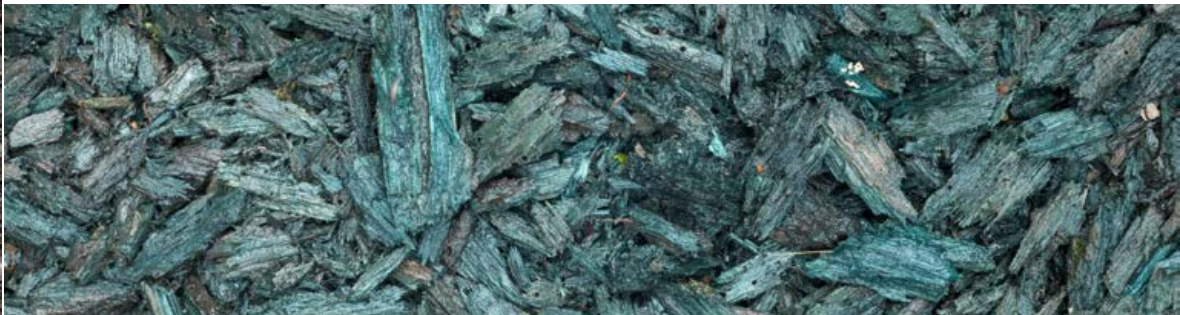
The males go to extraordinary lengths to woo prospective females. They first clear the ground surrounding their bower site, smoothing the surface where their seduction palace will be built.



Then they create a tunnel shaped bower by sticking rows of small branches into the ground before decorating the walls and floor with colour.



A single colour usually dominates but where several are used the male takes great care to keep them separate.



Alongside objects from nature such as feathers, berries and blossoms, man-made objects such as bottle caps, glass shards and plastic are becoming more commonly used.



Once the bower is complete the male performs to prospective females who make a decision about the health of their prospective partner based on the combination of bower, song and dance.

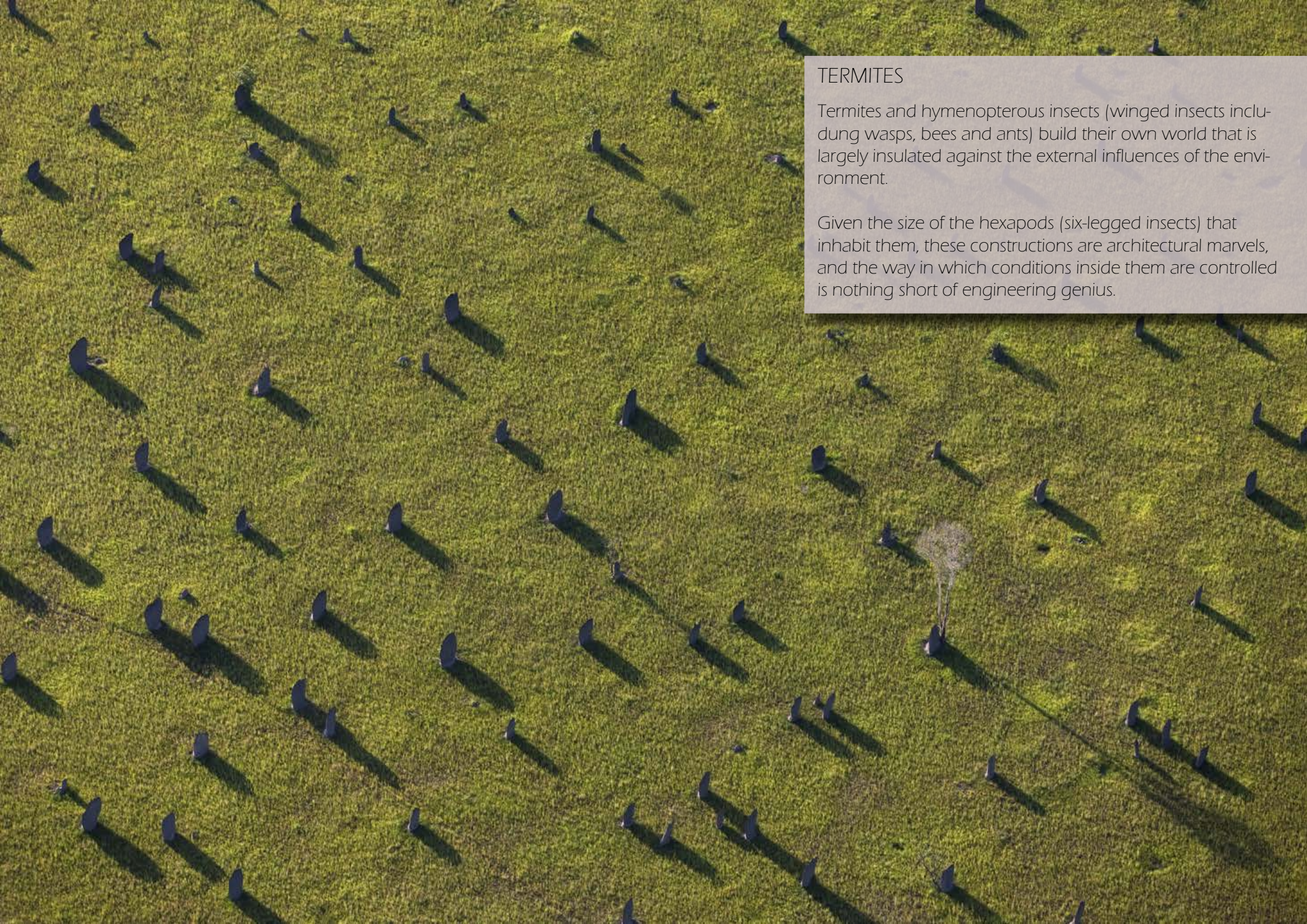
This form of sexual selection leads to ever more extreme courtship rituals on the part of the male!



Articulates

Some animal constructions are essential to their lives.

Among the best examples are the nests of colony-building insects.



TERMITES

Termites and hymenopterous insects (winged insects including wasps, bees and ants) build their own world that is largely insulated against the external influences of the environment.


Given the size of the hexapods (six-legged insects) that inhabit them, these constructions are architectural marvels, and the way in which conditions inside them are controlled is nothing short of engineering genius.



In northern Australia huge fields of flat-sided compass termite mounds can be seen. They are arranged in a precise north-south orientation, which combined with an efficient ventilation system ensures a constant internal temperature is maintained.



The flat sides of the structures, which can reach heights of three metres, catch both the morning and evening sun. Yet at midday, when the sun is strongest, the only surface the sun hits is the narrow upper edge, preventing the internal temperature from rising.



It is only possible for termites to build these enormous structures with a well organised communal effort.

A single structure can accommodate up to three million termites and at any one time there are masses of workers conducting alterations, extensions and repairs to the mound.



CADDIS FLY LARVAE

A more modest example of architecture, but no less significant is the protective shell built by the caddis fly larvae.

The larvae live in water and construct their shell out of small pebbles, shells or pieces of plant which are then held together with silk threads that the larvae expel from spinnerets in their heads.

This protective casing is then carried around with them and can be retreated into at the first sign of danger.

RED WOOD ANTS

Compared to their body size of just one centimetre, red wood ants build true skyscrapers.

Their structures made of plant material and earth can reach two metres tall and five metres wide, and the nests which sit within these hills often run far deeper underground than the hill is high.

The climate is carefully controlled using a widely branched system of tunnels and chambers with openings at the surface which can be blocked off or opened to regulate the internal temperature of the hill.

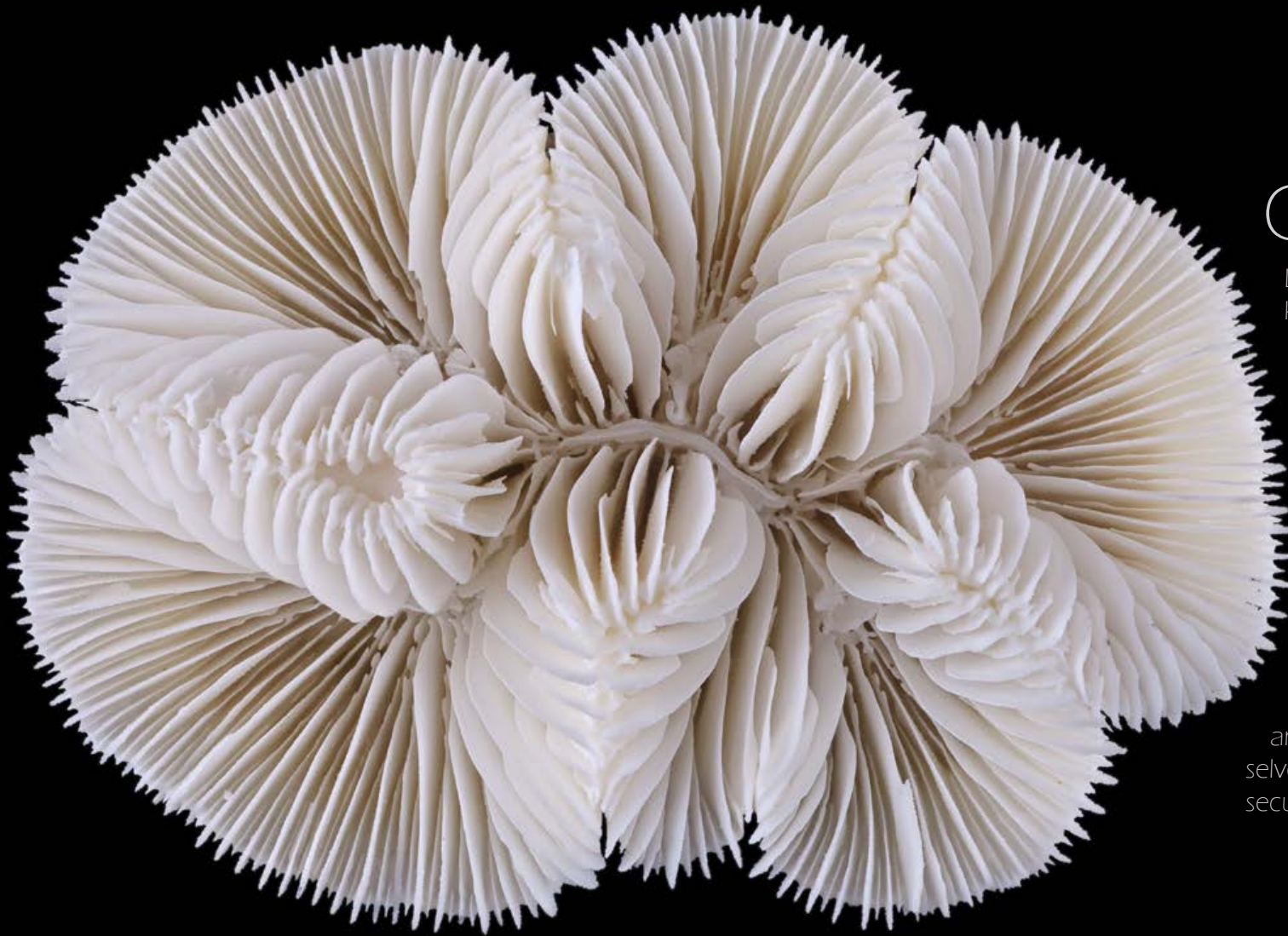




WASPS

Wasps chew up rotten and dry wood for the construction of their housing. The nest varies in structure and colour depending on the wasp's architectural style and the type of wood used. The chewed up wood, in combination with the wasp's secretions, forms a paper used to build hexagonal cells which are hung in horizontal hanging combs.

Large nests contain several of these combs surrounded by layers of paper protecting the nest from the outside world. The layers offer both physical protection and a means of insulation against temperature fluctuation.

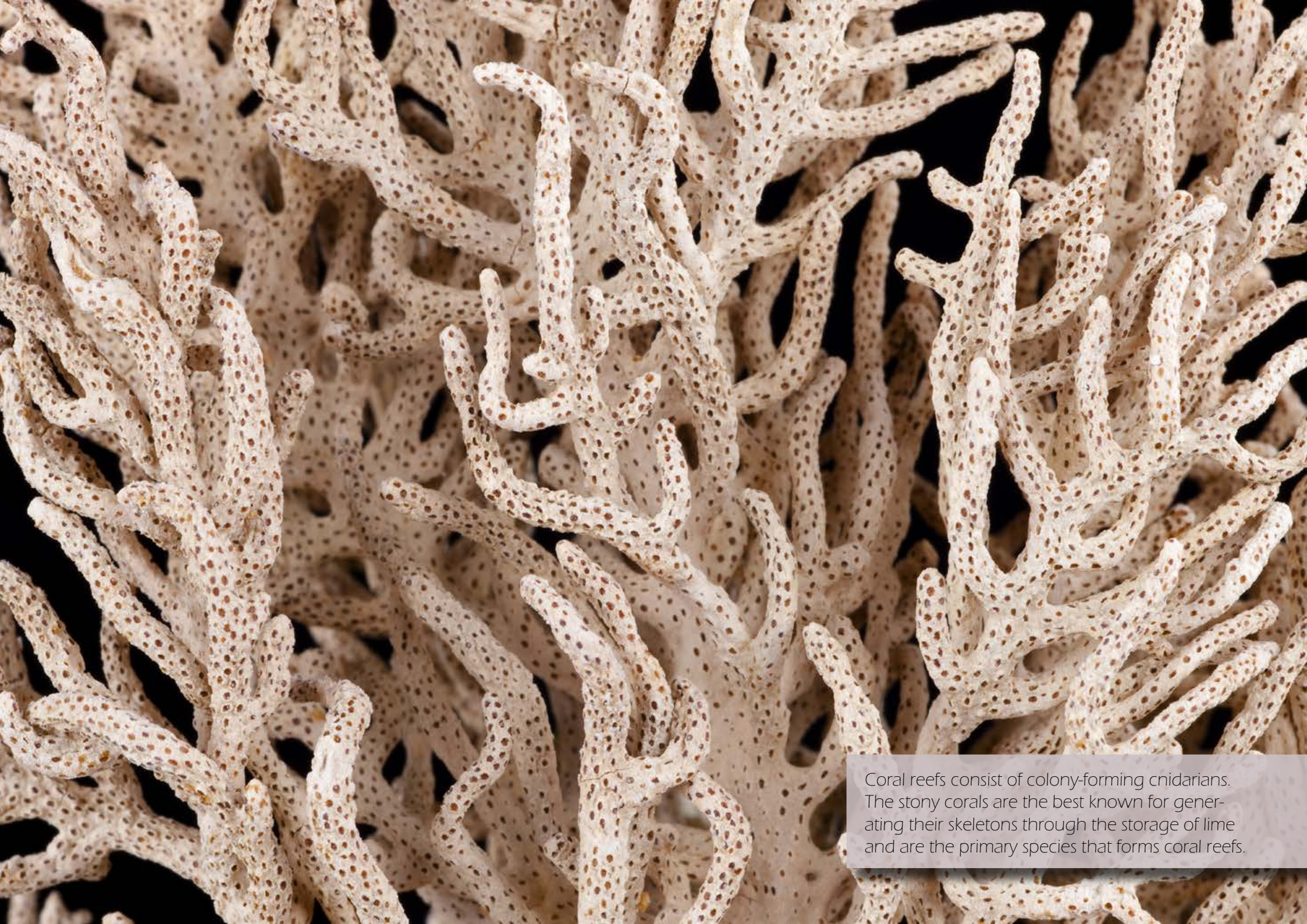


Corals

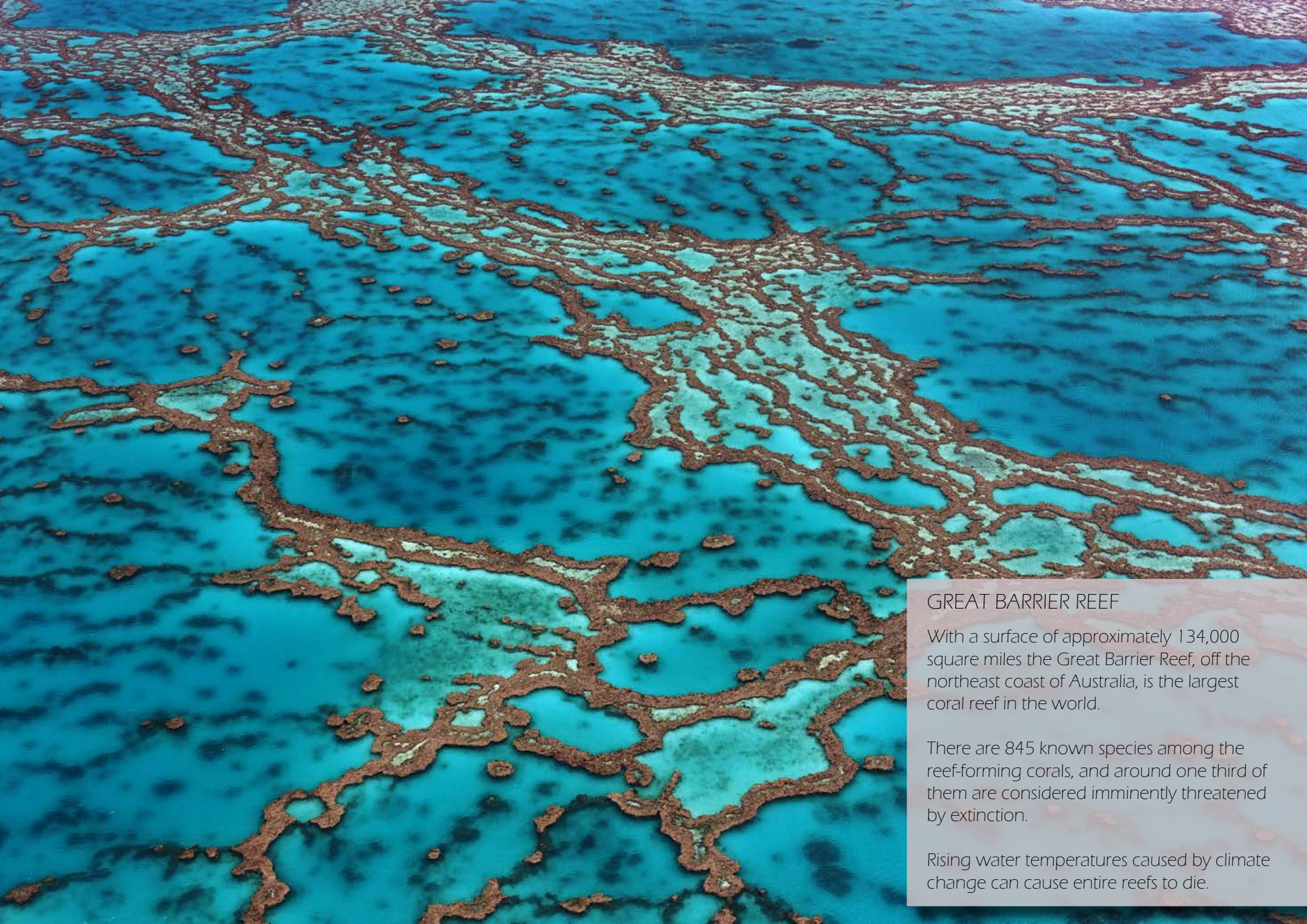
Lime, or calcium carbonate as it is also known, is an important building material for human homes, yet it is also a vital component of many animal constructions.

Coral reefs are the largest structures created by living beings and they are assembled largely of biogenic lime, produced by the coral polyps themselves.

Coral polyps have bodies that consist of up to 99% water, meaning they are very vulnerable, so they build themselves an exoskeleton which provides a secure shelter.



Coral reefs consist of colony-forming cnidarians. The stony corals are the best known for generating their skeletons through the storage of lime and are the primary species that forms coral reefs.



GREAT BARRIER REEF

With a surface of approximately 134,000 square miles the Great Barrier Reef, off the northeast coast of Australia, is the largest coral reef in the world.

There are 845 known species among the reef-forming corals, and around one third of them are considered imminently threatened by extinction.

Rising water temperatures caused by climate change can cause entire reefs to die.



Mammals

Mammals are generally not among the grand masters of nest building, but there are exceptions.

Because fur provides insulation and temperature regulation, and embryonic development takes place within a protective womb, nests are not so necessary for mammals.

There are however exceptions, including rabbits, squirrels and mice, that utilise their nest building skills to full effect.





HARVEST MICE

Harvest mice and beavers are both members of the rodent family, and as such their agile hands and sharp teeth make them well suited to building nests. Weighing only 5 grams the harvest mouse is one of the smallest mammals in the world.

Their light weight, combined with their long prehensile tail means they are well suited to life at the top of tall grass and grain stalks. They build a ball-shaped nest of intertwined grass leaves about one metre above the ground, using the tall surrounding stalks as supports.



A single small narrow hole in the side of the ball is the only entrance to the nest, and the inside is softly padded with finely split, neatly trimmed grass. Once inside the young are kept warm and dry and protected from the elements.



BEAVERS

If harvest mice are the structural engineers of the mammal world, beavers are the hydraulic engineers. They live in lodges, which can either be constructed of earth on a precipitous embankment, or hidden in a shallow bank beneath an accumulation of branches and small tree trunks.



The lodge is only accessible via an underwater entrance. This offers protection against enemies and extreme temperature fluctuations and provides an ideal birthplace for young.

Beavers only create lodges on moving water which enables them to regulate the water level using dams. They are then able to regulate the water flow accordingly throughout the year to ensure the entrance to the lodge is always covered.





NOTE FROM THE PHOTOGRAPHER

“Working on a photo project on the subject of Animal Architecture was extremely appealing but challenging - how was I to photograph the different species in the wild with their constructions in the foreground.

In order to meet the highest aesthetic standards, I decided to photograph a portion of the subjects in the studio in front of a black background. I hoped that these studio shots, in combination with the subjects that often are created under extreme conditions out in nature, would provide the right mix for this topic.

From the red ants just outside my front door to the bowerbirds in the remote jungles of West Papua and the huge termite fields in hot, northern Australia, I have travelled around the globe photographing animal architects. No matter what corner of the world, I was deeply impressed by the various constructions and the creativity of the animal architects I found there.”

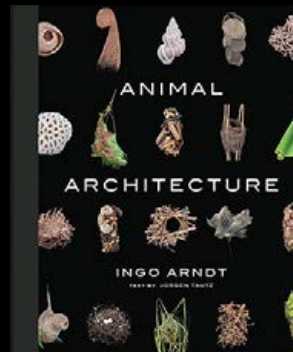


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