

The Alphabet Book

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2019

Extra Notes

Aa

The aardvark, *Orycteropus afer*, is found in Africa. The name aardvark means 'earth pig' or 'ground pig' due to this animal's burrowing lifestyle. Did you know that the aardvark is actually more closely related to elephants and manatees than it is to pigs?

The ants featured here are bull ants, *Myrmecia* species, which are found in Australia and are renowned for their large size and painful stings.

Have you ever seen a plant with aqua flowers? The turquoise ixia, *Ixia viridiflora*, which is native to a small area of South Africa, has striking aqua-coloured flowers. It is very rare in the wild due to habitat destruction, but it is popular in gardens.

Antarctica is the most southerly continent on Earth, and it includes the South Pole. It is almost completely covered with ice that averages nearly 2 km in thickness. Some species of penguins live in Antarctica, but there are no polar bears there. Did you know that it is the opposite in the icy far northern Arctic region of Earth, where there are polar bears but no penguins?

The armadillos featured here are Brazilian three-banded armadillos, *Tolypeutes tricinctus*, which are one of only two species of armadillo that can roll into a tight ball to defend themselves. This animal, which is listed as vulnerable to extinction, is only found in Brazil and its population is currently declining due to habitat loss and hunting.

This large species of ammonite, *Titanites giganteus*, is found as fossils in Jurassic rock in Dorset, England. It lived in the sea 147 million years ago, and was often over 1 m in diameter. During that geological time, there were numerous other species of ammonite, some of them even larger than this one. All ammonites went extinct at the end of the Cretaceous period, 66 million years ago, at the same time as the non-avian dinosaurs.

Would you like to eat some alphabet soup? Have you ever seen the pasta for alphabet soup in the shape of other scripts, for example Greek or Russian letters?

The wandering albatross, *Diomedea exulans*, spends a large proportion of its time in flight, and it flies greater

distances every year than most other birds. Their population is in decline due to deaths from plastic pollution in the ocean, and from drowning when they are caught on long-line fishing baited hooks.

The almond tree, *Prunus dulcis*, is one of the earliest blossom trees to flower each year. Do you know if they grow near where you live? Almonds are delicious to eat simply raw or blanched, or they can be added to muesli or made into foods such as cakes, biscuits, or nougat.

Anemones, *Anemone coronaria*, which are from the Mediterranean region, can have many different flower colours, including white, red, and shades of violet and pink. They are sometimes called windflowers.

Apples, *Malus domestica*, which were originally from Central Asia, are now one of the most popular fruits worldwide and several thousand varieties have been developed. How many different ways can you think of to eat apples? Have you ever tried making baked apples? Or an apple cake?

The arum lily or calla lily, *Zantedeschia aethiopica*, is from southern Africa, and now grows in many countries of the world as a garden plant. In some places it grows so prolifically that it has become an invasive weed, displacing native species.

This aloe plant is a specimen of *Aloe volkensii*, which is from Africa. It is a relative of *Aloe vera*.

Australia is a country that is made up of the Australian continent, the southerly state of Tasmania, and quite a few smaller islands including South Australia's Kangaroo Island. Do you know the name of the capital city of Australia? What do you think is the most interesting thing about Australia?

The silvery, striped angelfish featured here, *Pterophyllum altum*, lives wild in parts of South America. These fish are sometimes kept by collectors in an aquarium. What sorts of fish have you seen in an aquarium?

What different colours of autumn leaves have you seen? The autumn leaves drawn here are from a cherry tree, a cultivar of *Prunus avium*, which was originally a wild species native to Europe and western Asia.

The aurora illustrated here is called the Aurora Australis or the Southern Lights. It can sometimes be seen in the sky of the far south regions in the Southern Hemisphere, and it looks like a flowing curtain of coloured light. The same phenomenon in the northern regions of the Northern Hemisphere is called the Aurora Borealis or the Northern Lights. I hope you see either of these one day!

The green anaconda, *Eunectes murinus*, is the largest snake in the world by weight, and the second longest after the reticulated python. This snake spends a great deal of its time in or near water, in fact the first part of its scientific name 'Eunectes' means 'good swimmer'.

Aquarius, The Water Carrier, is one of the 88 modern constellations. It is in the sky near the other water constellations that include Pisces, The Fish, and also Cetus, The Whale, and Delphinus, The Dolphin. What do you find most awe-inspiring about astronomy?

Bb

The butterfly featured is the dainty swallowtail, *Papilio anactus*, which is endemic to Australia. It was originally from New South Wales, Victoria, and Queensland, and the growing of citrus orchards in South Australia during the late 1920s allowed it to spread to there.

The blossom featured here is on a nectarine tree in Adelaide. Did you know that nectarines are smooth and peaches are fuzzy, however they are both actually the same species of tree, called *Prunus persica*? There are hundreds of varieties of both nectarines and peaches. Have you tried both yellow-fleshed and white-fleshed nectarines and peaches?

These little boats with red sails are called Mirrors. They are sailing dinghies that are 3.3 m in length. Brilliant for learning to sail in!

The black flower illustrated here is Flor de Muerto, *Lisianthus nigrescens*, which is found in Mexico. This is a truly black flower. Some other flowers in the world have black markings, while still others are a very, very dark purple, red, or blue, which appear nearly black.

The big blue beetles here are the blue mint beetle or blue leaf-beetle, *Chrysolina coerulans*. Shall we investigate what kinds of beetle live near us? What colours are they, and how big are they?

Braille is a reading and writing system made up of raised dots that is used by people who are visually impaired. It is named after the person who created it, Louis Braille, a French 15-year-old boy who lost his sight when he was very young. Interestingly, he also invented braille representing music notation for sight-impaired musicians.

The beach boxes here are inspired by the beach boxes, sometimes also called bathing boxes, at Brighton Beach, which is about 6 km south of St Kilda

Beach, Melbourne, Victoria, in Australia. The walk from St Kilda Beach to Brighton Beach is a popular scenic walk that takes about 1 ¼ hours.

Three Australian bird species, along with their birdsongs, are depicted here: the rose robin, *Petroica rosea*, the superb fairy-wren, *Malurus cyaneus*, and the Australian magpie, flute-player, or flute-bird, *Gymnorhina tibicen*. The black and white Australian magpie, is one of Australia's most accomplished songbirds, and it is famous for its array of complex warbling vocalisations that span about four octaves. Magpies defend their nests, so when they are nesting take care that you are not swooped by a magpie, especially if you're on a bicycle!

Blackberry, *Rubus fruticosus*, is a delicious fruit that grows on a scrambling and often very prickly plant that in some countries has unfortunately become a seriously invasive weed. The fruits can be eaten fresh or cooked into jam, cakes, pies, and biscuits. Yum. Shall we try cooking some blackberry jam biscuits?

The bluebells drawn are *Hyacinthoides non-scripta*, which are a favourite wildflower in the British Isles and western Europe. The flowers are beautifully perfumed, and arranged along one side of the stem. An ecological problem is that some populations of these bluebells are being displaced by another type of bluebell, *H. hispanica* (with flowers that are less scented, and are radially arranged on their stem) which has been introduced from Europe.

Can you see the badminton rackets and shuttles here? Badminton is the fastest of all the racket sports.

Beetroot, *Beta vulgaris*, is very easy to grow. Did you know that you can eat beetroot leaves, raw when the leaves are young, or cooked when they're older, as well as the colourful root?

Bulrush, *Typha latifolia*, also called cattail, is a tall plant of various wetland environments. This is a widespread plant, native to much of the world. It has however been introduced into Australia and Hawaii where it has become a weed. The flower spike looks as if it's made from brown velvet.

Cc

Have you ever eaten foods with chilli in them? Careful, some chilli can be surprisingly hot. Did you know there is a scale of the hotness of chillies called the Scoville Scale, ranging from not hot at all, like a capsicum, right through to extremely, painfully hot!

The crocuses here are the saffron crocus, *Crocus sativus*, the source of the most expensive spice in the world, saffron. It is used in food to produce a yellow colour and a pleasant flavour, and it is used to dye fabric, and also as fragrance and as herbal medicine.

Cats, *Felis catus*, have been kept as household or farm pets for thousands of years. Shall we write some stories about pet cats?

The giant clam, *Tridacna gigas*, is the largest living bivalve mollusc. The word **bivalve** means the shellfish has two valves to its shell, and these are attached to each other with a hinge. The giant clam is from the Indo-Pacific, and it is listed as vulnerable to extinction due to overharvesting for food, the aquarium trade, and the shell collecting trade. This animal can live for more than 100 years, and some individuals weigh more than 200 kg (440 lb) and are 120 cm (47 in) across.

The cacti illustrated here are as follows, going clockwise and starting with the tall one on the left:

- Saguaro, or mojépe, *Carnegiea gigantea*, is native to the Sonoran Desert in Arizona, the Mexican State of Sonora, and the Whipple Mountains and Imperial County areas of California. Its main trunk can be 3 feet in diameter, often producing many branches. This plant can grow to be over 20 m (70 ft) in height. The fruit is edible.
- Sea urchin cactus, or pink Easter lily cactus, *Echinopsis eyriesii*, which is native to Argentina and Brazil in South America. This cactus is one of the most popular small rounded cactus species grown worldwide. Compared to the size of the green part of the plant, the flowers seem like immensely oversized trumpets!
- Pincushion cactus, *Mammillaria* sp. Most of the mammillarias are native to Mexico, and some are from southwest USA, the Caribbean, Colombia, Venezuela, Guatemala, and Honduras. This plant has a delicate circle of small hot pink flowers.
- Arizona rainbow cactus or rainbow hedgehog cactus, *Echinocereus rigidissimus* ssp. *rubrispinus*, is from Chihuahua and Sonora in Mexico, as well as from Arizona and New Mexico in the USA. It forms lovely stripes of colour on its main trunk as it grows taller, and produces truly flamboyant large pink flowers each year.
- Cardón, xaasj, Mexican giant cardón, or elephant cactus, *Pachycereus pringlei*, is native to northwestern Mexico in the states of Baja California, Baja California Sur, and Sonora. It is the largest cactus in the world, with a trunk up to 1 m (3.3 feet) in diameter, many branches, and growing to 18 or 19 m in height. The fruit is edible.
- Polka-dot cactus or bunny ears cactus, *Opuntia microdasys*, is a species of cactus native to central and northern Mexico. The short prickles of this plant are actually quite dangerous to touch because they are very tiny and barbed, and they detach readily from the plant. Beware!
- Plaid cactus, *Gymnocalycium mihanovichii* var. *friedrichii*, also known as *G. friedrichii*, is from south to northwestern Paraguay. This cactus is quite often red- or purple tinged in colour.

- Dwarf chin cactus, *Gymnocalycium baldianum*, has wonderfully attractive dark red flowers. This species is from Catamarca, Argentina, where it is locally abundant although its population in total appears to be decreasing.

- Golden barrel cactus, *Echinocactus grusonii*, is endemic to east central Mexico. In cultivation, it is one of the most popular cacti, however it is listed as endangered in the wild.

Which shapes and colours of cacti are your favourites?

The chameleons here are called *Furcifer pardalis*. Chameleons are often very brightly coloured. They have unusual pincer-like feet, on the front feet the 2 toes are on the outside and the 3 toes are on the inside, and on the back feet this order is reversed.

I wonder if you could grow cherries where you live! Even a small cherry tree can produce quite a few cherries each summer. Cherries are a cultivar of *Prunus avium*, which was originally a wild species native to Europe and western Asia. Have you ever tasted cherries?

Chocolate is produced from the seed of the cacao tree, *Theobroma cacao*, which is native to the tropical regions of the Americas. It was originally made into a beverage known as xocolatl, a Nahuatl word meaning 'bitter water'. They added ingredients such as vanilla, honey, and chilli. Do you like chocolate or chocolate-flavoured foods? I have decorated the chocolate cake illustrated here with whipped cream and chocolate curls. Yum! The cacao flower, as well as the large yellowish pods that contain the seeds of the cacao tree, are included in the picture.

The giant crab, *Pseudocarcinus gigas*, also known as the giant deep-water crab, or the giant Tasmanian crab, is the world's heaviest crab. It is endemic to Australian seas and is distributed from southern Western Australia to central New South Wales, inhabiting waters between 18 m and 500 m in depth. Some individuals weigh up to 13 to 15 kg and have a shell width of 46 cm.

The star constellation Cancer is commonly represented as The Crab, so I have added a few stars onto the drawings of the crabs in reference to this constellation.

The Andean condor, *Vultur gryphus*, is found in the Andes mountains and the nearby Pacific coasts in South America. It is considered near threatened due to habitat loss and also due to secondary poisoning from carcasses of animals killed by hunters. It is the largest of all flying birds, with a wingspan of up to 3.3 m and a weight of up to 11 to 15 kg (24 to 33 lb) for males and 8 to 11 kg (18 to 24 lb) for females.

The cupcakes selected for these pictures are flavoured with coconut, caramel, cinnamon, cherry, chocolate, and cranberry. Some other cupcake flavours beginning with the letter **c** are carrot, cardamom,

cookies and cream, candy floss, and currant! Can you think of any others?

What would you like best about living in a castle? Did you know that Windsor Castle in England, which was built by William the Conqueror in about 1070, is the oldest and largest inhabited castle in the world? It has been the family home of British kings and queens for nearly 950 years. It is an official residence of Her Majesty Queen Elizabeth II.

Herstmonceux Castle in East Sussex, England, which was first owned in 1066, is one of the oldest brick buildings still standing in England. From 1957 to 1988 its grounds were the home of the Royal Greenwich Observatory.

Dd

The dolphins drawn here are wild Indo-Pacific bottlenose dolphins, *Tursiops aduncus*. These three individuals are some of the Port River Dolphins. They live in the Port River in Adelaide, one of only a few places in the world where wild dolphins live within a major city.

The star constellation Delphinus represents The Dolphin, so I added the major stars of Delphinus to the drawing to represent water splashes.

The dragonflies featured here are as follows:

- Australian emperor, *Hemianax papuensis*, also known as the yellow emperor, which is a large dragonfly with a wingspan of 11 cm and a body length of 7 cm. It is distributed throughout Australia, NZ, Indonesia, and Papua New Guinea. (Yellow and brown).
- Blue skimmer, *Orthetrum caledonicum*, which has a wingspan of 7 cm and a length of 4.5 cm, is common and widespread in Australia, and also occurs in New Guinea. (Blue).
- Scarlet percher, *Diplacodes haematodes*, which has a wingspan of 6 cm and a length of 3.5 cm, is found throughout Australia (except Tasmania), and in Timor, New Guinea, Vanuatu, and New Caledonia. (Red).

A typical round brilliant cut diamond has 58 tiny facets, each a carefully cut, flat, polished surface. This shape maximizes the fire and brilliance of the diamond.

Diplodocus, *Diplodocus carnegii*, was a dinosaur that lived about 152 million years ago, during the Late Jurassic period, in what is now western North America. My drawing is based on the skeleton cast at the Natural History Museum in London, England, and the skeleton at the Carnegie Museum of Natural History in Pittsburgh, USA. Many other dinosaurs have been discovered that are of immense size, and several are thought to have weighed even more than diplodocus.

The daisy species illustrated in the tiny sketch book here are the following, from left to right:

- Lettuce, *Lactuca sativa*, which is one of the most well-known salad leaves. Did you know that lettuce is a daisy? This includes iceberg, cos, and mignonette

lettuce – they are all daisies! Shall we grow some lettuces one day. If some of them 'go to seed', you'll be able to see their daisy flowers.

- Painted daisy, *Tanacetum coccineum*, is a pink-flowered perennial plant native to the Caucasus that contains insecticidal pyrethrum substances.
- Chicory, *Cichorium intybus*, is grown for salad leaves and for its root, which is used as a coffee substitute. It has a pretty blue daisy flower.
- Golden daisy bush, *Euryops pectinatus*, is a yellow-flowered plant that is very popular in Australian gardens. It is native to South Africa.
- English daisy, *Bellis perennis*, is native to Europe, and is widely naturalised in the Americas and Australasia.

Instructions for stitching daisies:

1. Bring the thread to the front of the fabric. Take the needle tip in and out through the fabric, and form a loop of thread under the needle tip.
2. Pull the thread through, allowing the loop to settle in place. Take the needle to the back beyond the loop.
3. Pull thread through to anchor the loop with the small straight stitch. This is now a completed detached chain stitch.
4. Work several of these stitches to form a daisy.
5. Add long straight stitches in a different colour for the stem and leaves.
- 6.-8. You can add a bead for the daisy centre using one straight stitch to attach the bead. Try working detached chain stitches to represent some of the leaves.

The dodo, *Raphus cucullatus*, is an extinct bird that was last seen alive in 1662. The dodo was flightless, and was about 1 metre (3 feet 3 inches) in height and approximately 10 to 21 kg (23 to 47 lb) in weight.

Daylilies are also called *Hemerocallis*, which literally means 'day beautiful'. The original species are native to China, Korea, and Japan. Daylilies are very popular garden plants and there are thousands and thousands of cultivars that have been developed, in a huge range of colours.

Ee

The emu, *Dromaius novaehollandiae*, is the second largest living bird by height after the ostrich of Africa. It is quite commonly seen in bushland throughout much of mainland Australia. Have you ever seen an emu?

Echidnas, *Tachyglossus aculeatus*, are widespread in Australia, and are also found in parts of New Guinea. Their closest relatives are other types of echidna that are found in New Guinea, and the platypus. They are mammals that lay eggs.

The echidnas here are pictured amongst eucalyptus trees, which are also known as gum trees. Did you

know that there are about 700 different species of eucalyptus trees?

There are two species of elephant in Africa, and one in Asia. The elephants here are African bush elephants, *Loxodonta africana*, the largest type of elephant. Elephants are in danger of extinction due to being illegally killed for their ivory tusks and also due to habitat destruction.

Wedge-tailed eagle, *Aquila audax*, is a magnificent bird of prey found throughout Australia and in parts of New Guinea and Indonesia. The Tasmanian subspecies of wedge-tailed eagle is listed as endangered due to habitat loss and low population numbers.

Edelweiss, *Leontopodium nivale*, is a woolly white flower native to mountainous regions in Europe.

Ff

The fish featured here are the following:

- Tropical two-wing flyingfish, *Exocoetus volitans*, which is found in tropical and subtropical zones of all oceans including the western Mediterranean Sea and part of the Caribbean Sea. It is up to 30 cm in length. (Blue, with fins that look like wings).
- Harlequin tuskfish, *Choerodon fasciatus*, native to the western Pacific Ocean in two areas, from the Ryukyu Islands to Taiwan and from Queensland, Australia, to New Caledonia. This fish can be up to 30 cm in length. (Orange, red, and blue stripes).
- Longnose hawkfish, *Oxycirrhites typus*, which is found on tropical reefs of the Indian Ocean and the Pacific Ocean. It can be up to 13 cm in length. (Red and white squared pattern).
- Royal gramma, fairy-basslet, or royal gramma basslet, *Gramma loreto*, native to Bermuda and the waters of Central America and northern South America. It can be up to 8 cm in length. (Yellow at back, purple at front).
- Bluestripe snapper, *Lutjanus kasmira*, which is native to the Indian Ocean from the coast of Africa and the Red Sea to the central Pacific Ocean. It is up to 25 cm in length. (Yellow with blue stripes).
- Young harlequin sweetlips, *Plectorhinchus chaetodonoides*, which is native to the Indian Ocean and the western Pacific Ocean. At the juvenile stage it is up to 8 cm in length, and when adult it is about 60 cm in length, and looks completely different! (Brown with white dots when young).
- Parrotfish, *Scarus psittacus*, which is widespread in the Indo-Pacific and northwards to southern Japan. It is approximately 30 cm in length. (Aqua coloured).
- Largemouth flounder, *Pseudorhombus arsius*, which is from the Persian Gulf and east coast of Africa, Japan, northern Australia, and Fiji. It can be up to 30 cm in

length. (Light brown flat fish camouflaged in the sand).

The flamingos here are the greater flamingo, *Phoenicopterus roseus*, plus there's one Chilean flamingo, *Phoenicopterus chilensis*. Greater flamingos are found in Africa, India, the Middle East, and southern Europe, and the Chilean flamingo is mainly found in South America. The latter is listed by the IUCN as near threatened.

Forget-me-not, *Myosotis sylvatica*, is native to many parts of Europe, as well as India and some nearby countries. These delightful little flowers are usually blue, but are sometimes pink or white.

Diamond firetail finch, *Stagonopleura guttata*, also called *Emblema guttata*, are found in southeastern Australia. They're the finches illustrated here that have black with white dots on the body.

Red-browed firetail finch, *Neochmia temporalis*, is found in east and southern Australia.

These trilobites, *Tricrepicephalus texanus*, also called *Tricrepicephalus coria*, once lived in the sea during the Upper Cambrian period, 501 to 490 million years ago, mainly in what is now USA and Canada. It is 42 mm in length.

The brachiopods illustrated here, *Spiriferellina cristata*, lived in the sea, during the Upper Permian period, 256 to 248 million years ago in what is now the UK. They are 19.5 mm wide.

Frangipani, *Plumeria rubra*, trees were originally native to Mexico, Central America, and some of the northern countries of South America, and they are now very widely grown in many countries that have warm climates, including Australia. The flowers have a fantastic perfume and range in colour from white, yellow, and orange to red and pink.

The flame tree or Illawarra flame tree, *Brachychiton acerifolius*, is a rainforest tree from eastern Australia. It has really stunning bright red flowers which often cover the entire tree before the leaves grow!

Frilled lizard, frillneck, frill-necked lizard, or frilled dragon, *Chlamydosaurus kingii*, is native to northern Australia and southern New Guinea, and is occasionally found in more southerly desert regions of Australia. Frilled lizards are not venomous and they are not dangerous to humans. The name *Chlamydosaurus* means 'cloaked lizard'.

The frog illustrated here is the Australian red-eyed tree frog or orange-eyed tree frog, *Litoria chloris*, which is native to eastern Australia from north of Sydney to mid-northern Queensland. The irises of this frog's eyes are bright red-orange and the pupils are horizontal.

Fig, *Ficus carica*, is native to the Middle East and western Asia. It is now grown throughout much of the

world. There is archaeological evidence that the fig was one of the first plants cultivated by early humans, beginning more than 11,000 years ago.

The graceful fern featured here is called the lady fern, *Athyrium filix-femina*, and it is native to the temperate areas of the Northern Hemisphere.

Gg

The Gynea lily or giant lily, *Doryanthes excelsa*, is endemic to some coastal areas of New South Wales, Australia. It is gigantic! The leaves are frequently over 1 to 2.5 metres (3 to 8 feet) long and the flower spike is often about 6 metres (20 feet) in height.

Thousands of bright new colours and flamboyant forms of gerbera, called *Gerbera* hybrids, have been cultivated from the original wild species, which were native to Africa. They are extremely popular in gardens and for use in floral arrangements.

The grass illustrated here in front of the wall is sweetgrass, sometimes also called vanilla grass, *Hierochloa odorata*, which is native to northern Europe and Asia, and to North America. It is a highly regarded, important grass, used for cultural purposes such as herbal medicine and truly beautiful traditional basket weaving.

As well as Gynea lilies and gerberas, the other plants behind the garden gate are as follows:

- Ginkgo trees, *Ginkgo biloba*, which are called a 'living fossil' because today's living ginkgo trees, which are native to China, appear to be the same as the ginkgos that are found as fossils, some of which are up to 270 million years old. The leaf of the ginkgo tree is unique in shape among seed plants. It is fan shaped, with veins that branch in repeating Y-shaped patterns, and the leaf edge often has a well-defined central notch.
- Gypsophila or baby's breath, *Gypsophila paniculata*, is native to Europe. It is a relative of carnations and pinks, and it is often used in floral arrangements.
- Gentians, *Gentiana acaulis*, which are native to mountainous areas of Europe, have trumpet-shaped flowers that are a glorious deep blue colour.
- Gladioli, called *Gladiolus* hybrids, have been cultivated from a number of wild species, and have become very popular in gardens and for use in floral arrangements.

The geese here are domestic geese. Most domestic geese are descended from a type of goose called *Anser anser*.

Giraffes, *Giraffa camelopardalis*, are found wild in Africa. They are listed as vulnerable to extinction due to hunting and habitat destruction.

The grapefruit, *Citrus × paradisi*, is a hybrid originating from two ancestral citrus fruits, the pomelo from Southeast Asia and the sweet orange, itself a hybrid of Asian origin.

The grapes here are Midnight Beauty grapes, *Vitis vinifera*. Grapes were first cultivated about 6,000 to 8,000 years ago in areas including western Asia, Turkey, and Egypt.

Guava, *Psidium guajava*, from the myrtle family, is native to the Caribbean, Central America, and northern South America. It is now grown in many warm regions of the world for its delicious fruit.

Green correa, *Correa backhouseana*, is a coastal shrub that is originally from southern Australia. Have you ever seen any plants with green flowers?

There are many species of correas, also called native fuchsias, and their flowers can be green, white, pink, or many different shades of red.

Hh

The hedgehog illustrated here, *Erinaceus europaeus*, is found in Europe. Did you know that hedgehogs are not closely related to echidnas, even though they look a bit similar, both have spines, and both can roll up into a ball to avoid being hurt by a predator? Porcupines are also spiny animals, but are not closely related to either hedgehogs or echidnas. This is a good example of convergent evolution, which means that a number of unrelated creatures have evolved some very similar features.

Hyacinths, *Hyacinthus orientalis*, are beautifully perfumed flowers that were originally native to southwest Asia and parts of the Middle East. They have been cultivated for hundreds of years and there are at least 2000 named cultivars with flowers of many different colours.

The illustration depicts bee hummingbirds, *Mellisuga helenae*, some of them feeding on the nectar of a hummingbird bush or firebush, *Hamelia patens*. The bee hummingbird, which is found in Cuba and a nearby island called Isla de la Juventud, is the smallest living bird in the world. The female weighs 2.6 g and the male only 1.95 g and they're only 6.1 cm and 5.5 cm in length. Their nest is less than an inch in diameter! These birds are beautifully coloured and look like tiny jewels.

Horses, *Equus ferus caballus*, have been domesticated by people for about 6000 years. How many different coloured horses have you ever seen?

Honeysuckle, *Lonicera japonica*, is a trailing vine which is native to China, Japan, and Korea. The delicate flowers are delightfully perfumed. In many countries this plant is extremely popular in gardens but in others it has become an invasive weed.

The hippopotamus, *Hippopotamus amphibius*, is from Africa.

The hibiscus illustrated here, *Hibiscus rosa-sinensis*, is thought to have been originally from East Asia. The species has for a long time been cultivated, and there are now several thousand different variations of flower colour and form that are grown in many parts of the world.

Uniquely beautiful honey is produced in Tasmania by bees visiting the flowers of the leatherwood tree, *Eucryphia lucida*, an endemic Tasmanian rainforest species. The flowers and leaves of the leatherwood tree are pictured here decorating the bowl for the honey ice cream and the plate for the honey cake - a botanical homage to this special plant.

Interestingly another delicious honey with a beautiful flavour a bit similar to leatherwood honey, called ulmo honey (miel de ulmo), is produced in Chile and Argentina from a tree called ulmo, *Eucryphia cordifolia*, which is a South American close relative of the leatherwood tree.

I've illustrated a critically endangered fish called a Lake Victoria haplochromis or haplo, *Haplochromis ishmaeli*, swimming with the hippo here. This haplo is endemic to Lake Victoria in Africa. Nowadays it can be found occasionally in the aquariums of fish collectors. The population of this species in Lake Victoria declined due to the introduction in the 1950s of the Nile perch, *Lates niloticus*. This haplo has not been seen there since 1991. It is now listed as critically endangered, and in fact may now be extinct in the wild. I chose this haplo to represent the hundreds of Lake Victoria endemic fish species that are now extinct or threatened due to the ecologically disastrous introduction of the Nile perch. See *Darwin's Nightmare*, a 2004 film, for more information.

Ii

The insects featured here are the following:

- Yellow admiral or Australian admiral, *Vanessa itea*, which is a butterfly found in Australia and New Zealand.
- Monarch butterfly, *Danaus plexippus*, which is widely distributed, including in the Americas, Australia, and New Zealand. Did you know that a monarch butterfly weighs less than one gram?
- Blue ringtail damselfly, *Austrolestes annulosus*, a damselfly that is found throughout most of Australia.
- Blue-banded bee, *Amegilla cingulata*, which is a native bee that is found in Australia. It is an important pollinator of many plant species, including numerous crops. Similar species are found in nearby countries.
- Common green lacewing, *Chrysoperla carnea*, which is a widespread insect with delicate lacy wings. Its larvae feed on prey such as aphids, thrips, and white-flies.

- Common eastern firefly or big dipper firefly, *Photinus pyralis*, which is the most common species of firefly in North America.
- Thorn bug, *Umbonia crassicornis*, which is found throughout South and Central America, Mexico, and southern Florida. This is the most common species of *Umbonia* in the USA.

The impossible objects featured here are based on the many impossible objects, also called impossible figures, that have been drawn throughout history. These include those illustrated by Oscar Reutersvärd (The Reutersvärd Triangle), Lionel and Roger Penrose (The Penrose Triangle), Maurits Cornelis Escher (The Impossible Cube), D. H. Schuster (The Impossible Trident), and numerous others.

The three impossible garden forks here were created by the author and illustrator in 2016. The idea of garden forks was extended from The Impossible Trident mentioned above.

The irises here are bearded irises, *Iris x germanica*, which are of hybrid origin. Hundreds of different bearded irises and other irises exist, in a rainbow of colours, hence the name iris, which means rainbow.

Ivy, *Hedera helix*, is a climbing plant that is native to Europe and western Asia. It is widely popular as a garden plant but has become an invasive weed in some regions.

In case you're wondering, the ice cream pictured on the Alphabet Tag here is coconut flavoured! What other flavours of ice cream can you think of that are white in colour?

Jj

There are thousands of species of jumping spider worldwide, and they belong to a spider family called the Salticidae. This name is from a Latin word **saltare** which means 'to jump, leap, or dance'. Most jumping spiders are less than 10 mm long, and they can leap impressive distances, often several centimetres, to escape from danger, to jump across a gap, or when hunting to pounce on their prey. With their 8 eyes, they have excellent vision.

The jellyfish featured here is the mauve stinger, *Pelagia noctiluca*, a widespread species, is about 10 cm in diameter. It has eight thin marginal tentacles which may extend as long as 3 or 4 metres, and there are four frilled feeding arms. This species is bioluminescent, sometimes producing flashes of light.

Jewel beetles, which belong to one of the largest families of beetles, called the Buprestidae, are often very colourful and shiny. The jewel beetles featured here are the following:

- 1. Red speckled jewel beetle, *Chrysochroa buqueti rugicollis*, from Southeast Asia, which is 40 to 52 mm in length.

- 2. Jewel beetle, *Chrysochroa fulgens*, from Thailand, which is 35 to 40 mm in length.
- 3. Banded jewel beetle, *Chrysochroa rajah*, from Asia, which is 32 to 48 mm in length.
- 4. Jewel beetle, *Chrysochroa fulminans colbatina*, from Java, which is 40 mm in length.
- 5. Jewel beetle, *Chrysochroa limbata*, from Sabah, which is 54 mm in length.
- 6. Jewel beetle, *Buprestis octoguttata*, from Europe, which is 15 to 18 mm in length.
- 7. Jewel beetle, *Temognatha alternata*, from northern Queensland, which is 26 mm in length. There are over eighty species of *Temognatha* found in Australia and New Guinea.

Jackfruit, *Artocarpus heterophyllus*, is widely cultivated in tropical regions of the world. A fully grown tree can produce a huge number of the giant fruits each year. The unripe fruit, the ripe fruit, and the seeds are all eaten in many different dishes, the leaves are used for wrapping food for steaming, and the wood is also extremely useful for building, furniture, and musical instruments.

Jasmine, *Jasminum azoricum*, is native to the Portuguese island of Madeira where it is critically endangered. Although this species is very rare in its native habitat, it is widely grown in gardens in many parts of the world, including Australia. The white flowers are produced in profusion and have a truly beautiful fragrance.

Kk

The kookaburra, *Dacelo novaeguineae*, is native to eastern and southeastern Australia, and it has been introduced into Tasmania, Western Australia, and New Zealand. The name **kookaburra** is from a language called Wiradjuri, which is an Australian Indigenous language.

The kangaroo mother and joey illustrated here is a Western grey kangaroo, *Macropus fuliginosus*. This species is found in the southern part of Australia.

The kangaroos of many colours hopping along represent a number of species: Western grey kangaroos, *Macropus fuliginosus*, including one here that is albino, as well as Eastern grey kangaroos, *Macropus giganteus*, and red kangaroos, *Macropus rufus*.

My knot garden is based on traditional Celtic knot designs, but I designed this one with 5-way symmetry. The plants used to create this knot garden are the following useful plants:

- Borage, *Borago officinalis*, which is a herb, originally from the Mediterranean region, that is grown for

many uses including the culinary use of its leaves and flowers. (Blue flowers).

- Sage, *Salvia officinalis*, a shrub originally from the Mediterranean region, that is grown for many uses including the use of its leaves in cooking. (Violet coloured flowers).
- Thyme, *Thymus vulgaris*, a small shrub originally from Mediterranean areas, that is grown for many uses including the use of its leaves in cooking. (Pink flowers).
- Rue, *Ruta graveolens*, a herb native to the Balkan Peninsula, that is grown for a number of uses including its use in some cuisines. (Yellow flowers).
- Chamomile or camomile, *Chamaemelum nobile*, a herb originally from Europe, that is grown for many uses including for making herbal tea. (White flowers).

Kiwifruit or Chinese gooseberry, *Actinidia deliciosa*, is originally from China, and this delicious fruit is now cultivated in China, New Zealand, and many other countries.

North Island brown kiwi, *Apteryx mantelli*, is one of the species of kiwi that is found in New Zealand. It is listed as vulnerable to extinction, mainly due to introduced predators such as feral dogs and cats.

Koalas, *Phascolarctos cinereus*, are native to eastern and southern Australia. They are not native to Tasmania or Western Australia. Their closest relatives are wombats, kangaroos, possums, and other marsupials. They live in eucalyptus forests, and almost exclusively feed on eucalyptus leaves. Koalas are listed as vulnerable to extinction due to habitat destruction.

Kowhai, *Sophora tetraptera*, is a stunning yellow-flowered tree that is native to New Zealand.

Ll

The seven-spot ladybird, 7-spot ladybird, or seven-spotted ladybug, *Coccinella septempunctata* or *Coccinella 7-punctata*, is one of the most commonly seen species of ladybird.

The labyrinth depicted here is the Waite Arboretum Labyrinth at Urrbrae House Historic Precinct Gardens in Adelaide, South Australia. This labyrinth was created in 2010 by the then curator of the Waite Arboretum, Dr Jennifer Gardner. This labyrinth is built from rows and rows of timber rounds that define the path. Have you ever walked around a labyrinth? Some labyrinths are quite large and can take a long time to walk around.

The lighthouse illustrated here is Cape Willoughby Lighthouse, which is positioned at the eastern end of Kangaroo Island, South Australia. It was first illuminated in 1852, and was South Australia's first lighthouse.

The lizards here are eastern blue-tongue lizards, also called blue-tongues, *Tiliqua scincoides*, which are native to Australia, including South Australia, and to a few islands of Indonesia to the north.

The leaves illustrated here in the little notebook are as follows:

- Lettuce, *Lactuca sativa*, which was originally cultivated in Egypt, and is now grown throughout most of the world. (Oval lettuce leaf of cos variety).
- Liquidambar, sweetgum, or ocotzocuahuitl, *Liquidambar styraciflua*, which is native to North America, Mexico, and Central America. It is now widely grown as a colourful ornamental tree. The fruits of this tree are round, very spiky, and persist for a long time on the ground. (Red leaf. This is its autumn colouration).
- Lace-bark tree or lacebark, *Brachychiton discolor*, which is native to parts of eastern Australia and Queensland and produces elegant, very attractive pink flowers each year. It is grown widely as a beautiful feature tree. (Lobed green leaf).
- Lantana, *Lantana camara*, which was originally from Central and South America, and is now grown widely for its decorative flowers. In many places, it has become a serious weed that out-competes native wildflowers. (Upper green leaf).
- London plane tree, *Platanus x acerifolia*, is thought to be of hybrid origin, arising as a cross between the American sycamore, *Platanus occidentalis*, and the Oriental plane tree, *Platanus orientalis*, some time before 1700, or it may be a cultivar of *Platanus orientalis*. The London plane is grown as a street tree in many cities worldwide, including London, Melbourne, Sydney, and Adelaide. (Yellow leaf. This is its autumn colouration).

The lobsters here are European lobsters, *Homarus gammarus*, which are blue, dark grey, or occasionally orange in colour. The two claws of this animal are different, usually the left claw is the crusher, and the right is the cutter.

The lilies featured here are Easter lilies, also called November lilies, *Lilium longiflorum*, which are endemic to Taiwan and the Ryukyu Islands of Japan. They are now very widely cultivated throughout the world for their stunning white flowers.

Leopards, *Panthera pardus*, have the widest distribution of all the wild cats. Their range extends from Africa, through parts of the Middle East, India, and across parts of Asia. They are listed as vulnerable to extinction due to habitat fragmentation, habitat destruction, and illegal hunting. They are already thought to be locally extinct in some countries where they used to live.

Lime or Tahitian Lime, *Citrus x latifolia*, is a citrus of hybrid origin which does not occur in the wild. It is now

cultivated widely for use in innumerable dishes. The lime tart pictured here is absolutely delicious!

Lemons, *Citrus limon*, which were originally from South Asia, are now grown throughout the world for culinary uses and for aromatherapy and cleaning purposes. The layered lemon and sugar crêpes illustrated here are simple and scrumptious!

Mm

The woolly mammoth, *Mammuthus primigenius*, which once lived across northern Europe, Asia, and North America. The various woolly mammoth populations became extinct between 14,000 years ago and 4,000 years ago, thought to be due to a change in the climate and hunting by early humans.

Have you ever been in a maze? Mazes have lots of dead ends, and all the paths and walls look the same. Sometimes it's quite difficult to find your way out of a maze!

Illustrated here is a diagram of a maze that's at Maxwell Wines, McLaren Vale, South Australia. It's made from rows and rows of pencil pine cypress trees that were planted in 1990. It's a lot of fun to find your way through a maze!

The mushroom houses here are based on three common types of edible mushroom:

- King oyster mushroom, *Pleurotus eryngii*. (On the left).
- Portobello mushroom, *Agaricus bisporus*. (The middle one).
- Enoki mushrooms, *Flammulina velutipes*. (On the right, some with spiral staircases).

Marigolds, *Calendula officinalis*, are bright orange or yellow flowers originally from Europe, and now cultivated very widely throughout much of the world. Did you see any marigolds here, for example decorating the muesli bowl, and inside the maze?

The mandarins depicted here, also called mandarin oranges, *Citrus reticulata*, were originally a wild species found in Vietnam, China, and Japan. It is now a very widely cultivated and popular citrus fruit and interestingly it is one of the ancestors of the orange.

The manatees featured here are West Indian manatees, also called North American manatees, *Trichechus manatus*, which are listed as vulnerable to extinction due to habitat loss and also due to injuries from fishing equipment and collisions with boats, and to illegal hunting. Let's learn more about manatees!

The three monograms here are based on my initials, WSS. If you'd like to design a monogram from your initials, experiment with drawing the letters close together, or try intertwining the letters, or you can make a picture of something out of the letters.

Nn

The nest illustrated belongs to a bird called the noisy miner, *Manorina melanocephala*, which is found in the east of Australia, from Queensland to Tasmania, and across to South Australia.

The nautilus, *Nautilus pompilius*, lives in deep waters off the coasts of many countries including Australia, Fiji, Thailand, Indonesia, and Japan. The populations of this creature are declining due to such threats as habitat degradation and overfishing for the shell collection trade. Little is known about these creatures, and so a great deal of research still needs to be done.

The narwhal, or narwhale, *Monodon monoceros*, lives wild in the waters around Greenland, Russia, and Canada.

The neon tetra, *Paracheirodon innesi*, lives wild in fresh waters of southeastern Colombia, eastern Peru, and western Brazil. Neon tetras are one of the most popular aquarium fishes, and many millions of them are captive-bred every year for the aquarium trade. This colourful fish is up to 4 cm in length.

The stitches worked with the needle and thread illustrated here are detached chain stitch, detached chain stitch with a long anchor, straight stitch, beading, French knot, fly stitch with a long anchor, plus there is a row of chain stitch.

Subjects featured in the little night sky notebook illustrated here are as follows:

- Full Moon.
- Halley's Comet, which was last seen from Earth in 1986. This comet returns nearby to Earth approximately every 75 or 76 years, so it is projected to return in 2061.
- The Pointers with Constellation Crux, The Southern Cross. Crux is the smallest of the 88 modern constellations.
- Constellation Orion, The Hunter, one of the most conspicuous and recognizable constellations in the night sky.
- The planet Jupiter.

Macadamia nuts, which have the scientific names *Macadamia integrifolia*, *M. ternifolia*, and *M. tetraphylla*, are a very popular nut that is endemic to New South Wales and Queensland, in Australia. It is one of Australia's most famous native food plants, and is now popular throughout the whole world.

Oo

The orchids illustrated here are as follows:

- Pink rock orchid, *Dendrobium kingianum*, and also known as *Thelychiton kingianus*, which lives perched

on rocks, or sometimes in trees, in locations from the coast to nearby ranges from New South Wales to Queensland, Australia. (Groups of medium-sized pink flowers).

- Cymbidium orchid or boat orchid, a *Cymbidium* hybrid, the ancestors of which were from Australasia. (Large dark red flowers).
- Moth orchid, a *Phalaenopsis* hybrid, the ancestors of which were from Australasia. (Large pink striped flowers).
- Spider orchid, in particular the wispy spider orchid, *Jonesiopsis capillata*, found in South Australia, Victoria, and New South Wales, in Australia. (Wispy white flowers).
- Slipper orchid, *Paphiopedilum insigne*, which is from India and Myanmar. (Large yellow flower with a slipper-like structure).
- Pink fairy orchid or also called pink fairies, *Caladenia latifolia*, which is native to southern Australia including Tasmania. (Small pink flowers).
- Cattleya orchid, a *Cattleya* hybrid, the ancestors of which were from Central and South America. (Large frilly dark pink flowers).
- Large shell orchid, also called a greenhood orchid, *Diplodium robustum*, which is found in South Australia, Victoria, and New South Wales, Australia. (Small green shell-like flower).
- Masdevallia orchid, *Masdevallia veitchiana*, which is native to Peru and Colombia. (Large triangular orange flowers).
- Hyacinth orchid, *Dipodium roseum*, which is native to east and southeastern Australia, including Tasmania. (Many medium-sized pink flowers on a leafless stem).
- Donkey orchids, *Diuris orientis*, which is endemic to eastern Australia from New South Wales to South Australia, and including Tasmania. (Small orange and yellow flowers).
- Blue sun orchid, *Thelymitra ixioides*, which is native to southern and eastern Australia, from Queensland to South Australia, and including Tasmania, and also to New Zealand. (Small blue flowers).

I hope you've had time to look up more information about optical illusions! It's so interesting that quite often what we think we see is not what's actually there!

The ostrich, *Struthio camelus*, is the world's largest living bird and lays the largest eggs of any living bird. It is native to Africa.

The owls illustrated here are the following:

- Snowy owl, *Bubo scandiacus*, which is from the Arctic regions in Europe, Asia, and North America. (White).

- Eurasian eagle owl, *Bubo bubo*, which is found throughout Europe and Asia, and is one of the world's largest owls. (Brown).
- Western screech owl, *Megascops kennicottii*, which is from North and Central America. (Grey).

If you're very observant, you will see that there is also one orange cat in the oak tree with the owls!

The owls are depicted here in an oak tree called a burr oak, or bur oak, *Quercus macrocarpa*, which is found in eastern North America. It is one of the most massive oaks, and may live up to 400 years.

One of the open sandwiches here is called a Ploughman's Lunch. It's made using wholemeal bread, Cheddar cheese, pickled onions, spring onions, and freshly ground black pepper.

The other open sandwich is Smoked Salmon and Greens. It's made using wholemeal bread, snow peas, smoked salmon, cucumber, and parsley.

The orange, *Citrus × sinensis*, is a citrus fruit of hybrid origin. Interestingly, it was the result of a cross between a hybrid pomelo and a hybrid mandarin some time before about 314 BC. Oranges have since become one of the most popular fruit worldwide. How amazing!

Many different types of onion belong to a highly cultivated species called *Allium cepa*. There are wild onion species that occur from Iran through to Central Asia that may have been its ancestors. Onions are very popular vegetables, used in innumerable dishes. They are related to garlic, leeks, and chives.

Pp

The panda, *Ailuropoda melanoleuca*, which is native to south central China, eats mainly leaves and shoots of various bamboo species. The panda's population numbers are rising slightly due to huge conservation efforts, although it is still listed as vulnerable to extinction, due in particular to habitat destruction. Interestingly, the panda is not closely related to the red panda of southwest China and the Himalayas.

The parrots featured here are rainbow lorikeets, *Trichoglossus moluccanus*, in Adelaide. Rainbow lorikeets are native to the east of Australia from Queensland to South Australia. Their feathers are astonishingly multi-coloured! They feed mainly on pollen, nectar, and fruit, including the fruit of fig, plum, loquat, peach, and nectarine trees in people's gardens (unless they put nets over their trees when the fruit is ripening)!

The peacocks illustrated here are blue or Indian peafowl, *Pavo cristatus*, which is native to India and Sri Lanka. If we didn't know that these birds are real, we wouldn't think that such an amazing bird with such flamboyant and elaborate tail feathers could exist!

The pine branch and pine cones illustrated here are chir pine or longleaf Indian pine, *Pinus roxburghii*, which is native to the Himalayas.

The pear tart featured here is called a pear tarte tatin, and it is wonderfully delicious!

Pears, *Pyrus communis*, were originally from Europe and southwest Asia and are now cultivated widely throughout the world. There are many cultivars of pears that differ in colour, shape, and flavour.

The platypus, *Ornithorhynchus anatinus*, is endemic to eastern Australia, including Tasmania. Its scientific name actually means 'duck-snout duck-like', in particular referring to its unique bill. When the preserved platypus specimen was first examined by European scientists, they thought it might be a fake because it was like no other animal they had ever seen!

Now we know that of course it's a real animal! Its closest relatives are the echidnas, the only other egg-laying mammals.

I hope you've been reading about the planets that orbit our Sun! Here are some interesting facts: Mercury has no moons.

Venus has no moons, and it rotates on its axis in the opposite direction to the rotation of all the other planets except for Uranus.

Earth has one moon, the Moon.

Mars has two moons, Phobos and Deimos.

Jupiter has four large moons, Ganymede, Callisto, Io, and Europa, plus at least 75 smaller moons.

Saturn has 62 moons, including Dione, Titan, Tethys, Rhea, Iapetus, and Enceladus.

Uranus has 27 moons, including Miranda, Ariel, Titania, Umbriel, and Oberon. Uranus rotates on its axis in the opposite direction to the rotation of all the other planets except for Venus.

Neptune has 14 moons, including Triton.

It is amazing to note that the moons called Ganymede and Titan are larger than the planet Mercury.

Did you know that since the 1990s, thousands of planets (4,103 as of 1 August 2019) have been discovered that are outside our Solar System, orbiting stars other than our Sun? Would you like to make discoveries about all of these planets?

The pasta illustrated here is as follows:

- Spaghetti = little strings.
- Fettuccine = little ribbons.
- Alfabeto = alphabet.
- Conchiglie = shells.
- Spirali = spirals.
- Ruote = wheels.
- Penne = quills.
- Cavatappi = corkscrews.
- Farfalle tricolore = butterflies. There are three flavours/colours of these: spinach, plain, and tomato, the colours of the Italian flag, which are green, white, and red.

The passionflower and passionfruit pictured, *Passiflora edulis*, grow on a vine that is native to Brazil, Paraguay, and Argentina. It is now widely cultivated throughout the world for its beautiful perfumed flowers and its delicious fruit. Passionfruit pulp is perfect with other fruit, like the peaches shown here, on a pavlova!

The pelican here is an Australian pelican, *Pelecanus conspicillatus*, which is commonly found in Australia, New Guinea, Indonesia, and Fiji.

The palm featured here with the parrots is a date palm, *Phoenix dactylifera*, which most likely originated in the area between Egypt, Iraq, and Syria.

Pinks, *Dianthus plumerius*, are native to Austria, Croatia, and Slovenia, and are now a much-loved, beautifully perfumed garden plant grown throughout much of the world. The colour pink may have been named after this flower.

The petunias here are Petunia hybrids, *Petunia x atkinsiana*, the ancestors of which are native to South America. Have you seen how many different colours and patterns of petunia there are?

The peonies, or sometimes spelled paeonies, depicted here are the garden peony *Paeonia lactiflora*, which is native to central and eastern Asia. There are now several hundred variously coloured and shaped cultivars of this plant. They are truly flamboyant!

Qq

Quetzalcoatlus (usually pronounced "KET-sal-ko-AT-lus"), with the scientific name of *Quetzalcoatlus northropi*, was one of the three largest pterosaurs, which are a group of reptiles known from fossils. This huge flying animal lived 68 to 66 million years ago during the Cretaceous period, in what is now West Texas. They became extinct at the end of the Cretaceous period, along with the non-avian dinosaurs. In fact, at least three quarters of all species of life on Earth at that time died out during that sudden extinction event.

The quokka, *Setonix brachyurus*, is a marsupial from southwest Western Australia, including the mainland, Rottnest Island, and Bald Island. It is listed as vulnerable to extinction due to habitat fragmentation and degradation, and to predation by feral cats and foxes.

There are six species of another marsupial that's called a quoll in Australasia. The populations of all of these species are declining. The quolls illustrated here are the eastern quoll, *Dasyurus viverrinus*, which was once found in mainland Australia and Tasmania, but, due to disease and to predation by foxes and feral cats, it became extinct on the mainland in the 1960s, or possibly in 1990, and is now only found in Tasmania. It is currently listed as endangered.

The quandong or native peach tree, *Santalum acuminatum*, is native to most southern regions of

mainland Australia, including the desert areas. The quandongs or native peaches are one of Australia's most well-loved and famous native bush foods. The fruit is quite often made into delicious sauces, pies, and slices.

I have illustrated two different quahog clams here:

- Ming, later named Hafrún, was an ocean quahog clam, *Arctica islandica*, from the North Atlantic Ocean near Iceland, that lived from 1499 until 2006, attaining an age of 507 years. The clam was initially called Ming, referring to the Ming Dynasty which was in power when the clam began its life. It was later named Hafrún, which means 'ocean mystery'. Imagine living for that long!
- Beautiful purple and white beads are made from the shell of the northern quahog, *Mercenaria mercenaria*. This clam is native to the eastern shores of North America and Central America.

The resplendent quetzal, *Pharomachrus mocinno*, lives in montane cloud forests of southern Mexico and Central America. This bird is 36 to 40 cm (14 to 16 in) long, plus an extra 65 cm (26 in) of tail feathers (male).

Queen angelfish, *Holocanthus ciliaris*, are from the Caribbean Sea and the western Atlantic Ocean. They are up to 45 cm in length.

Queen Triggerfish, *Balistes vetula*, are found in the Caribbean Sea and in both the western and eastern Atlantic Ocean. They are up to 60 cm in length.

The quince, *Cydonia oblonga*, is from areas such as Western Asia and the Middle East. It produces wonderful large blossoms. These are followed by perfumed yellow fruits that are usually eaten cooked into quince desserts or quince paste, jam, or jelly.

Quaking grass, *Briza maxima*, is from northern Africa, southern Europe, and Western Asia, and has been introduced more widely, including into Australia.

Rr

The rainbowfish featured here, *Melanotaenia duboulayi*, is a freshwater rainbowfish that is endemic to Australia. It lives in the eastern regions of northern New South Wales and southern Queensland. These fish are 12 cm (4.7 inches) in length.

Redback spiders, *Latrodectus hasseltii*, are commonly found all over Australia, and have now been introduced into some places elsewhere in the world such as New Zealand and Southeast Asia. We see them pretty often!

Manta rays, *Manta birostris*, is the largest species of ray in the world. They are found all around the world, typically in tropical and subtropical waters, but also in temperate waters.

Roses, of the genus *Rosa*, are one of the most widely cultivated groups of garden plants. There are hundreds of species, many of which were originally from Asia and Europe, and thousands of cultivars. Many roses are fantastically perfumed. How many different colours of rose have you seen?

The rhinoceros I have illustrated here is the black rhinoceros or hook-lipped rhinoceros, *Diceros bicornis*, which lives in Africa. It is listed as critically endangered due to habitat destruction and illegal hunting for its rhino horn which in fact is made of keratin and has no medicinal properties at all.

Raspberries, *Rubus idaeus*, are native to Europe and northern Asia. There are many other species of raspberry in other countries as well. What a lovely fruit! Have you ever tried growing raspberries?

Aren't rainbows fantastic? And double rainbows are amazing! The dark area of unlit sky lying between the primary and secondary rainbows is called Alexander's band or Alexander's dark band, after Alexander of Aphrodisias who first described this phenomenon nearly 2000 years ago.

Rafflesia, *Rafflesia arnoldii*, which lives in Sumatra and Borneo, is the largest flower in the world, measuring approximately 1 m in diameter. The flower has no stem or leaves, and lives parasitically on vines of the genus *Tetrastigma*.

Ss

The following seashells are featured here:

- The moon snail, or conical moon shell, *Polinices conicus*, which is also called *Conuber conicus*, is endemic to mainland Australia and Tasmania. The shell can be up to 5 cm in length. The females of this and another species of moon snail lay egg masses that are clear, crescent-shaped, and jelly-like. (Smooth shell).
- The conch, or true conch, *Strombus* sp. pictured is from southeastern Australia. This particular shell is 2.8 cm in length. (Speckled shell).
- China moon snail or spotted moon snail, *Naticarius onca* or *Natica onca*, from the Indopacific region including Australia. The shell can be 1.5 to 2 cm across. (Spotted shell).
- The brooch shell, *Neotrigonia bednalli*, belongs to a group of related shells that are abundant around the world as fossils, but there are only a few living species, all of which are found in Australia. This species is endemic to southeastern Australia, and it is up to 5 cm in length. (The shell that is shiny inside).
- The tower shell or tower snail, *Gazameda iredalei*, which is found from Bass Strait to southwest Australia. The shell size is 2.5 to 4 cm in length. (Sharp, spiky shell).

- This banded kelp shell, *Bankivia fasciata*, is from Australia, where this species can be found from northern New South Wales to South Australia, including Tasmania. The shells can be 1.5 to 2.5 cm in length. (Striped snail).
- Sunset Cockle, *Sunetta vaginalis*, which occurs from southern New South Wales, around southern Australia to Western Australia. This particular shell was found at Ninety Mile Beach, Victoria and is 3 cm across. (Shell with radiating stripes). (This ID of this specimen was kindly provided to me by the South Australian Museum on 1 Dec 2017).
- The kelp shell, *Phasianotrochus eximius*, which is endemic to southern mainland Australia and Tasmania. This shell is up to 4 cm in length and is often notably shiny and rainbow-coloured inside and delicately patterned outside. (This shell is on the Alphabet Tag).

The lovely deep blue starfish illustrated here is the blue sea star, *Linckia laevigata*, which is widely distributed in tropical Indo-Pacific waters including the Great Barrier Reef.

The scorpions here are the Flinders Ranges scorpion, *Urodacus elongatus*, which is one of Australia's largest scorpions. It is native to eastern Australia, including South Australia, and is 9 to 12 cm in length.

The sheep here are Merinos, which are a breed of domestic sheep, *Ovis aries*. Merinos have lovely fine, soft wool.

The sugar maple, *Acer saccharum*, is featured here as it appears throughout the four seasons. The trees are tapped for their sap and maple syrup is made in late winter and early spring.

Make sure you put on sunscreen!

I wrote this as an homage to Mary Schmich for her brilliant June 1st 1997 essay in the *Chicago Tribune* commonly known by the title *Wear Sunscreen*.

The drawing here of the stegosaurus, *Stegosaurus stenops*, is based on the fossil skeleton called Sophie, which is at the Natural History Museum in London. This fossil, which is 150 million years old, was excavated from rocks in Wyoming, USA in 2003. Sophie is the most complete stegosaurus skeleton known. She is 5.6 m long and 2.9 m tall.

The seahorse featured here is the long-snouted seahorse, *Hippocampus guttulatus*, which is native to the northeast Atlantic and the Mediterranean Sea. It is about 12 cm in length. This seahorse is quite rare and the threats to its survival include habitat degradation due to trawling, dredging, and pollution.

There are many species of wild strawberries throughout the world, including in Europe, Asia, and the Americas. The garden strawberry, *Fragaria × ananassa*, is a hybrid that is today cultivated worldwide.

The sea anemone here is the waratah sea anemone, *Actinia tenebrosa*, which is from eastern Australia and New Zealand.

Tt

The tree snails featured here are the emerald green snail, also called the green tree snail or the Manus green tree snail, *Papustyla pulcherrima*, or it is occasionally also called *Papuina pulcherrima*. This is an air-breathing snail that lives in trees. It is endemic to some rainforest areas of Manus Island and it is listed as near threatened due to logging of the rainforest and also to over-collecting for the shell collection trade.

The tiger moths featured here are the black and white tiger moth, *Ardices glatignyi*, also called *Spilosoma glatignyi*, which is native to the southern half of Australia. This and many other species of tiger moth have furry caterpillars that are popularly known as woolly bears.

The tortoise featured here is Jonathan, a Seychelles giant tortoise, *Aldabrachelys gigantea hololissa*, that lives in the grounds of Plantation Hose, the Governor's residence in Saint Helena, which is an island in the South Atlantic Ocean. Jonathan is the oldest living land animal in the world, reported to be 186 or 187 years old as at January 2019 (he hatched in about 1832). This type of tortoise and its close relatives that are also giant tortoises are listed as vulnerable to extinction. Did you know that tortoises are reptiles?

The plants in the terrarium are as follows:

- Vanilla-scented oncidium orchid, *Oncidium Twinkle*.
Oncidiums are originally from South America, Central America, and Mexico.
- Maidenhair fern, *Adiantum* sp.
- Lemon button fern, *Nephrolepis cordifolia* Duffii.

Tomatoes, *Solanum lycopersicum*, also sometimes called *Lycopersicon esculentum*, were originally from South America and Central America, and they are now cultivated worldwide. The name **tomato** is from the Nahuatl word **tomatl**.

The trees demonstrating some of the different shapes that trees can be are as follows:

- Bottle tree or Queensland bottle tree, *Brachychiton rupestris*, which is native to Queensland, Australia.
- Fir tree or Nordmann fir, *Abies nordmanniana*, which is from the mountains south and east of the Black Sea.
- Lombardy poplar, *Populus nigra* Italica, from Europe, parts of Asia, and northwest Africa.
- Nectarine (and peach), *Prunus persica*, which was originally from northwest China and has for a long time been cultivated widely.

- Silver birch, *Betula pendula*, which is native to Europe and parts of Asia.
- Dragon tree, *Dracena draco*, which is native to the Canary Islands, Cape Verde, Madeira, and western Morocco.
- Coconut palm, *Cocos nucifera*, which is native to the Indo-Pacific region.

Tulips, *Tulipa* spp., are native to the region from southern Europe to Central Asia, and have a long history of cultivation. There is a beautiful, huge permanent display of tulips at Keukenhof in The Netherlands.

Uu

The orchids illustrated here with the unbelievably long twirly petals are a species of slipper orchid called Sander's paphiopedilum, *Paphiopedilum sanderianum*. The petals can be over 1 m in length!

This orchid was first discovered by F. Sander's plant collector, J. Förstermann, in 1885, at Gunung Mulu in northwestern Borneo. It was later lost to cultivation and not located again in the wild until 1978, when it was found by Ivan Nielsen, who found it flowering near Fire Mountain in Sarawak, Borneo. This orchid is now protected in Gunung Mulu National Park.

The underground orchids featured in the pictures are the following:

- The western underground orchid, *Rhizanthella gardneri*, which is found in Western Australia, where it is endangered due to habitat loss and drought. Only 19 mature specimens in six populations of the orchid are known to currently exist in the wild as of 2017.
- The eastern underground orchid, *Rhizanthella slateri*, which is found from the south coast of New South Wales to southeastern Queensland. It is listed as endangered due mainly to habitat destruction. In NSW it is known from about ten locations, with a few individuals at most of the locations, and several at one location. Evidence suggests that the Queensland individuals may be a different species of underground orchid. Further research is required.

The unusual animals featured here are as follows:

- The red-coloured sea fan illustrated here is called the regal sea fan, *Leptogorgia hebes*. Even though it looks like a plant, it's actually an animal! It's a type of coral, related to other corals, and to sea anemones and jellyfish, and it grows to about 15 cm in height. It is found in the western Atlantic Ocean, from the eastern USA to the Gulf of Mexico, and to the coast of Venezuela and Brazil.
- The two white creatures here are sea lilies, also called stalked crinoids, *Neocrinus decorus*. They are attached to the sea floor and they look like plants, but in fact they're a type of animal related to starfish and sea urchins. This sea lily lives at great depth (143 m to 1200 m) in tropical Atlantic Ocean waters,

particularly around the Caribbean Ocean, including at Roatán off the coast of Honduras. This animal grows to approximately 70 cm in height. Amazingly, to escape predation by starfish, these stalked crinoids can detach from a section of their stem and then use their arms to crawl away along the sea floor.

- The bright pink animal is a sea slug, also called a nudibranch (which is pronounced "NOO-di-brank" or "NYOO-di-brank"), *Hypselodoris bullocki*. It is from the tropical western Pacific Ocean and the eastern Indian Ocean, and it grows to about 5 cm in length.
- The colourful blue and yellow animal is a sea slug, also called a nudibranch, *Chromodoris annae*. It is from the western Pacific Ocean, including around the Philippines, Indonesia, and Papua New Guinea, and it grows to about 5 cm in length.
- There are two different pangolins illustrated here, the first of which is a tree pangolin from Asia called the Sunda, Malayan, or Javan Pangolin, *Manis javanica*. It is found in Southeast Asia, where it is critically endangered due to habitat loss and illegal hunting for its meat and scales. Many people do not know how close to extinction this animal is. Also they incorrectly think that pangolin scales possess healing and health properties, but in fact there is no evidence at all to support this. The pangolin's scales are actually made of keratin, the same material that your fingernails and toenails are made of.
- The second type of pangolin pictured is a species from Africa, the giant pangolin, *Smutsia gigantea*. It is found in West and Central Africa, and is listed as vulnerable to extinction due to habitat alteration and illegal hunting for its meat and scales. People do not realise how threatened with extinction this animal is. Also they wrongly believe that pangolin scales possess healing and health properties, but in fact there is no scientific evidence at all for this. The pangolin's scales are in fact made of keratin, the same material that your fingernails and toenails are made of.

Uilleann pipes are a unique musical instrument! The full set is made up of the bellows, the bag, a chanter, three drones, and three regulators. As accents and dialects vary throughout Ireland, there are various ways to pronounce the word "uilleann", ranging from "ILL-un" (rhymes with "villain") to "ILL-yun" (rhymes with "million"). The word is from the Irish **uille**, which means **elbow**, which refers to the method of inflating the bag.

The unusual fruit illustrated here is a custard apple, a result of crossing the sugar apple, *Annona squamosa*, from Central America and the West Indies, with the cherimoya, *Annona cherimola*, which is native to Colombia, Ecuador, Peru, and Bolivia. There are now many varieties of custard apples in cultivation worldwide. What a delicious fruit it is!

The sea urchin here is the purple sea urchin, *Heliocidaris erythrogramma*, which is commonly found along the south and east coasts of Australia, from Esperance, Western Australia, to Heron Island, Queensland.

What do you think is the ultimate perfect dessert? Is it banana cinnamon cake, chocolate gateau with strawberries, or perhaps pineapple upside down cake with cherries and dark brown sugar? Yum.

The plant with the unusual leaves drawn here is a succulent, *Cotyledon orbiculata*, which is native to South Africa. It is a very variable species, with very pale light grey to green leaves, often with red edges. The leaves of some varieties are flat, some are rounded, and some are wavy or ruffled. Lovely!

Vv

The volcano depicted here is Mount Vesuvius, in Italian called Monte Vesuvio, erupting in 1944. This volcano is well-known for its eruption in the year AD 79 which destroyed Pompeii and other nearby cities. It has erupted numerous times since then, and the most recent was in 1944.

The vipers here are the common viper, also called an adder, *Vipera berus*, which is found in Europe and eastern Asia. This is the only venomous snake in many countries, including in England. It grows to a length of 60 to 90 cm.

The village here is based on the village of Manarola on the coastline of the Mediterranean Sea in the Italian Riviera region of northern Italy. Walking tracks link five towns, the Cinque Terre of Monterosso, Vernazza, Corniglia, Manarola, and Riomaggiore.

Violets, *Viola odorata*, are native to Europe and Asia, and are introduced to many other parts of the world. They are much-loved for their lovely flowers which have a truly exquisite perfume.

The soft velvety leaf illustrated here is a leaf of the peppermint pelargonium, also called the peppermint-scented geranium, *Pelargonium tomentosum*, which is native to South Africa.

The Venus flytrap, *Dionaea muscipula*, is a carnivorous plant that is native to the east coast of the USA, in the states of North and South Carolina.

Many plants have variegated leaves, and some have variegated flowers. The plant with variegated leaves illustrated here is a variegated rubber tree, or rubber plant, *Ficus elastica*. This species is native to India, Nepal, Bhutan, Burma, China, Malaysia, and Indonesia. The variegated form is very popular in cultivation.

Vanilla 'beans' are actually the capsules of the vanilla orchid, *Vanilla planifolia*. This orchid is native to Mexico, Central America, the Caribbean, and northern South America.

Ww

Watermelon, *Citrullus lanatus*, is native to West Africa, and is now cultivated widely and is very popular throughout the world.

The whales illustrated here are humpback whales, *Megaptera novaeangliae*, which is one of the larger species of whale. They are found in oceans and seas worldwide, and they eat mainly krill (which are like small prawns) and small fish.

The wentletrap, or the precious wentletrap, *Epitonium scalare*, is from the Red Sea, the Indian Ocean near Madagascar and South Africa, near Japan, and in the southwest Pacific Ocean.

The waves pictured here were waves that I drew at Bells Beach, Australia, a famous surf beach!

Walruses, *Odobenus rosmarus*, are found in various areas of the far north in the Northern Hemisphere. They are listed as vulnerable to extinction due to pollution and habitat alteration.

The windmill illustrated here is Callington Mill, which is a windmill in Oatlands, Tasmania. It was originally built in 1837, and was restored in 2010. It is used to grind grain into high quality flour. The link to find out more about Callington Mill is: <https://www.callingtonmill.com.au/>

Wallflowers that are popular in gardens, *Erysimum* cultivars, are mostly derived from a wild wallflower, *E. cheiri*, that is native to southern Europe. Did you know that wallflowers are related to cabbages?

Xx

The xyris plant illustrated here, also called tall yellow-eyed grass, *Xyris operculata*, is native to southern Australia including South Australia. There are over two hundred species of xyris, or yellow-eyed grasses, that live in many parts of the world.

Spix's macaw, also called the little blue macaw, *Cyanopsitta spixii*, is native to Brazil. The scientific name of this bird, *Cyanopsitta spixii*, means 'blue parrot of [Mr] Spix'. This beautiful bird is listed as critically endangered due to such factors as deforestation and the introduction of rats, cats, and other animals, and evidence suggests that it is extinct in the wild. Approximately 160 individuals remain in captivity as of 2018.

The fish pictured here are X-ray tetras, also called X-ray fish, *Pristella maxillaris*, which lives wild in the Amazon and Orinoco Basins, and in northeastern coastal South America. This is a popular aquarium fish, and many of them are captive-bred every year for the aquarium trade. This fish is almost transparent, and about 5 cm in length.

The x-shaped flowers depicted here are as follows:

- The island boronia, *Boronia edwardsii*, which is endemic to South Australia, including Kangaroo Island.
- Ixora, *Ixora coccinea*, which is originally from South Asia and is now cultivated widely throughout many warm parts of the world.

The xenophora, also called the carrier snail, featured here, *Xenophora pallidula*, is from the Philippines. This species also occurs more widely in other parts of the Indo-Pacific region. These snails are often described as assemblage artists of the underwater world, and one of nature's masters of bling! There are many species of xenophora, or carrier snails, throughout the world. They also occur worldwide in the fossil record, beginning about 89 million years ago. Some attach shells, others pebbles or pieces of coral, while many attach a mixture of objects to their shells.

The grey-headed flying fox, *Pteropus poliocephalus*, is a bat that is endemic to the southeastern forested areas of Australia, mainly east of the Great Dividing Range, from Bundaberg, Queensland to Geelong in Victoria, with outlying colonies in Ingham and Finch Hatton, and in Adelaide. It is one of the largest bats in the world. Adults have an average wingspan up to 1 metre. Did you know that bats are mammals? When they are not flying, bats hang upside down using their feet to hold onto branches.

The fox here is the red fox, *Vulpes vulpes*, which is native to the Northern Hemisphere. It has been introduced into Australia, where it is invasive and poses a threat to native wildlife.

Yy

Yaks, *Bos grunniens*, are found throughout the Himalayan region of India, the Tibetan Plateau and as far north as Mongolia and Russia.

The yacht illustrated here is *Vindilis*, a yacht designed by Dr Thomas Harrison Butler (Davinka Design, published in 1925), which he had built as his own yacht. She was built by A H Moody & Son, in Southampton, England, in 1935. For more information concerning *Vindilis* and other yachts, please see the Thomas Harrison Butler Association website at the following address: <http://www.harrisonbutlerassociation.com/>

Yellowfin tuna, *Thunnus albacares*, are found in tropical and subtropical oceans worldwide. They grow to 2.4 m in length and can swim at speeds of up to 80 km per hour, which is 50 miles per hour.

Ducklings are the young of domestic ducks, most of which are descended from the mallard, *Anas platyrhynchos*, a very adaptable and widespread species of duck.

The canary, *Serinus canaria* forma *domestica*, is the domesticated form of the wild canary, which is native to the Azores, Madeira, and the Canary Islands.

The sunflower, *Helianthus annuus*, was originally from the Americas, and is now cultivated widely. Some sunflowers are truly huge!

Ylang-ylang, or sometimes called the perfume tree or cananga tree, *Cananga odorata*, is a tree that is native to Southeast Asia, Papua New Guinea, and northern Australia. Ylang-ylang flowers have an absolutely exquisite fragrance!

The yabby, *Cherax destructor*, is an Australian freshwater crustacean that grows to about 20 to 30 cm in length.

Zz

Zebras, also called plains zebras, *Equus quagga*, are found in east and southern Africa. They're so beautifully striped!

Zebra fish, *Danio rerio*, are freshwater fish that are native to the streams of the southeastern Himalayan region and parts of India, Pakistan, Bangladesh, Nepal, and Myanmar. They are approximately 4 cm in length.

The zebra plant pictured here, *Aphelandra squarrosa*, is native to Brazil.

The zebra-striped butterfly illustrated here is the zebra butterfly or zebra longwing, *Heliconius charithonia*. It is from South America and Central America and as far north as southern Texas and peninsular Florida.

The zebra succulent pictured, *Haworthia fasciata* or *H. attenuata*, is a succulent from South Africa.

The moth with zigzag patterned wings is called a 'scallop shell', *Rheumaptera undulata*, and it is found quite widely, including in the British Isles and North America. Its wingspan is 25 to 30 mm.

The zigzag cactus illustrated here, also called the fishbone cactus, moon cactus, queen of the night, or rick rack cactus, *Epiphyllum anguliger*, is endemic to Mexico. This cactus has fragrant white or pale yellow flowers, and edible fruit.

The zigzag patterned seashells here are banded kelp shells, *Bankivia fasciata*. They are found in Australia, where this species can be found from northern New South Wales to South Australia, including Tasmania. It is a very variable species, with spiral bands of colours, or narrow zigzag patterns. The shells can be 1.5 to 2.5 cm in length.

The bees depicted here are European honey bees, *Apis mellifera*, which are one of the most common honey bees worldwide.

The ZZ plant, *Zamioculcas zamiifolia*, is a tropical plant native to eastern Africa, from Kenya to South Africa. Because both parts of its scientific name begin with the letter Z, it's called the ZZ plant for short!!

The zinnias depicted here, *Zinnia elegans*, are a type of daisy that is native to Mexico. They are cultivated very widely in gardens and there are now hundreds of different colourful cultivars. Would you like to grow some zinnias?