

Air Theme Thoughts

Air and Life

Air! We can survive without water or food for relatively long periods of time, but if we are deprived of air for even a short time, even for 8 minutes and 46 seconds, we die. The word for breath in Ancient Greek was also the word for spirit or soul, and a similar equivalency exists in Hebrew. Air is the very breath of life.

Air contains two things necessary to life on earth: Carbon dioxide and oxygen. In photosynthesis green plants take carbon-dioxide from the air, water from the soil, and energy from the Sun, to make sugar and release oxygen into the air. In respiration, sugar stored in our bodies and oxygen from the air are turned into carbon dioxide, water, and the energy that powers cellular activity. Air makes life work.

Birds

Ah, Birds! Except for a few species, birds own the air, are meant to use it in every possible way. Their bodies are designed to exploit it: hollow bones, strong light feathers, body weights of sometimes only a few grams. They make air visible as they casually use it for even ordinary short trips. Some, like Rock Pigeons make art in their use of air, some use it for elaborate courtship displays, several species can hover in the air, and hummingbirds can even move backwards and forward. Some deal death from above as they split the air at over 200 miles per hour. Many species can glide, but a few can also soar, riding columns of rising air vertically for thousands of feet. Some Albatross species soar so well that after fledging, they will spend six years in the air without ever touching land. Air is a highway for avian migrants. Many fly a few hundred miles at the change of seasons, and many more one or two thousand miles, but Hudsonian Godwits fly from the Canadian Arctic to Patagonia in a single non-stop flight.

Insects

In all but the coldest locations air is home to tens of thousands of flying insect species. Some such as bees, moths, butterflies, and other flying insects play essential roles as pollinators. Others such as mosquitoes and blackflies are highly annoying and may be vectors for diseases such as malaria. Emerald ash borers are poised to wipe out ash species in North America, as Hemlock Woolly Adelgids threaten the survival of Hemlocks. Many of these exotic pest species have been carried to North America from other continents, but once here, their flying ability allows them to spread through the air. Beekeepers watch in dread as Africanized bees (“Killer bees”) have expanded northward from Brazil to Texas.

Most insect flights are local trips in search of mates, food, or new locations, but other insects are capable of epic migratory flights. Painted Lady Butterflies travel from North Africa to Iceland, and Monarch butterflies make extraordinary multi-generational migrations to and from Mexico eastern and northeaster North America.

Flying night and day, insects have great power for harm or good—from the human perspective. But flying insects offer something else: beauty. Dragon flies cut the air in their crisscrossing pursuit of prey. We stop in mid-sentence to show a butterfly to a friend, while a lunar moth leaves us completely speechless.

Bats

Only insects, birds, and bats can fly, and bats are the only mammals to do so. A thin membrane stretched across unusual arms and highly elongated fingers make the bat's wings. Almost helpless on the ground, they are true masters in the air. Some eat insects; others fruits and berries; while some carnivorous bats eat amphibians, lizards, birds and even fish—catching them on the wing. Bats that hunt aerial prey use air in a unique way as a medium for echolocation. Sound waves transmitted toward, and reflected from, flying prey allow bats to find prey in the dark.

Air moving lightly

The lake surface perfectly reflects the little mountain across the way. Nothing moves. There is no wind; the air is still. But soon the quaking aspens, with their flat and flexible leaf stalks, show they know something the other trees have overlooked. The aspen leaves dance, while those of adjacent trees hang motionless. The aspens have detected, let us call it, a *zephyr*, that lightest of all air movement. Now the other trees catch on as the breeze freshens a little. Their leaves begin to move, while long and flexible branches rise like wings in the wind. The lake has ceased to reflect and is now covered with wavelets.

Coastal warnings and air as destroyer

Over by the coast, measuring the wind is more formal. As wind speeds climb, they are measured by numbers on the Beaufort Scale: at Force 6 large branches move and wires whistle; at Force 8, spindrift blows across the waves, twigs break off trees; at Force 10 and there are high waves with overhanging crests and trees are uprooted; Force 12 is a hurricane, typhoon, or cyclone bringing huge waves and devastation ashore. With global climate change, catastrophic wind patterns become larger, stronger and more frequent.

Winds of the world

Around the world, winds have their own names and personalities. Some are hated and some loved. There are dozens of winds with dozens of names. Here are four winds well-known in Europe and North America: **Chinook**: In the US and Canada these sudden warm winds from the Rocky Mountains can raise winter temperatures by 50 degrees or more and melt a foot of snow in a day. **Mistral**: In southern France and along the north coast of the Mediterranean Sea, this strong northwesterly wind appears mostly in late winter and spring, and brings clear dry air. **Scirocco**. In North Africa and the Mediterranean this hot, dry southerly wind comes from the interior of the African continent and often carries dust. **Santa Anna**. This is a wind originating in northern Mexico and bringing hot and nasty late summer days to Los Angeles.

Human flight

Birds and bats fly through the air with ease, and for centuries humans dreamed of doing the same. In Greek Myth, architect and craftsman Daedalus built wings for himself and his son Icarus in order to escape Crete, but Icarus's wax wings melted when he flew too near the Sun. Leonardo da Vinci was fascinated by flight, did studies of birds, and sketched flying machine designs, but never flew himself. By the mid 1800's ascent by hot air balloon had been achieved, and by the end of that century many had experimented with glider designs. But it was the Wright Brothers in 1903, who first achieved powered flight. There followed a brief and romantic period, when humans, building or flying their own make-shift craft, felt, touched, and worked with the air itself as they tried to conquer it in hand-to-hand combat. But by the First World War airplanes were products of companies, and later Guernica foretold a century of horrors delivered from the air.

Sources of mechanical power

Before the coming of the steam engine, mechanical power was provided by animals, water, or air. The wind turned windmills to pump water and grind grain. Falling water did the same, as well to drive the machinery of the textile mills. Wind, and only wind, drove sailing ships around the world, for conquest, commerce, or both. This all changed when fossil fuels began to power engines of various kinds. Air became not the provider of power but merely the carrier of the smokey waste of industrial production. Now, looking back on the wasteland created by fossil fuels, we hope that wind energy together with solar energy and waterpower may yet lead us to safety.

Air as carrier of sound

Air carries sound to our ears. Every musical instrument in every form is meant to create vibrations in air. Without air, there would be no music of any kind: not drumming, not orchestral music, not rock, not hip-hop. Poetry could exist but not a single song.

Air as carrier of scent

Air carries information beyond sound. A wolf sniffs the and detects dinner from the scent of a deer. Downwind from the threat, a rabbit smells an approaching coyote and hides. A bobcat marking his territory uses scent to warn away rivals. A buck responds to the scent of a female ready to mate.

Air as bringer of danger

But the air so vital to our lives, can also bring us harm: air so polluted that on certain days it is not safe to go outside; air bringing invisible mercury that, falling in our lakes, makes fish too dangerous to eat; air carrying tiny droplets laden with a novel virus that upends our lives and causes hundreds of thousands of deaths

Climate change

And most dangerous of all: fossil fuel consumption drives greenhouse gases in the air to ever higher levels. Seas rise, glaciers melt, fire consumes one part of the country,

while hurricanes destroy another part, and floods inundate a third. Warmer temperatures displace whole species and favor exotic pests that devastate whole forests. Farmlands dry and turn to desert. Rain and snowfall patterns change, and water becomes scarce. Will we survive? Can we make the changes needed? The answer my friend is blowing in the wind.