



SUMMER WORLD: A Season of Bounty

by Bernd Heinrich

Introduction

MARCH OFTEN BRINGS heavy snowfalls here in Maine and Vermont. It's cold outside and I spend much of my time behind windowpanes in a bubble of tropical environment created by our wood-burning stove. I'm waiting for summer. Here in the north temperate zone, "summer" usually lasts for roughly half the year, from May through October. It's the time most of us (who are not recreational skiers) live or at least wait for.

Day after day I gaze at the white expanse of the beaver bog by our house to wait and hope for the red-winged blackbirds to return. Instead, in my mind's eye during March I see a family of beavers entombed in their lodge, which sticks up like a big lump above the thick snow-covered ice on the pond. The beavers' bubble for sustainable life is now a mere platform of sticks inches above the ice-cold water. It's barely large enough to move around in, and they live there in continuous darkness. Occasionally one or another of the beaver family holds its breath for several minutes as it dives into the hole next to its platform that is kept ice-free, to bring back a twig and chew off the bark. I identify with these beavers, because like theirs, much of my living is, for months, repressed and in my own bubble. Summer releases it. The world right now seems dead, but some birds are already stirring. Hairy and downy woodpeckers have started to drum; blackcapped chickadees sound off their "dee-dahs" at dawn; and the first robins have returned, and they hop where snow has melted along roadsides. Dawn is a bit earlier each day, and I awake with yearning and anticipation.

In my nostalgia for summers past and anticipation of summers to come, I think of swimming, basking in the sun while wiggling into warm sand at the beach, and reveling in the sights, sounds, and smells of flowers, bees, and birds. I think of the dances on balmy nights as we swung and do-si-doed our partners and sweated to fiddle music at the town hall; and of bass fishing on Bog Stream, where we canoed past floating lily pads and big white water lily blossoms. I think of the school year coming to a close.

For me, summer used to begin on the first day of school vacation, the season of long days. A more universal and just as specific beginning of summer (in the northern hemisphere) is probably around 20 March, the vernal (spring) equinox ("equal night"), when the night and the day are the same length. The height of northern summer is near 21 June, the summer solstice (corresponding to the winter solstice in the southern hemisphere), when in the north the days are the longest and we receive the most sunshine in the year. However, this is designated as the beginning of summer, not the height, because the maximum warmth is yet to come; it takes about a month and a half before the northern lands and oceans, still cold from the winter, have reheated. Then, after the summer solstice, the days shorten until about ninety-four days later, on 22 September, when they are again equal. On 21 December, the

winter solstice, the days are shortest. Again, owing to the temperature lag from the just-cooled earth and ocean, this date is called the beginning of winter, not its peak.

Almost all of life on the surface of the earth is fueled by the enormous amounts of energy intercepted from the sun, through a chemical reaction involving one main molecule, chlorophyll, and its reaction with water and carbon dioxide to produce sugar, the main fuel that powers life. The process that produces it is photosynthesis, meaning, literally, “making from photons.” The amount of this energy that continually streams onto Earth, and is proximally fixed into sugar, is relatively constant throughout the year, but the portion that is captured in any one place on Earth at any one time depends largely on the daily duration of illumination, and the angle at which the rays hit the Earth’s surface.

Both the duration and the incidence of illumination at any one place depend on the Earth’s tilt, or inclination, toward the sun, and the seasons are a consequence of this tilt. At all points of the Earth’s approximately 365-day (actually 365.2422-day) orbit around the sun, which we define as a year, the Earth’s axis of rotation (an imaginary line connecting the north and south poles) is 23.5 degrees with respect to the plane of its orbit around the sun. This angle does not affect the total energy that the entire Earth receives over the year; rather, it shifts the distribution of energy between the northern and southern hemispheres. When one hemisphere gets a lot of energy, the other gets little, and thus when it is summer in one it is winter in the other. At the equator the energy input is equal year-round, the sun is directly overhead at noon, and days and nights are always equal.

When the Earth is at the point in its orbit where the north pole is inclined at its maximum, 23.5 degrees, toward the sun, that is defined as the summer solstice in the north. At this time the far north is in continuous light and the far south is in continuous darkness. As the Earth continues its journey around the sun (while still maintaining its own same axis of rotation) the tilt that was toward the sun decreases gradually until solar radiation falls equally slanted onto both poles. At this point, the autumnal equinox, day and night are of equal length everywhere.

The solstices, the asteorological relationships during the Earth’s annual journey around the sun, proximally cause the seasons and the overall weather patterns to which life adjusts. However, ultimately the seasons are due to an ancient catastrophe. Astronomers believe that about 4 billion years ago a body the size and mass of Mars slammed into the Earth at 18,000 miles per hour, possibly tipping the Earth’s axis of rotation. Additionally, the matter that was ejected by this colossal collision produced the moon. Life arose near that time, about half a billion (500 million) years later, and it has adjusted to summer versus winter ever since. Different species each have their own schedules of preparation for summer, although for most summer is the season of reproduction, feeding, growing, and trying to avoid being eaten. It’s the season of courting, mating, and birthing; of living and dying.

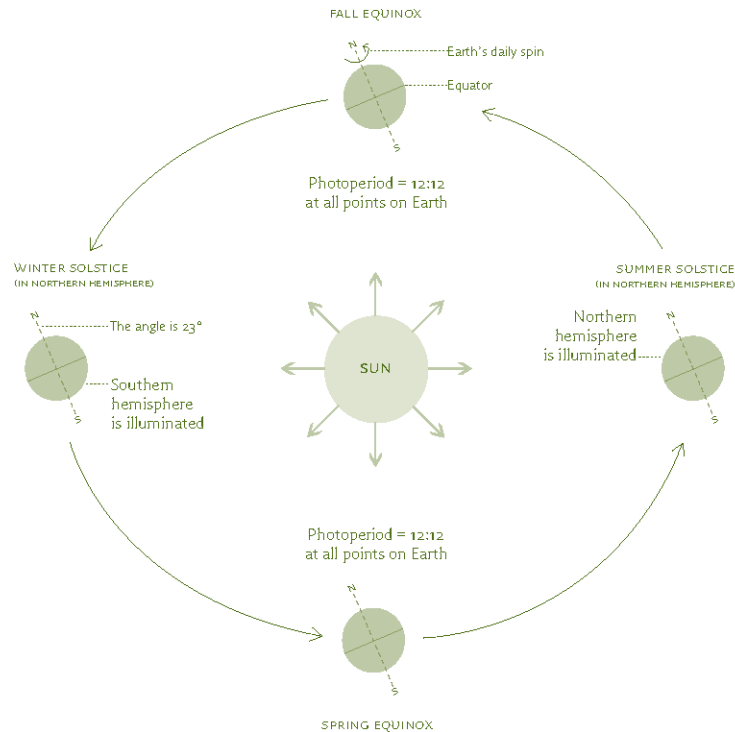


Fig. 1. The Earth's annual journey around the sun, showing the seasons in relation to the planet's tilt. At the solstices, the durations of day and night are different in the north versus the south polar regions. At the equinoxes these durations are equal at every point on Earth.

THE MEMBERS OF MANY SPECIES, myself included, become more alive again at the first “scent” of summer. Skunks come out of their dens, and we get the first whiffs of their presence. Chipmunks emerge from underground and leave their first tracks on the softening snow. The yearling beavers leave their dens as their parents get ready to have new pups. Flower buds of the willows, alder, beaked hazel, poplars, and elms are poised to respond to the first warmth, to open and reveal their beautiful colors and varied forms. Some of the birds that overwintered begin to sing, and the migrant birds are plying the skies by the millions on their way north from the tropics. The first are starting to arrive. Nature is about to burst at the seams. As George Harrison’s song, performed by the Beatles in 1969, goes: “Here comes the sun—da da da da. It’s all right—.” The warming sun signals relief, and I’m ready. The rest of nature has been waiting and getting ready as well.

During the increasingly longer and brighter days after the vernal equinox, the purple-brown flower buds of the alders in the bog, and those of the birches, hazels, and quaking aspen that surround it, begin to get ready for summer. These plants had their flower buds fully formed in the fall, ready to pop open and bloom at the right moment. Some had already formed their new leaf buds in early July, during the warmth of the previous summer, to get a jump after winter for the brief summer to come. Not all northern buds “hold back” from July till next June. Some “jump the gun”—red oak buds, for example, on shoots that have access to direct sunlight, often “break” in July and produce a second shoot with another set of leaves, instead of waiting eleven months for the next year. Then, however, they still make another set of buds before winter.

To the bees in my two beehives under snow next to our house, the external world will scarcely have changed over the last several months, but they have also been getting ready. The queen will already have started laying eggs into the combs so the hive can field a large cohort of workers to exploit the big but brief first flush of bloom of the poplars and maples, long before the leaves appear.

Summer is “those lazy, hazy, crazy days” that Nat King Cole sang about. But is it more? I asked my eight-year-old daughter, Lena, to tell me what she thought it is, and she wrote me a poem that I give here verbatim: “Summer days are fun. They make me want to run, under the hot boiling sun! The days are long and light, I get to stay up late at night! It’s quite a starry sight! Screaming yelling, chanting! Running, jogging, panting!” I wonder where she gets her ideas, but to me her poem seems in tune with Roger Miller’s catchy rhythm and words from the 1960s: “In the summertime, when all the trees and leaves are green and the redbird sings, I’ll be blue, ’cause you don’t want my love.”

Summer is a time of green, urgency, and lots of love lost and found. It is the most intense time of the year, when the natural world of the northern hemisphere is almost suddenly populated with billions of animals awakening from dormancy, and billions more arriving from the tropics. Almost overnight there is a wild orgy of courting, mating, and rearing young. The main order of business in summer is reproduction, and the window of opportunity is short. Proximally, summer may be a frolic, but that masks the underlying competition and struggle, because for every new life of any one species there are necessarily, on average, equal numbers of deaths of that same species. Furthermore, for each of the large animals there are necessarily also hundreds or thousands of deaths of smaller ones of other species that get eaten to produce this life. And every one of them has evolved mechanisms to reduce its chances of being eaten.

THE KEY TO SURVIVAL in winter is finding solutions to a combination of cold and scarce energy. Summer is the opposite situation. One could consider the summer world as delineated by survival at high temperatures and limited by water; and although I provide a brief reference to the “extreme” summer of physical constraints, as in the desert, I have chosen instead to look at the ingenuity of life more locally, as life-forms interact with one another—the main order of business in the summer. I focus mainly on what I see and saw played out in the familiar world that is at the doorstep of my log cabin in Maine, in a clearing in the woods. In addition, I paid as much or more attention to all this at our home along a dirt road in rural Vermont. Our house is surrounded by woods, a beaver bog, a vegetable garden, a couple of beehives, bird boxes, a woodshed, and patches of wild and cultivated flowers and fruit trees. I decided to live two summers actively observant. I wanted to pursue the interesting and often puzzling, without taking the seemingly prosaic for granted.