Negative Ions - Vitamins of the Air?

by Don Strachan and Jim Karnstedt

When certain kinds of winds begin to blow throughout the world, hospital admissions, suicides, and crime rates skyrocket . One country- Switzerland- even accepts the blowing of the "Foehn" during the commission of a crime as mitigating evidence in court.

These "notorious" desert and sea winds are also linked to minor illnesses and malaise epidemics. Victims' claims range from sleeplessness, irritability, tension, migraine, nausea, palpitations and hot flashes with sweating or chills, to tremor, vertigo, swelling, breathing difficulty, and frequent intestinal movement. In addition, elderly persons are affected with depression, apathy, and fatigue.

What causes these "witches' winds," as they're often called, to differ from others? What do they possess or lack that make them a dread to the lands or oceans they blow across?

Nothing more than an ambulance of invisible, minute particles with an imperceptive electrical charge- positive and negative ions.

According to the experts, positive ions rob us of our good senses and dispositions, while their stimulating everything from plant growth to the human sex drive.

For the uninitiated ions are charged particles in the air, formed when enough energy acts on a molecule- such as carbon dioxide , oxygen, water, or nitrogen- to eject an electron. The displaced electron attaches itself to a nearby molecule, which then becomes a negative ion- neg-ion. The original molecule (minus an electron) is now a positive ion- pos-ion. These ions, in turn, react with dust and pollutants to form larger ions. Small neg-ions -usually no more than 12 gaseous molecules clustered around a charged atom or molecule- are short-lived and highly mobile.

As long as 1789, the Abbe Bertholon, a European monk, speculated that ions exist and affect people. He recorded the responses of medical patients and normal people to changes in the electrical state of the ambient air. More than a century later, in 1899, two scientists named Elster and Geital proved the existence of ions. Only since the 1930s have researchers been probing their secrets.

In nature, ions are formed in a variety of ways. About half are created by radioactive gases. Radioactive substances in the soil, cosmic rays, ultraviolet rays, air flow friction, falling water and plants all produce the other half. For example, they stream off the leaves of plants, most notable pines and asparagus ferns.

Ions are apparently also created by the phenomenon of "subterranean suspiration." As Fred Soyka, author of The Ion Effect, told the first Ions and Light Conference held this summer in Atherton, California. "Solar and lunar influences cause the water table to rise, forcing air out of the earth." This prompted Federal Aviation Administration research psychologist, Bruce Rosenberg, to charge the earth with having "bad breath." Being negatively charged, he said, "it breathes positive ions."

Normally only about one atom in 100,000,000,000,000,000 is ionized, making a total of maybe 1000-2000 ions per cubic centimeter (that's like a handful of planets floating in a circle 4 billion miles in diameter). These are usually balanced pretty evenly between positive and negative, with a slight edge toward positive. "However, the normal may not be the optimal," Fred Soyka told New Realities. "On the seashore, where water is always falling, you have about 2000 negative to 1000 positive. That seems to be the ratio that human beings respond to most favorably."

We have all experienced this positive effect, regardless of our proximity to waterfall or the ocean. Every home has a built-in, natural ionizer- the shower. Our daily bath rituals are, in effect, the practice of preventive medicine. Research has shown that falling water creates thousands of negative ions by splitting otherwise neutral particles of air, freeing electrons to manifest their vitalizing function. These electrons join up with smaller air particles, thus giving them a predominantly negative charge.

Waterfalls have always been the favorite habitat of mystics and artists. The inspiration and romance generated at places like Niagara Falls and Yosemite have a direct relationship to the lowering of serotonin levels in the blood, caused by the waves of negative ions from the spray of these falls.

Those notorious desert and sea winds mentioned previously raise the ion count, but over-balance the positive- up to a ration of 33 to 1 positive. As the winds blow through arid areas, they stir up dust and the neg-ions are leeched out. In Israel such winds are called the Sharav; in the Alps the Foehn; along the Mediterranean the Sharkiye (called the Sirocco in Italy and the Xlokk in Malta); in Africa the Simoon, France, the Mistral. There's the Boras of the Adriatic, the Karaburan of the Gobi, the Zondi of Argentina, the Tramontana of Spain. In the U.S., the Chinook plagues the Rockies and the Santa Ana the southern California desert. Still other winds pos-ionize India and Australia. But whatever their name, throughout the world, they are known to blow no good.

One might postulate that the culprit is really humidity, wind or temperature changes, not positive ionization. That has been considered, but doesn't account for the fact that weather-sensitive people react to the approaching Sharav 12 to 24 hours before

meteorological instruments do. Positive ionization remains the culprit. So much for natural pos-ions.

The really lethal doses of pos-ions lie within our polluted cities, which William Radley, president of Bio-Environmental Systems, refers to as "ion prisons." Car exhausts, factory fumes, tire dust, cigarette smoke, cooking and heating fumes, dust and soot gobble up neg-ions, either neutralizing or positively charging them. Inside, steel and concrete building act as electro-magnetic Faraday cages, absorbing the charges of negative ions. Synthetic building materials, clothing and furniture covering eat up more; so do the metal ducts covering heating and air conditioning outlets. The positive static charge of plastics takes care of the rest so that in a typical interior, the neg-ion count may be below 100 per cubic centimeter. (the minimal amount for optimum human functioning is about 1000/ccm.) In the words of Dr. William Rea, Chief of Surgery at Brookhaven Medical Center in Texas, "Houses don't breathe like they used to."

Several people have investigated the mechanisms of pos-ions debilitating effects. According to the Russian ion pioneer Vasil'yev, ions act on the endings of pulmonary afferent nerve fibers, altering the functional state of the central nervous system and through it, the peripheral organs. Sulman et al (1970) found that weather-sensitive people excrete more of the neuro-hormone serotonin than non-sensitive people. Serotonin is secreted by the pineal gland and the intestines. It affects sleep, mood, nerve impulses, blood-clotting and contraction of smooth muscles. LSD effects are caused by serotonin inhibitor and chronic serotonin depletion is characteristic of some types of mental anomalies.

Sulman's work supports the findings of American ion dean Dr. Albert P. Krueger, who discovered that the specific negative ion of oxygen -O- speeds up the rate at which serotonin is oxidized in the bloodstream.

Krueger also found that pos-ions slow the sweeping action of the tiny hairs in our throats form 900 to 600 beats per minute and cut mucus flow, thus lowering our resistance to airborne allergens. For example, the pos-ion carbon dioxide (CO_2) causes contracture of the back tracheal wall. Pos-ions also cause vasoconstriction and increased respiration rate.

Oddly enough, notes ion author Soyka, "About five percent of the population seems to react well to a positive charge. They feel euphoric."

If pos-ions are the bad guys, neg-ions wear white hats and shoot silver bullets. Their beneficial effect was first discovered in 1932 by Dr. C.W. Hansell at RCA Laboratories. Dr. Hansell was startled by the violent mood shifts of a co-worker who sat beside and

electrostatic generator. He observed carefully and discovered that his colleague was ebullient when the machine produced neg-ions, morose when it made pos-ions.

Subsequent researchers (mostly abroad) have found that neg-ions reduce neurosis and anxiety, heighten appetite and thirst and stimulate sexual behavior. They improve performance of voluntary movements: 81.2 percent of drivers with neg-ion generators scored in the top half on reaction time. And in school they sharpen mental functioning and reduce error rates. After a year with neg-ion generators in their classrooms, a group of kindergarten teachers reported that their students concentrated better and showed almost no "weather effect." Hyperactive kids were calmer, absenteeism was down (except on Mondays) and the teachers themselves felt less fatigued.

Neg-ions promote alpha brainwaves and increase brainwave amplitude, which translates to a higher awareness level. Neg-ion induced alpha waves spread from the occipital area to the parietal and temporal and even reach the frontal lobes, spreading evenly across the right and left brain hemispheres. All of this creates an overall calming effect.

On the physical side, they have given relief from hay fever, migraine and burn and post-operative pains. Along with the burn pain relief, they lessen infection, dry the burns faster, heal them more quickly and leave less scarring. After operations, not only did 57 percent of Dr. Igho Hart Kornblueh’s patients treated with large do ses of neg-ions (10,000/ccm) feel less pain (as opposed to 22.5 percent of controls), but restlessness and infection were also reduced and healing quickened.

But why are ions therapeutic? Partly because they kill germs. Back in the 1930s, a Russian team headed by A.L. Tchijevski found that large ion doses of either polarity retarded bacteria colony formation on plates. Ionization also sterilized enclosed air. Later experiments duplicating Tchijevski’s work noted an exponential bacteria decay rate of 23 percent per minute for untreated air, 34 percent per minute for air with pos-ions, and 78 percent per minute for negatively charged air. They concluded that the pos-ion decay rate was due to simple bonding of the ions with the bacteria, whereas the neg-ions actually killed them.

Interestingly, animals larger than microbes find neg-ions beneficial. Rats learn better and are less anxious. Mice live longer. (Mice with flu die more quickly if deprived of neg-ions.) Silkworms eggs hatch earlier, larvae grow faster, spinning begins sooner, cocoons are heavier. Chickens lay more eggs and grow more plump. Sheep grow faster and supply more wool.

And in the vegetable kingdom, plant seedlings grow up to 50 percent more when charged. Fruit stays fresh longer: after 10 days, ionized tomatoes were still fresh while

untreated controls rotted.

Researchers offer a variety of reasons for ion effects. Dr. Krueger explains that plants benefit from both positive and negative ions because "ions expedite both the uptake of iron and its utilization in the production of iron-containing enzymes.... (and) stimulate the metabolism of ATP in the chloroplasts and augment both nucleic acid metabolism and oxygen uptake."

In humans, most researchers think that neg-ions act on our capacity to absorb and utilize oxygen, accelerating the blood's delivery of oxygen to our cells and tissues. Dr. R. Gualaterotti of the University of Milan says they make wider cell nuclei with more volume. The weight of evidence supports Krueger's theory that ions break down serotonin in the bloodstream.

Lest negative ions sound too much like a cure-all, testers report that neg-ions work only so long as they're being inhaled. As the charge is most readily absorbed through the olfactory nerves, you need to breathe them in through your nose, not your mouth. Dr. Krueger cautions that "the biological (non -clinical) effects produced by atmospheric ions are not dramatic; on the contrary, they tend to be limited in degree."

But that's atmospheric ions. Artificially generated ions are another story. Just as positive ions can be generated artificially by pollution, so can negative ions be man made- with negative ion generators. It's true, you can't plug in an ionizer at night and expect new muscles in the morning. But their effects are not always subtle. "People are allergic to the Twentieth Century," says Bio-Environmental Systems President William Radley. "Our architects and interior designers are poisoning us. Some people are so sick or so intolerant of chemical that sometimes the results of ionization are quite dramatic.

Since the 1950s, manufacturers have produced dozens of ion generators for laboratory and home use. Early machines ionized atoms and molecules via high-voltage electrical fields, incandescent materials, ultraviolet light, x-rays and alpha- or beta-radiation from the isotopes. The output of the electrostatic, incandescent, and ultraviolet generators tended to deteriorate rapidly. In addition, electrostatic and ultraviolet machines produced ozone, a toxic oxygen allotrope, as a by-product.

Dr. Krueger used tritium-based generators during the '50s. Tritium is a betaradiating hydrogen isotope with a half-life of 12.5 years. A minute amount of the gas is sealed in zirconium and deposited on a stainless steel foil. An electrical potential difference varying from 300 to 2000 volts DC is used to separate pos-ions from neg-ions before they recombine in the plasma. Tritium machines allow precise dosages, but unfortunately tritium is so dangerous that it's illegal (except in fusion power plants). Thus, the tritium

generators manufactured during this period were seized by the FDA.

During the 1960s, ion collectors drew air through an electrostatic field between parallel plates or concentric cylinders; the ions were collected on the plates.

Present ion units apply a high-voltage electrical signal directly to the air to create an intense electric field around the emitters.

Why not set up a monster ionizer over Manhattan? Well, a safety dictates a size limit. Dr. Robert Massy of the University of the Trees reported at the Ions and Light Conference that, whereas a 5,000 volt machine produces less than .05 parts per million of ozone (the limit allowed by the FDA), extremely high-voltage units invariably fail to meet standards.

Although most people in the U.S. are not ion-wise, generators have been popular elsewhere in the world for decades. In World War II, Luftwaffe planes were Negatively ionized by electric field generators, in order to reduce pilot fatigue. And it worked! (Electric field generators are like female ion generates: instead of ejecting ions, they attract them.) Germany and USSR use them in government buildings, hospitals, schools, factories, restaurants, health spas, beauty salons, homes, offices, cars and trucks. In Canada, Fred Soyka notes, "Ionization has become a household word. My book became a best-seller and innumerable articles have come out."

The U.S. has equipped nuclear submarines with ion machines. Ionizers are being used industrially in auto spray paint booths, food processing plants, grain storage bins and chemical spray factories.

Architects and designers are beginning to see the health benefits from fountains and rooftops solariums placed in urban environments, echoing the wisdom of their forefathers in the Roman culture. The growing recognition of our biological needs amidst our artificial interiors is opening up whole new industries aimed at replicating nature indoors.

In addition, we could all take Rosenberg’s advice and wear underwear of polyvinyl chloride to attract neg-ions. From BVD’s to PVC’s then, it’s the negative ion generation.

Several machines are now in the market for home and office use ranging in cost from about $70 to several thousand dollars. You just plug them in and they ionize away. But, here are some considerations to keep in mind. If something or someone is between you and the generator, the ion count around you will drop. If you and the machine are in contact with the same dielectric material (as, for instance, if it and your arms are on the same desk), a charge will build up between you and it, and this charge will repel ions.

(Supposedly this doesn't happen with the latest machines.) Also, you own static charge will often repel ions, especially in dry, indoor wintertime air. Synthetic clothing absorbs ions: wear cotton or wool, which have neutral charges.

At the Ions and Light Conference, Fred Soyka told New Realities of some in-progress Swiss research on ion machine frequencies. Frequencies of 60-100 Hz (cycles/sec) are stimulating to a person, while less than 25 Hz are relaxing. "If you have 60-100 frequency machine,:" Soyka says, "you may have trouble sleeping well with it on. Manufacturers ought to look into machines with adjustable frequency ranges. Some European machines already modulate frequency, so people can dial their needs electrically."

A problem with ionizers has been determining their effectiveness. A typical generator may supposedly churn out 100 billion ions per second. But how many of them survive a yard past the machine? Ion counters do exist, but until now no store or salesperson selling generators has had one around. Inexpensive units are now on the assembly line. Ion counters must be used carefully: within a room the ion concentration varies a lot, depending on how far you are from the generator, from conducting wall, from charge buildup on insulating walls, from curtains or draperies.

Poor measurability partly explains why shoddy machines have been marketed (and confiscated by the FDA) in the past. Today, regrettably, the field is still not without its quacks. According to Bruce Sullivan, president of Environmental Sciences Corp. "Some people are selling generators for thousands. One company calls its machine The Air Doctor."

Advanced technology has eliminated most problems associated with previous ion devices, and as such there are more on the market today. Moreover, it is now possible to create higher voltages with lower current, thereby reducing or eliminating the production of ozone (Federal law prohibits more than .05 parts per million ozone level). So to ensure that a device meets the buyer's needs, one should carefully examine the manufacturer's literature.

In addition, buyers should look for a warranty on parts and labor, including a description of the room size affected by the machine, and even a money-back trial period offer. A list of authorized service centers should also be provided to the consumer. So caution is still the watch-word since industry standardization has yet to be instituted, although industry standard for ion measurement and output are currently being drawn up by several manufactures.

The first call for some kind of industry standards was issued by ion pioneer Igho Hart

Kornblueh back in 1961: "Standardization of the generating and metering equipment by an independent authority would terminate the hasty and regrettable trend to market ion generators of questionable safety, quality and output."

Today Fred Soyka echoes his words: "Measuring the sending capacity of these machines is very important. You should by able to say, like when you buy a 60-watt light bulb. I'm getting an ionizer of this and this capacity. And to correlate that to room sizes."

A giant step was taken at the Ions and Light Conference, where the International Bio-Environmental Society was formed to set up standards and regulations within the industry. "We've already gone through our Inquisition on ionization," said president Bruce Sullivan, "We don't need another one." The Association is building a box within which the ion output of different machines can be counted at a standard distance and humidity.

Ions have been around for eons. Science has had its eye on the ion for 80 years. But public ignorance, generally non-ionized interiors and lack of generator standards is the hallmark of a science and industry still in its infancy. Dr. E.R. Holiday thinks we know as much about air today as we did about food 70 years ago, when biochemists thought protein, fat, and carbohydrates were all we needed. Then a substance was discovered that prevented rickets: the first vitamin. Ions might well be, as Holiday suggests, "the vitamin of the air."

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