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Yearning To Be Round

4. Life Lives in Circles
Life-Materials
Continually Cycle

Life Materials are things like
Oxygen, Carbon, Calcium, Hydrogen—
the elemental nutrients our bodies are made of

Life Materials are shared by all lives and
used over and over again

Death is Earth's original re-cycling plan
Each death makes shared life materials

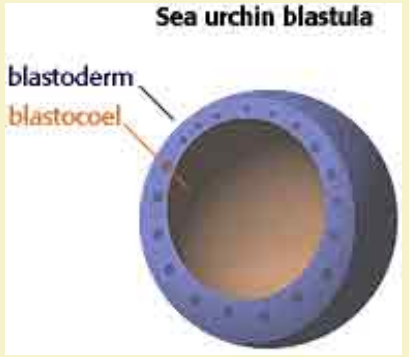
available to new lives

**Our physical bodies are entirely recycled,
100% post-consumer content**

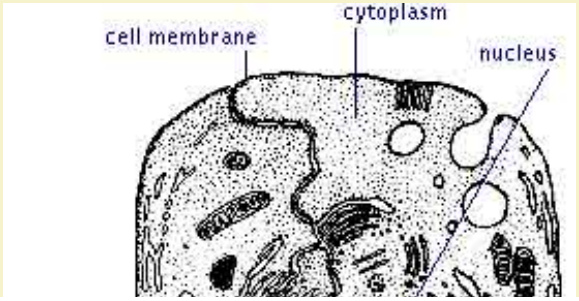
There are certain fundamental patterns in the Universe. The most important patterns for Life on Earth are circles and spirals.

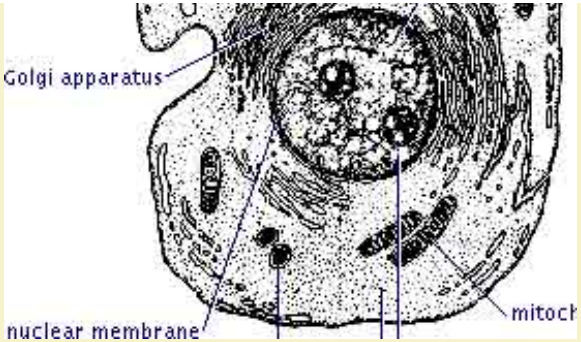
Fetal Growth

We all begin in circles. Animals (such as ourselves) are conceived of a circular egg pierced by a roundheaded sperm cell. In our early hours, our first embryonic form is a sphere of cells called the blastula.



All animals form the blastula, so not only humans, but all multi-cellular animals have actually been spheres early in life. Most plant seeds and spores are circular or spherical in shape. So we all not only live in circles, but we have all actually been circles.As we develop, circles continue to show up. Many of our cells, such as red blood cells, turn out to be circular, and each of our billions of cells has a central circular part called the nucleus.





We develop blood vessels which are cylindrical tubes, like straws, so in cross-section they are circles. Our bones are cylinders as well. Our skulls become domed like part of a soccer ball. As we develop in our mother's womb, our growing bodies stretch our mothers' bellies into larger and larger rounds.

After we are born, we carry on our bellies the 'button' that says we were once very attached to our mothers, and we suck at a circular nipple on a semicircular breast. When we as newborns are angry, we scream with our mouths wide in a circle. Later, drops of our blood form circles where they fall, as do the tears of our weeping. At bedtime yawns stretch our lips into circles. From the beginning we live in circles, and we continue in circles throughout our lives. The Yin and Yang symbol shows the circular embrace of the male and female principles—it is this embrace of love in which we are conceived.

Cycle: A cycle is a circle that operates through time by continuously repeating itself.

For instance, we all pump blood around our bodies in circles, so we call it the circulatory system. The heart pumps blood into the lungs, where carbon dioxide is dumped, and oxygen is picked up, then the blood is pumped back into the heart and from there pumped through arteries everywhere in the body, where the oxygen is delivered to all our cells and carbon dioxide picked up for dumping. Then the blood is pumped through veins back to the heart again for another trip through the lungs, and again, and again, and again, as long as we live. Life is lived in circles.

Earth spins like a huge slow top as it travels through space, and each spin is a sunrise and sunset. The very word "circle" comes from a Latin word, *circa*, which means 'day.' The day–cycles created by the rotating Earth dominate our eating and sleeping, our dreams and our

loves. Our bodies contain many clocks which time our cycles, or bio–rhythms.

Most cycles our bodies live in are the result of the very large physical circles described by the Earth as it spins and as it circles the sun in its enormous year-long orbit. The menstrual cycle is the result of the Moon drawing circles around Earth once a month. These circles of the Moon pull up a bulge of ocean which travels around the earth and creates the tides which regulate many creatures' fertility.

So not only did we all begin as circles, but we re-create the circle shape every day in many ways as our bodies experience their bio–rhythms.

All in the Circle

We all, every life on earth, live within the huge circles of the solar year and the lunar month. We all are part of Earth, the sphere of white cloud on blue ocean; we all live from the energy of Sol, the sphere of gold fire, and we all have interior tides pulled by Luna, the sphere of cool silver.

The Season Cycle

The solar energy that Earth receives shrinks and expands as Earth orbits Sol, and gets closer and farther from it, which creates the Seasons. The Earth's Seasons are a central cycle of our lives: Fall, Winter, Spring, Summer, forever and forever, long before us and long after us.

he season cycle also is a source of truths about our lives: The Christian Old Testament tells us that:

> *To everything there is a season, and a time to every purpose under heaven…a time to be born, and a time to die, a time to plant and a time to reap, a time to weep and a time to laugh, a time to keep silence and a time to speak.*

When we say that Life is lived in circles, we don't have to mean something scientific or profound or mystical. Cycles in our bodies are bio–rhythms; we are essentially rhythmic creatures. Every time we dance, or skate, or throw a ball or run the bases, we prove again that

life is lived in circles. Every time a dog fetches the ball back to the hand that threw it, a circle has been completed. Every time a mouse nibbles a deer bone for its calcium and turns it into milk for her litter, a circle has been completed.

A migrating bird flies from Minnesota to Peru in August. Next April, it will fly from Peru to Minnesota. When it does this, it will have made a circle both in time and in space.

Picture Earth traveling in its orbit around the sun—now picture that tiny bird flying South in August, and as Earth wheels through its year, flying from Peru to Minnesota in April. “Life is lived in circles” is not just an idea—these are real circles and real lives we’re talking about.

Our Solar system whirls in what is called the Milky Way Galaxy, which is shaped like an infinitely large pinwheel, because it is turning, although it turns slowly as we experience time.

A traditional variation on the season cycle is to imagine the human life span as the calendar year. A child ‘buds’ in her teens as if in Spring; opens into full Summer bloom and makes seed; then, in life’s Autumn, gradually loses petals and strength, and begins to dry and bend, and finally, in Winter’s culmination, mirrors the snow with her hair. A love affair between a young person and an older one is called a “May–December romance.”

Our Milky Way Galaxy is 100,000 light years in diameter. Every 200 million years, our solar system can celebrate a birthday in one turning of its galaxy. The circle as shape and as cycle is one of the central facts of the Universe.

Every star, and there are uncounted billions, is an enormous ball of fire.

The circle is so basically important that many human societies and religions cast their philosophies into Wheels and Mandalas. We use circles as symbols—of life, of wholeness, of

marriage and completion. To the ancient Romans, Fate was the Wheel of Fortune, raising us up, then at times rolling right over us. American Indians give us the Medicine Wheel and the sacred hoop. Tibetan Buddhism pictures the universe in magnificent circle diagrams called Mandalas.

Several pre-historic cultures left behind them stone circles. Below is one in Cornwall, Britain, called the Merry Maidens:

Another relict of the ancient Britons is the Men-an-Tol, a holed stone which was used in ceremonies celebrating birth and death. People passed themselves and their infants through the hole nine times 'against the sun', or widdershins. It has stood in Cornwall since before the pyramids.

Nature and Human Nature

Circles are every where on earth. Above us, the hawk floats wide circles in the sky. At our feet, the chipmunk's den opens its round mouth, seeds round his bulging cheeks; in the lake's shallows the whirligig beetle spins its crazy dance. In our neighbor's yard, a girl does cartwheels, and her little brother twirls in a circle until he is so dizzy he falls. The robin in the tree above them sculpts her nest with the shape of her breast. When we toss a pebble into a pool we create ring upon ring of ripples. We play with the wonderful brief spheres of soap bubbles and the bouncy spheres of balloons, which widen our circular eyes.

If circles are every **Where**, circles are also every **When**. When the very first cities were built in Mesopotamia, their walls made circles. The two main streets cut the city-circles into quarter-circles. We still talk, some six thousand years later, about certain neighborhoods of a city as 'quarters'. Paris has a 'Latin Quarter.' The earliest decorations on pottery were circles.

The ancient earth religions were based on the eternal circle of the Sacred Year.

Social/Communal Circles

One of the meanings of “circle” is a group of people sharing an interest or activity. You have a circle of friends. Your mother may belong to a sewing circle, a church circle. Our ceremonial and social life generally revolves in circles. Kids form circles at the slightest pretext. Many of the world’s religious ceremonies use the circle heavily.

Circles are also important in our storytelling—from King Arthur and His Knights of the Round Table to The Fellowship of the Ring.

Human celebrations often happen in circles—think how many circle dances there are. In childhood we sing ‘rounds.’ In Joni Mitchell’s song The Circle Game, the circle is a metaphor for human life everywhere. Here is the refrain:

> And the seasons they go round and round,
> And the painted ponies go up and down,
> We’re captive on a carousel of Time,
> We can’t return, we can only look
> Behind from where we came,
> And go round and round and round in the Circle Game.

Our everyday folk wisdom uses circles too—we remind each other that “what goes around, comes around.”

The circle-shape is so extravagantly common in nature and our lives—it is everywhere!—that we may think we know everything about it. Like most very common things, just because we know something about circles doesn’t mean we know what’s important about them.

Life-Materials Cycle and Re-Cycle

This essay began by saying “All life lives in circles.” We have not yet talked about the biggest, most important circles of all, which are Earth’s cycling and re-cycling of Life-Materials.

Life–Materials are the substances that all living things need to eat and breathe in, metabolize for energy and to build and re-build their bodies with. They are often called **nutrients**. Living things include the Five Kingdoms of Bacteria, Protozoans, Plants, Fungi, and Animals. Some Life-Materials are gases, some are liquid and some are solids.

To understand Earth's cycles, you must first know that Earth is pretty much a closed system. No matter comes in from outside except for a few meteorites and a daily bombardment of water in the form of snowballs/iceballs, which originate in the cometary region in the far reaches of the solar system.

The rest of Earth has been here ever since the planet was formed some 5 billion years ago. Every plant, every animal alive on earth this minute is made of life-materials that have been used and re-used by life over and over again. In other words, your own body, almost all of your physical self, is made of stuff that's been alive before.

This is such an important idea that it cries for more to be said. Death is one of life's most important inventions.

The Invention of Death, the First Recycling Program

Bacteria, the earliest life, and sttill the most successful kind of life, usually reproduce by dividing in two, over and over and over. They do this very rapidly. So the genetic part of bacteria is reproduced so often that it is "smeared" across time. You could say that the first bacteria are still alive in their copied descendants, but in fact all forms of reproduction have copying errors now and then, just like paper copiers. So bacteria do change. They also change in response to changes in their environment or surroundings.

These very simple, very successful creatures called bacteria (most life on Earth is bacteria) don't seem to have a "life span" (no inner clock that shuts them down after a certain time alive)—they just continue living until something kills them.

So as multicellular creatures evolved and lifeforms became larger and tied up more Life-Materials, Earth invented the first Recycling Program, which we call Death.

Death is the way Life-Materials are made available again to new lives. Every time something dies, other life forms get to use its materials so they can live. Nature re-cycles every life on Earth using Death. Without death, no
life-materials could be recycled. "Ashes to ashes and dust to dust," is accurate language. "May you return to the dust from which you were made," has been said at numberless burials.

Picture the planet Earth as it floats in space.

Imagine the thin layer of life that covers it--land and oceans and atmosphere. Imagine all these living organisms as an enormous seethe of atoms that are used over and over. Lives rise up out of the pool, sequester and exchange atoms that they need, live, die , and return their atoms to the pool.

Dying

Only one dying—
you can't have it,
I can't have it,
we all die it,

share
it.

You die, I do;
I die, you do.
You can't save me,
I can't save you.
Only one crying,
we all cry it,

bear
it.

—Ursula LeGuin

Earth, and the Sun and the other planets, were formed from the debris of a star which exploded which in turn formed a nebula of dust and gas, which eventually, after a very long time condensed into the solar system.

If you take the long view, we are all made of stardust, and we are all certainly made of Earth. We don't ride on a planet on its journey through space.

We are not passengers, we are part of the planet, as is every other lifeform on Earth. We are the parts of Earth that learned to speak and learned to laugh and weep.

Water Cycle

The largest physical process on earth is the water cycle. It is powered by the sun. The water cycle, together with the winds —also powered by the sun—together make the weather, which is central to our lives.

Your body is over 60 % water, so the water cycle should be of some interest to you. Water is a molecule made of two pieces(atoms) of Hydrogen (H) and one piece (atom) of Oxygen (O), so we call it H2O.

Basically, Life uses much the same water over and over again. But recall that Earth receives comet ice every day as well.

Heat from the sun changes liquid surface water (oceans, lakes, wetlands rivers) into the gas water vapor, which rises into the air. This is called **evaporation**.

Another huge source of water vapor in the air is plants. Green plants, especially trees, suck water out of the earth with their roots, and pump it up throughout their bodies, ending in the leaves, which breathe out water vapor. Green plants, especially trees, are really fountains. Here is an English mycologist's painting of a forest as fountain:

This pumping of water into the atmosphere is called **evapo-transpiration**.

A Simplified Sketch of the Water Cycle:

Above the ocean and rain forests, water vapor gathers into clouds. Winds move the clouds of vapor from west to east (usually). The clouds release their water in liquid form (rain) or crystal form (snow). The water lands on earth and eventually some of it ends up in a river which flows into the ocean, where the circle repeats.

Imagine one molecule of water off the coast of Hawaii. One sunny day the molecule and evaporates up into the air. It was liquid, now it is a gas. It rises and becomes part of a cloud. A few days later, it rains down in Mexico. It is absorbed by the ground. Then a plant root sucks our molecule into itself and the plant makes the molecule part of its flower petals. After a time, the petals wilt and dry, and the molecule vaporizes again and lifts into the sky.

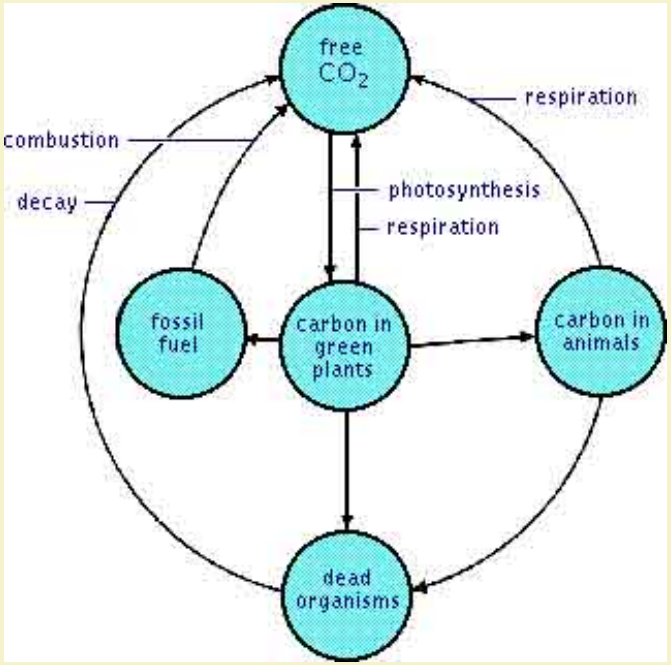
Imagine the journey as it might continue. That molecule of H2O might sink deep underground and become ground-water, or it might get pumped up into a faucet to become part of your own blood sometime, or it might get locked up inside a stone or locked up in a glacier for a few thousand years. It might even be in a tear on your pillow.

The amazing thing is that the hydrogen and oxygen atoms of water molecules and atoms of every other kind of life-material have all been on an incredible journey for millions and millions of years, now transforming into this, now transforming into that, and every part of the immense journey is circular and repeats itself over and over.

Carbon Cycle

The Life-Materials of Earth are all over the place. Life on Earth is carbon-based. A lot of your body is made of carbon. You breathe out carbon every time you exhale, 24 hours a day, in the form of carbon dioxide. All animals do, great and small.
Green plants don't. Unlike animals, plants breathe–in carbon dioxide and exhale oxygen, which is what we animals must breathe in. How's that for a convenient circle?

Living things constantly make circular trade-offs; the plants make oxygen for us animals, while we animals make carbon dioxide for the plants. This is not only a circle, it is a balance.



By far the largest producers of free oxygen on Earth are big tropical trees and ocean algaes, so when we cut down the tropical rainforests and pollute the oceans we stand an excellent chance of knocking the carbon–oxygen cycle out of balance.

When a smoothly turning circle, such as a spinning top or coin, is knocked out of balance, we know what happens. It rolls around wildly and falls down. You may have seen a washing machine go out of balance and start walking across the floor.

Back to carbon for a moment. Some carbon parts of your body, right now, were parts of living plants only a few months ago. Plants, through photosynthesis , make carbohydrates (chemical compounds made of carbon, oxygen and hydrogen—like pasta) that animals eat for food. You've heard of athletes' carbo-loading.

You ate the plants, fresh (salad)or dried (pasta) form, or another animal ate the plants, then you ate the animal (meatballs), and pretty soon the carbon that was part of grass became part of you!

It should be clear by now that we are creatures of Earth, made from Earth's atoms, and that, like all of Earth's creatures we participate in these great Circles of Life.

But for a few hundred years now, maybe longer, human societies, out of ignorance, have acted as if people did not belong in these Circles, or that we had become too important to worry about them.For example:

- We have behaved as though it didn't matter what we threw into rivers and lakes and oceans—even though everything alive depends on clean water.

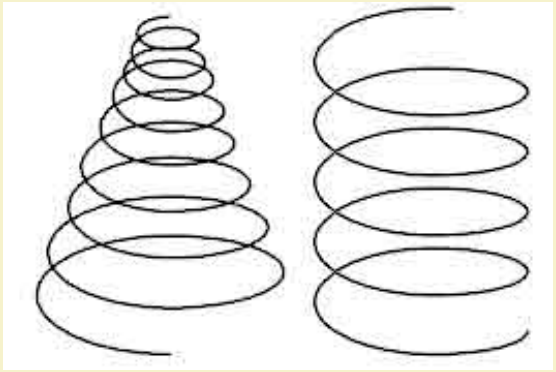
- We have behaved as if it didn't matter what we threw into the air—even though everything alive, plant and animal, depends on clean air to breathe.

Human beings have acted as though we could step outside the Natural Circles, as if we were kids dancing in and out of a jump rope. The jump rope describes a circle in the air; if you try to step outside the rope, sometimes you touch it and the rope flops around and the circle disappears. In the great circle dance called Life, we cannot try to step outside the circles without breaking them. If we want to remain players in the game of life, we'll have to learn to be better players and stay inside the circles our lives depend upon.

Spirals

The spiral is another kind of circular form, which occurs throughout the universe in such fundamental ways that it deserves its own account.
Spirals in nature are usually three-dimensional, whereas spirals in human culture are often flat, such as a spiral drawn on

paper.



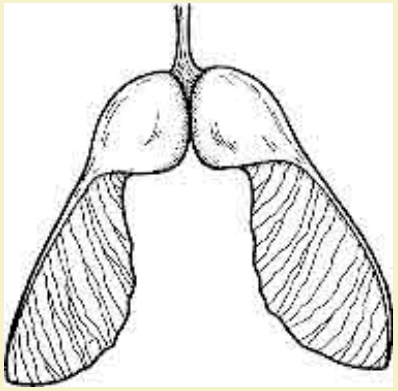
Natural Spirals, Plants:

Vines climb in spirals. Most climbing plants grow in a clockwise spiral. Parasitic plants such as figs and mistletoe, and such garden crops as pole beans and grapes urge their growing tips up and into a tight turn. Flower petals and leaves are often arranged in whorls, like these lily leaves and petals. :

When the bark sheds from a dead tree, we notice sometimes that the wood was formed in a spiral. If you look at germinating seeds and young stems and roots, you often see them growing and searching in spirals.

Fern leaves form tightly coiled and uncoil as they open:

Seeds of many trees sail down in spirals when it’s time to grow. Kids call the twirling winged maple seeds ‘helicopters.'



The scales of pine cones are arranged in spirals, and so are the needles on pine stems.

Natural Spirals: Animals

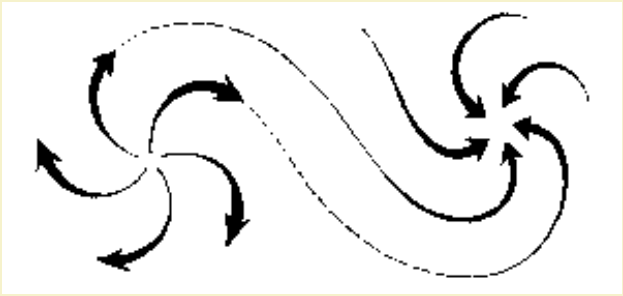
The spiral pattern also shows up in animals. The bodies of bacteria have three basic shapes. One is a disk (a circle), one is a rod (circular in cross-section), and the third is a tiny spiral. All are based on the circle-pattern. Many mollusks have shells which grow in beautiful spirals, such as snails, whelks, conches and the and the spectacular chambered nautilus.

Some human cultures have taken advantage of the way spirals channel air by making music with the larger shells, and with the other twisted hollow form, the horns of rams and goats and many antelope. Jews still blow their ancient rams-horn shofar in synagogue.
A ‘small’ Arctic whale, the narwhal, grows a spiraling ivory tusk out of its head which can reach ten feet long. These were once offered as proof of unicorns.
Many antelope and other horned animals grow spiraled horns, such as this kudu:

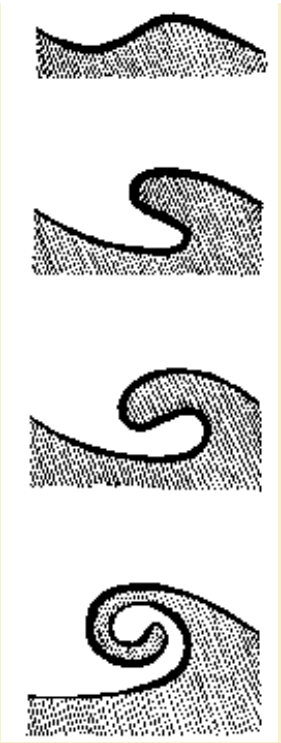
One of the odd spirals in nature is the twisted pink abdomen of the hermit crab, which has learned over millions of years to be a spiral so it will more easily fit into the shells of the dead mollusk-shells it uses for home and armor.

Natural Spirals: Fluids

We have all experienced the dynamic moving spirals which happen in fluids such as water and air. Twisters or tornadoes are only the most dramatic, but wind whirling in spirals also makes the huge storms called typhoons and hurricanes. The dust-devils that pick up soil from fields, and the waterspouts that form over lakes and sea are two smaller examples. Weather from day to day is a sequence of high pressure areas followed by low pressure areas. The winds in both highs (left) and lows (right) always flow in the spirals this diagram shows:

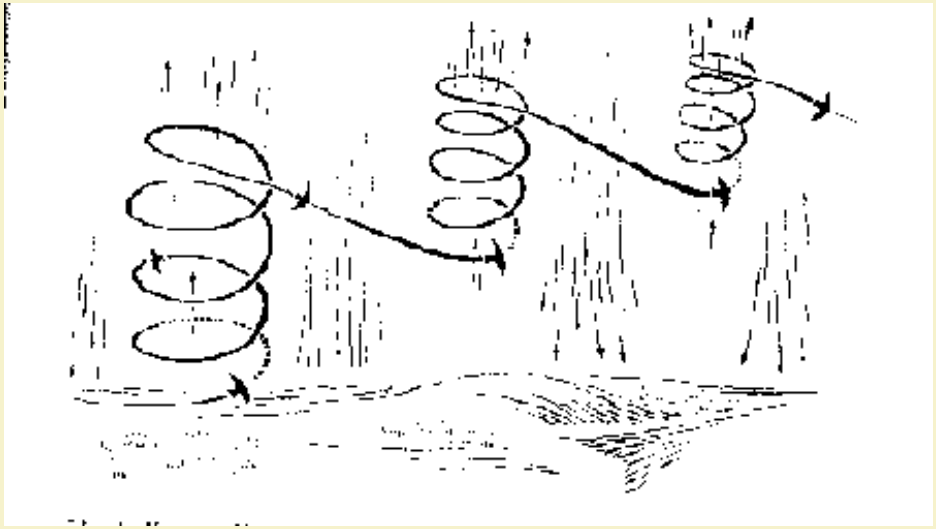


Over most of the Earth's surface all day, all night, for billions of unimaginable years, the spiral has been repeated at the crest of every breaking wave:



When a bird leaps into flight, air resistance shapes the bird’s wings into spirals which look almost like growing leaves reaching for light.

Warmed air rises in spirals which soaring birds such as hawks and vultures ride up and up into the sky:



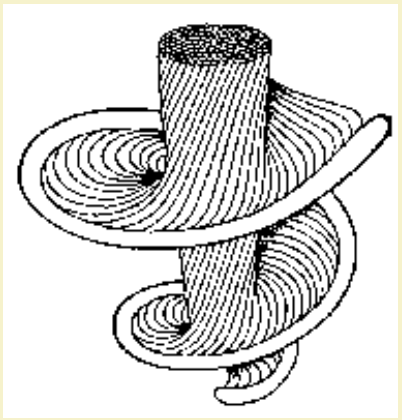
Perhaps most people's fascination with spirals began as children watching water drain from a sink or tub, creating visible and almost magical whirlpools. Anyone who has paddled a canoe knows the little spirals that follow when you lift your blade.

One name for spirals in fluids is 'vortex.' Many microscopic creatures such as rotifers and vorticella, feed by pulling water into their 'mouths' by creating whirlpools with their cilia (rapidly beating 'hairs" which circle the rim of their openings).

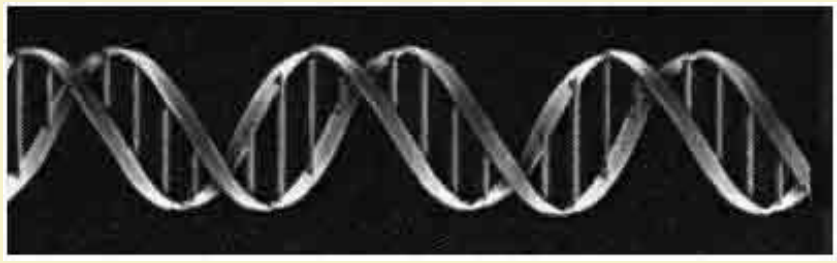
Natural Spirals: The Double Helix

Our bodies, like all animals, are partly built on spiral patterns. The cochlea of the inner ear is a spiral.

Auditory nerve tissue is spiral, too:



The most remarkable spiral in nature, though, is the most common. Everything alive has it. We have it billions of times over. It is in every cell in our bodies, and every cell of every flower and every earthworm and every sperm whale and every protist on earth. It is DNA, the stuff that carries and replicates the genetic code for everything alive. Its shape is a long double spiral, most often called the double helix. A helix is a coil, a 3-D spiral, such as a bedspring or a Slinky. The double spiral of DNA is the primary pattern of life on earth.



Human Culture Spirals

Humans have noticed and been fascinated by spirals no doubt as long as we have existed. Spirals turn up as motifs in our art and our mythologies from the beginning. The ancient Celts used the spiral extensively in their art. (See The Book of Kells, 8th Century) One of the oldest gestures from Europe is to point your finger at your temple and draw a spiral in the air, which has become a way of saying “crazy person!”, but long ago meant “godtouched person.”

The most persistent spiral from our cultural past, however, is the Caduceus, the two intertwined snakes with wings on top which create the staff of Aesculapius, Roman god of healing.

As far back as ancient Babylon(1800 BC.) the Caduceus stood for healing, fertility and wisdom. It is still the dominant symbol of medicine, of course, in most of the world. It is odd that our oldest symbol for the health of our flesh is the shape of the double helix of DNA embedded in every cell of that flesh.

Spirals figure into some of our oldest stories. The voyage of Odysseus or Ulysses after the Trojan War was almost ended by the sea monster Charybdis, a whirlpool.

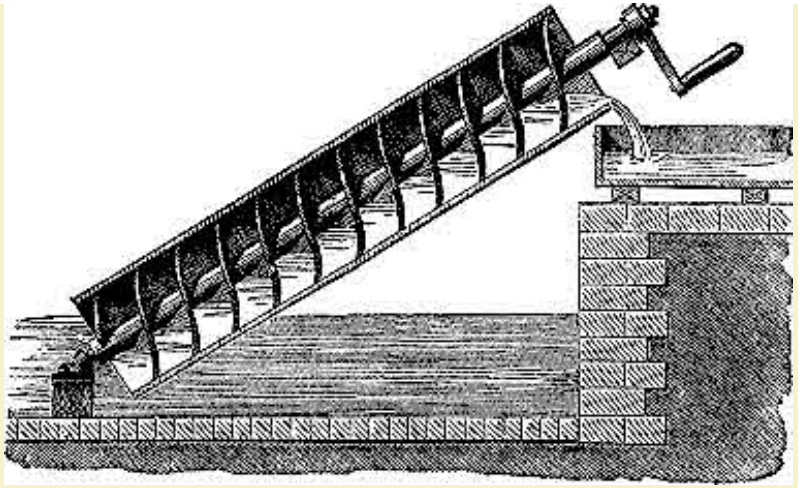
The famous Labyrinth of King Minos in which Theseus killed the Minotaur was a kind of elaborated spiral, as all mazes are. There is evidence that in very early earth religions, the spiral stood for the human journey through life. So if your life

feels sometimes like you're trapped in a maze, know that people have thought that way for a very long time.

Did you ever play Hopscotch? Archeologists found 5,000 year old hopscotch diagrams when they excavated Mohenjo-daro on the Indus River. Hopscotch diagrams like the one you drew on the sidewalk were originally, it seems, a kind of Labyrinth that kids had to make their way through as part of their initiation into adulthood. They had to show that they could make their way through the maze of life. They practiced for that ceremony. We still practice for it, but we've forgotten the initiation itself.

Long before the Celts arrived in Ireland, prehistoric peoples built stone passage-graves. Here is the carved "spiral stone" at the entrance to Newgrange, Ireland:

Here is a final example of the importance of the spiral in human life. One of the greatest inventions of all time was the screw, invented by Archimedes in the 3rd century BC. It is so routinely part of so many machines we don't even notice anymore. Yet the screw is itself a simple machine—and it is but a spiral on a rod.



Natural Spirals: Cosmos

DNA spirals and spiral bacteria are incredibly small, but we can see them with the electron microscope. We live in the Milky Way Galaxy, which is a spiral galaxy.

Spiral Galaxies look like loose pinwheels. It is that same fundamental shape set on a cosmic scale. Our Milky Way is a slowly turning pinwheel of stars that takes 200 million years to spin once. Many other galaxies are spirals. So whether we use microscope or telescope, we find that the fundamental shape is that variation on a circle that we call a spiral.

There is a final spiral we should notice. Using huge telescopes, astronomers have long photographed the formation of stars and their solar systems, and based on what they see in those photos, think they know what the formation of our own local solar system looked like. A nebula (an enormous interstellar cloud with a dense core or nucleus plus a thin shell of gaseous matter—the whole thing the size of a solar system) rotates around the nucleus and breaks up into whirlpools of gas called protoplanets. The nucleus condenses into a star, the protoplanet spirals each condense into planets. So Earth likely began its existence as a spiral!

So we see that the shape we call spiral, or vortex, or helix, or coil— so often repeated in ocean and air and land, and so rooted in our bodies and our thought—is in fact a mirror of Earth's very beginning, her first whirling dance across the stars.

Some Sources for Life Lives in Circles

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