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**Oxygen & the Spirit: Joseph Priestley, Unitarian**

In Hebrew, the word for "spirit" – *ruach* – is the same as the word that means either "breath" or "wind" – that is, "air in motion." Similarly, in Greek, the root "p-n-e-u" -- as in, say, pneumatic, also means both spirit and air in motion, as breath or wind. "Pneumatology" is the word used by theologians to describe thinking about, or studying the spirit. Hebrew and Greek are, of course, the primary languages in which the Hebrew Bible and the New Testament were written. We are very much aware of both the movement of the wind and the act of breathing – they are essential parts of life. We can't see them, and yet we know they exist. So it's pretty easy to see how this connection between spirit and breath or wind came about among the people of the Bible. "Spirit" for them was the evidence in the world around them of the presence of *Elohim, Jahweh,* the New Testament *God,* and so on. Just as with their breath and the sighing of the wind, they sensed a divine presence that they could not see.

This is true in English as well. The Latin root of words such as inspiration and respiration is *spirare*, which means both breath and the spirit. And, of course, many forms of meditation use the breath as the focus for the meditation practice.

Well, interestingly, the person I want to talk about today was someone who also made this connection between the spirit and the air that enables us to exist. Joseph Priestley was a minister in 18th Century England, who eventually became both Unitarian and Universalist in his beliefs. He was also a "natural philosopher" – the term used in his day for a scientist. Working on his own, Priestley conducted experiments, first in electricity, and later in the chemistry of air. He was elected to the Royal Society in England at a young age, and he was a colleague of many leading scientific thinkers of his day, including Benjamin Franklin. Priestley is widely known as the discoverer of oxygen, although this is somewhat misleading because he didn't know that he had discovered it. Today, I am relying partly on a new book about Priestley. It was written by Steven Johnson, and it's entitled *The Invention of Air: A story of Science, Faith, Revolution, and the Birth of America.* The title sounds strange; we think of Priestley as the discoverer of the composition of our air, but not as its inventor. But the author is making a point here – Priestley made a far more important, but little noticed, discovery that would unlock the mystery of how the evolutionary process invented the air that we now breathe. The fruits of Priestley's discovery enable us today to see the world as a vast, interdependent, interconnected web – a new way of looking at the world that enables us to think in ecological terms. And thereby – as they say – hangs a tale!

After having studied electricity and publishing a book on his findings, Priestly began to conduct experiments with air. He began to explore the properties of air by putting things into sealed jars to see what would happen. He noticed that mice and frogs put in sealed containers would quickly die. A lighted candle in a sealed jar would also expire in a short time. Priestly didn't know, of course, that it was because they had used up all the oxygen in the space. Thinking that plants would be similarly affected, he placed a mint plant in a sealed jar and waited for it to expire. But the plant didn't die; in fact it flourished, and it continued growing in the sealed container all summer long. He

tried some variations. A candle placed in the jar would burn readily alongside the mint. A mouse put into the jar survived happily. Somehow, the plant was disabling whatever it was that would otherwise snuff out the candle and suffocate the mouse.

We know that Priestley shared this discovery with Benjamin Franklin, but we don't know exactly what he made of it. We do know that Franklin wrote back, and that both men suspected that something profound was lurking in the discovery that the mint survived. What we now know, of course, but what they could only guess at was that the plant was producing oxygen and taking in carbon dioxide. But the two men shared a further insight that the mint's capacity for rejuvenating "putrid" air was part of a larger system that extended far beyond Priestley's experiments. They guessed, correctly, that this discovery was a key to understanding the cycle of life on Earth. Indeed, what they had grasped – however dimly – was the process of photosynthesis that created the atmosphere on earth that allows us to exist today.

Some 2 billion years ago, a form of cyanobacteria hit upon a photosynthetic process that used the sun's energy to extract hydrogen from water. The strategy was spectacularly successful, but it created the earth's first pollution problem. The process expelled oxygen as a waste product. Earth's oxygen content shot up, and countless microbes were destroyed by this cocktail of sunlight and oxygen. Over time, though, organisms evolved to thrive in an oxygen-rich environment, and we, of course, are their descendents. Oxygen levels stabilized at around 20% or our atmosphere (Most of the rest is Nitrogen), and these levels permitted the growth of life as we know it today. We exist in a delicate system of balance in which oxygen-breathing animals, and carbon dioxide-absorbing plants have achieved a state of homeostasis. And this, of course, is the source of the title "The Invention of Air." As the author, Steven Johnson, put it:

> The invention of photosynthesis created a radically different atmosphere for Earth—an artificial bubble created by the plants, at first lethal, and then, over time, life-sustaining, as a whole new family of organisms discovered the possibilities of aerobic respiration, through the evolution of mitochondrial power plants that used oxygen to produce energy.

Now Priestly conducted his experiments in the English cities of Leeds and Birmingham. And he lived in the beginnings of the industrial era in England. Located just under the surface of much of England's soil are huge deposits of coal. And what is coal? -- All the debris piled up during the explosion of oxygen billions of years ago in the form of carboniferous rocks, which we know as coal. Huge quantities of nonbiodegraded organic matter trapped in the carboniferous layer make this coal an unparalleled source of fuel. So photosynthesis enters the picture again in the form of energy – originally from the sun – that has been stored in those deposits over millions of years. And this energy made possible a huge transformation in the years during which Priestly preached and did his experiments – a tremendous increase in wealth and innovation, a radical restructuring of the relationship between town and country, and a whole new way of life – industrial labor.

As I mentioned, Priestley is widely credited with having discovered oxygen, and indeed he was the first to have isolated pure oxygen, which he did in the course of various experiments involving burning substances. He didn't give it its name, however, and he hadn't gotten the science right. It remained for Antoine Lavoisier, in France, to

build on Priestley's work, to study it systematically, and to conclude that the atmosphere is one-fourth of what he called "pure air" that enables burning, and respiration. And it was Lavoisier who gave this "pure air" its scientific name, oxygen.

Now, during all the time that Joseph Priestley was conducting his experiments, he was also serving as a minister in various churches. He was raised in a family of Calvinists, who, of course, were known as "dissenters" from the quasi-official Anglican church. But he rejected the strict doctrines of Calvinism at a young age, and progressed in his thinking through various stages of what was considered to be "heretical" thinking. It could rightly be said that he was both Unitarian and Universalist in his theology; he argued for the humanity of Jesus and for universal salvation.

Priestly concluded that much accepted Christian dogma was actually a "corruption" of the original Christian faith, which led him to write his best-known theological work – the *History of the Corruptions of Christianity.* In it, he opened with a meticulous assault on the doctrine of the Trinity, and he went on from there to challenge many other leading Christian doctrines and practices. But here is a curious fact about his man of science. Even as he continued to alter and to reinvent his beliefs – and to challenge the orthodoxies of his day – he was determined to keep the core of his religion alive. He was a heretic of the first order who nonetheless possessed an unshakable faith. Thus, he took great care in the *Corruptions* to present the book as a defense of the Christian faith, restoring it to the original values of Jesus and of the "primitive" fathers of the early church who worshipped a single god. So Priestly clearly saw no contradiction between his commitment to science and his commitment to his religion. Indeed, through his experiments, he saw the world as a wondrous place, and he saw the discoveries of science as vindication of his faith, not a contradiction of it.

Like many other scientists and liberal churchmen of his day, Priestley was also a political radical. Ever the optimist, he believed that the discoveries of science indicated an upward path of progress for humanity. Similarly, in the turmoil and upheaval of revolutions in America and France, he saw indisputable signs of progress, both individual and societal. Priestley and a burgeoning Unitarian movement, along with other liberals, saw in these revolutions the promise of a humanity freed from despotism and superstition. As England became more and more frightened by the turmoil across the channel, Priestly and the Unitarians were denounced as enemies of both church and state. In 1791, a mob attacked and burned Priestley's church, library, and laboratory.

Three years later, Priestley emigrated to America, joining several of his children who had already settled here. His works on religion and science had already been published here. He gave a series of lectures at the Universalist church in Philadelphia, and later helped to establish a Unitarian church in Philadelphia, the first church in America to be called Unitarian.

I have already mentioned Priestley's connection with Benjamin Franklin, a long-lasting relationship of mutual liking and respect. Once in America, Priestley also became acquainted with many of the leading lights of the new republic, including John Adams, Thomas Jefferson, and Benjamin Rush, signer of the Declaration of Independence, who was a Universalist. His views on religion had little impact on Dr. Franklin, who remained a devout nonbeliever. His writings and conversations with Thomas Jefferson had a greater influence. It was only after reading Priestley's

*Corruptions of Christianity,* that Jefferson felt comfortable calling himself a Christian again. And Jefferson very much subscribed to Priestley's vision of an uncorrupted early Christianity. He called Priestley's writings, "the basis of my own faith." Referring directly to Priestley's work, Jefferson wrote: "To the corruptions of Christianity I am indeed opposed, but not to the genuine precepts of Jesus himself." And Jefferson went on to redo the four Gospels and to create what came to be known as "the Jefferson Bible," a work that exists today. In it, Jefferson edited out references to miracles and other supernatural events, and to Jesus' divinity, and he pasted together a collection of what he considered to be actual sayings and teachings of Jesus.

Joseph Priestley lived out his years, preaching and lecturing in Northumberland, PA. He died in 1804. So – why do we care about Joseph Priestley today? He seems to me to have been the ideal Unitarian (and Universalist, too!) In matters of religion, he remained devoted to what he believed to the essence of Christianity – the teachings of Jesus. His own theology progressed over the years, and was something that he was always altering and amending. He was a man of the enlightenment – committed to science and to reason – in his religion as well as in his life as a scientist. He believed in justice from oppression and tyranny, and he spoke out about his views (at considerable cost to himself and his family).

But I believe Priestley's major contribution to our modern world lies in his experiments with that little sprig of mint. Priestley, with considerable help from Dr. Franklin, took the first halting steps toward seeing the world as interconnected and interdependent. Remember that our UU 7th Principle calls on us to honor and respect "the interdependent web of all existence, of which we are a part." On so many levels, and in so many ways, we need to begin to see ourselves not just as consumers of resources, but as a small part of a vast interconnected web. Priestley didn't know about photosynthesis; he didn't know that the coal that fueled the industrial revolution was simply a different form of the energy created by photosynthesis. But his way of approaching the world around him helps us to see that we are all in this together, that we are tiny ephemeral blossoms on the tree of life, that our fate, and the fate of the world are inextricably bound up together.

On an intuitive level, Priestley – man of science and religion – sensed the connection between the air we breathe and the spirit. Air is essential to life, and many peoples throughout history, and up to the present day, have sensed its spiritual significance, its sacred aspect. When we pay attention to our breathing, as we do in the meditative part of service, we have the potential to feel our connection with the larger, vaster, web of all existence. Joseph Priestley took some tentative first steps to helping us to understand our place in this interdependent web, and to understand the importance of the web to our existence and to the existence of all living beings.

- So, let us remember Joseph Priestley for his willingness to challenge religious orthodoxy and yet to remain steadfast in his faith.
- And let us remember him for showing us the way to a more holistic, a more ecological, view of the world around us; for showing us that we are part of a vast web of connections and interdependence.