

**Northern Lights**  
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*Ben Kruser, The Leader, February 1992.*

Aurora Borealis, the Northern Lights, has been the subject of speculation, myth, and scientific study throughout history. Indigenous people in Canada and the northern U.S. had many legends to explain the lights. One legend says the souls of departed friends were lighting torches to guide those who followed. Another describes a great hole in the sky through which souls pass from this world to the next. Many stories tell of spirits with light bands on heads and waist playing a lively game of football with a walrus skull.

Although auroras were common occurrences to northern peoples, the occasional aurora seen in central and southern Europe created panic. Greek and Roman philosophers believed the sky was opening and spewing forth flame and smoke. In early times, people detected major fires by the light reflected from the evening clouds. When an aurora made an uncommon appearance in southern latitudes, troops rushed to neighbouring cities to help with what appeared to be a major conflagration

In the middle ages, Europeans went from hysteria to hallucination. They saw vast armies of angels clashing in the sky, and tens of thousands of peasants across Europe joined pilgrimages in hopes of saving the world from approaching Armageddon.

Science also had its opinions about the aurora. Some scientists speculated that the force of ice and glaciers produced flame, while others thought that vast ice belts reflected the sun's light into the evening sky. Active research began in the 17th century when Pierre Gassendi, a mathematician and philosopher, named the lights after Aurora, the Romans' rosy-fingered Goddess of Dawn, whose job was to usher in the rising sun.

Carl Stonner, a Norwegian physicist, was the first to solve the question of the aurora's length. He took pictures of two widely separated points and used triangulation to calculate auroral span. Auroras usually start around 105 km above the earth and stretch to altitudes over 485 km.

Another question researchers addressed was where auroras occur most often. After compiling records of auroral activity from northern expeditions and other accounts, Elias Loomis, a Yale professor, developed a map of the arctic showing auroras frequency. It has since been updated by more sophisticated means, such as satellites. We know that people living on latitude 65 degrees N can expect to average 243 nights of northern lights a year. Most Canadians live in an area of 50 to 100 auroras per year

But what is an aurora? What causes the Northern Lights? Using a prism, Norwegian scientists discovered auroral light was discontinuous; that is, it did not have all the colours of the rainbow. The only

colours produced in an aurora are deep violet, green-yellow, and red.

When atoms become electrically charged, they emit energy that produces radio waves, x-rays, and visible light waves. Air consists of nitrogen and oxygen atoms. When nitrogen atoms become electrically charged, they emit violet and red colour waves. Charged oxygen atoms produce green yellow light. Scientists studying the sun discovered that sun spots produce solar flares, which shoot streams of highly charged electrons into space. As charged particles reach earth, they are drawn into the planet's magnetic field, which is heavily concentrated in northern latitudes. (That's why we have a "magnetic north" and "true north" compass reading.) The collision of forces causes a geomagnetic storm, which we witness as an aurora.

The principle that lights up our sky is the same that commonly lights neon signs. Electricity charges a gas, which emits energy as coloured light. We also make an "aurora" when we turn on a colour television. The only difference is that a real aurora is more interesting to watch.

It's important for Canadians to continue studying the aurora. Auroral activity can interfere with the radio and satellite operations that form vital communications links in northern communities. And, because auroras consist of an electric current of about one million amps, in intense northern geomagnetic storms, an aurora can induce electric current along lengthy conductors such as oil pipelines, power lines, and telephone cables. The result: transformer malfunction and power outages.

Despite some of the technical headaches auroras can cause, most of us see them as one of nature's wonders. And some popular myths persist. For example, some people believe you can control the behaviour of an aurora by whistling. The better the whistle, the more the aurora will change and even dance to you. Others believe you can control the aurora by spitting at it, but I don't recommend telling this one to a group of small boys.

There's still disagreement about whether the aurora makes a noise. While some researchers claim no evidence that the lights produce a sound, there are those who believe they can hear the lights crackling. While science and philosophers argue over this point and others, I am happy to believe that the aurora is friends from days gone by calling me out to enjoy the northern lights and, maybe, a lively game of walrus skull football.

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