ENVIRONMENTAL LAW REVIEW

INTRODUCTION

Occasionally, the *Vermont Law Review* is fortunate enough to celebrate significant law school community events via the publication process. In this issue, we are pleased to observe the passing of the ten-year anniversary of the Environmental Law Center of the Vermont Law School. The Environmental Law Center was established in 1977 to respond to the needs of society to educate law and policy makers regarding environmental challenges. The goal of the law center is to enable both lawyers and nonlawyers to become environmental professionals who possess the vision to see broad environmental objectives and use the well-honored legal, technical, and administrative skills necessary to achieve progress toward those objectives.

In the spirit of the law center's commitment to expose both domestic and international environmental issues, the first decade anniversary celebration culminated with a keynote address by United States Senator Al Gore from Tennessee. Senator Gore's attendance at the anniversary celebration was indicative of the center's efforts to attract preeminent personalities to address significant environmental issues.

Senator Gore was elected to the Senate in 1984 after serving eight years in the U.S. House of Representatives. He ran for President of the United States in 1988. He is Chairman of the Senate's Environmental and Energy Study Conference and he is considered a leader in legislation to correct and prevent environmental problems. He authored the landmark World Environmental Policy Act of 1989, designed to address the greenhouse effect, prevent future environmental damage, and to promote global cooperation on these issues. He chaired the first congressional hearings on the greenhouse effect, leading to the restoration of research funding on that issue; and he is a leader in the effort to respond to the dual threats of ozone depletion and global climate change. He also chaired hearings that revealed billions of pounds of hazardous chemical wastes being dumped every year into unsafe sites, and was a coauthor of the landmark Superfund Act, which resulted

from those hearings. He was born in March of 1948 and raised in Carthage, Tennessee, and Washington, D.C. He received a degree in Government with honors from Harvard University in 1969; after graduation, he volunteered for enlistment in the U.S. Army and served in Vietnam. Returning to civilian life, Gore became an investigative reporter with the *Nashville Tennessean.* He attended Vanderbilt University Divinity School and Vanderbilt Law School and operated a small homebuilding business.

Consistent with the Environmental Law Center's devotion to anticipating the future environmental demands society must acknowledge, Senator Gore agreed to discuss *The Environmental Challenge: What We Must Do to Survive.* The *Vermont Law Review* would like to congratulate the Environmental Law Center on the tremendous contributions it has made to the fields of environmental law, policy, and practice in the eighties. We also wish the law center continued success throughout the nineties and into the next century in educating the public about the critical and fragile nature of our environment.

SPEECH

THE ENVIRONMENTAL CHALLENGE: WHAT WE MUST DO TO SURVIVE

U.S. Senator Al Gore

VERMONT LAW SCHOOL, SEPTEMBER 23, 1989

This is a great event in honor of the tenth anniversary of the Environmental Law Center at VLS. America has many law schools, and more than a few lawyers, but there are not very many law schools like this one, nor very many lawyers like the ones that the graduates of this school are going to be, and I want to congratulate those who have had a part in creating this outstanding program. The Environmental Law Center is known nationwide for its pioneering work in environmental law and environmental action. Here the professors don't just teach environmental law, they write it. Where else can you find professors drafting groundwater protection legislation that then passes into law, and students interning and lobbying at the state legislature. Dean Costle helped to found the Environmental Protection Agency, ran it so extremely well,

and is now a very close advisor to the Governor of this state. It really is an extraordinary program.

In any event, this is a unique school and I guess it is appropriate because there are not many states like Vermont, either. It is rare that I get a chance to give a speech on the environment where one of my concerns is that the audience will think my proposals don't go far enough. That's unusual for me, but I welcome it. I must say that it is such an honor to serve with the senior Senator from this state, Pat Leahy, who has been a leader on many issues, including the environment. Pat and I have been partners on a number of initiatives and, since this is a bipartisan crowd, let me add that I enjoy my working relationship with Jim Jeffords also. The seat which he holds in the Senate was held by a republican, Senator Bob Stafford, who was one of the great environmentalists the United States has ever seen. And, of course, Governor Madeleine Kunin is probably the most farsighted Governor in the United States, or who has ever been a Governor in the United States, where the environment is concerned. Here and throughout New England, the environment has always received a little bit more attention than in other parts of the nation. But Vermont has always been a leader. In the '70s, Vermont was one of the first states to adopt a land use law, a bottle bill, and a ban on billboards. In the '80s, Vermont was the first state to do its part to protect the stratospheric ozone layer by phasing out the use of chlorofluorocarbons in automobile air conditioners. In the '90s, if Governor Kunin has her way, Vermont will be the first to devise a comprehensive energy plan and global warming strategy and the first to create a conservation and protection fund dedicated to the state's environmental infrastructure. I would like to see proposals and laws and initiatives at the national level and the international level of the caliber that your legislators and your leaders in the academic and business and civic circles have been successful in promoting here.

I mentioned a moment ago that in the presidential campaign last time around, I tried to make environmental issues a part of the agenda. When I announced my campaign in 1987, I forthrightly declared that global warming and the destruction of the stratospheric ozone layer were going to be two of the three most important issues in the campaign. Well, that didn't go over too well. I remember vividly about two days later the columnist George Will, who really has a way with words—as you know—just took me

apart, saying that I was incredibly naive to think that issues like those were going to be part of a successful presidential campaign. Unfortunately, he was right. I think he was right for the wrong reasons, in that a year or two later, the attitude of the American people toward those concerns has changed somewhat. I also think that the American people are ahead of the press sometimes, in being concerned about issues like this. I sometimes get the impression from some of the national press coverage of the campaigns that the important issues are submerged in a discussion of surface concerns. In Tennessee, they tell a story, to illustrate this point, about the three preachers who were finishing up a revival. (I am a Baptist—I know that my church is probably stronger down in Tennessee than up here. We have revivals in my religious tradition.) After the revival one night, the three ministers were waiting in the tent afterwards and the first one said, "You know, I have to unburden my heart with a confession. Here, with you, my brothers, I would like to say that I have preached many times against the sins of alcohol and yet, I too, have frequently indulged." The second one said, "I'd like to confess also. I have preached against the sins of the flesh, and I too, have indulged." The third one said, "Well, fellows, I don't know how to tell you this, but my sin is the sin of gossip and I just can't wait to get out of here."

I think things are changing in that people throughout this nation feel that the concerns related to the environment must be given the attention they demand. It is increasingly obvious that there is now a brand-new relationship between the human species and Planet Earth. That pattern, which is so visible to many, is still not seen by everyone. A lot of people who look at politics and business and whatever profession they are involved with in traditional terms, still don't see how things have changed dramatically just in our lifetimes. Why is it that it's so hard to see that pattern? There is a classic story from science about an experiment involving a frog where water is boiled and the frog is dropped in water and it immediately jumps out. Then the same frog is placed in a pot of tepid water and the water is slowly brought to a boil and the frog doesn't jump out until you reach in and pick it out, of course, to save its life. The point of the story is that a frog's nervous system is wired in such a way that the sharp sudden contrast of the boiling water triggers the appropriate response and the frog saves its life by jumping quickly out of the pot. If the change is slow enough then the nervous system of the frog doesn't pick up the signal and it doesn't react appropriately. We as a species have a kind of col-

lective nervous system. We rely on science to give us evidence about the world around us. We rely on the public dialogues to help us see and hear and feel new developments and interpret them as they occur and yet, it seems that like the frog, we are better at reacting when there is a sudden sharp contrast to the pattern to which we are accustomed. What is the definition of the word sudden in this context? What does it mean to say we need a sharp contrast before we can understand that something is different and needs a response? Is the time scale always defined just in terms of our short attention spans?

Sometimes large patterns can only be seen from a distance: a distance in space or distance over time. Some years ago the computer scientists studying pattern recognition, in an effort to try to build machines that could help us see patterns in information, conducted a series of experiments designed to reduce the amount of information in a pattern to the smallest quantity possible that would still convey meaning to those who saw it. There was a famous picture of Abraham Lincoln that was made up of large blocks of light and dark and if you stood close to that picture, it looked like a crossword puzzle with no meaning or pattern whatsoever. But when you stood back twenty or thirty feet from it, remarkably, the picture locked into a pattern that was instantly recognizable as the face of Abraham Lincoln. We face a similar challenge today when we look at the large blocks of temperature measurements in the United States and around the world. We look intently at areas like New England and the Southeast and the Midwest and we search for some meaning in the small fluctuations of temperature from year to year or decade to decade. And yet, the entire continental United States makes up only two percent of the surface of this earth. If one looks at the entire surface of the earth and the temperature record for the entire earth, the pattern locks into a clear and recognizable picture of global warming. There was a debate in science back in the '50s and '60s that reminds me of the debate some scientists persist in continuing today, on whether global warming is real or not. It had to do with continental drift. I remember in the International Geophysical Year [from July 1957 to December 1959], I was an elementary school student studying geography and there was a map of the world at the front of the room. One of my classmates raised his hand and asked the teacher to look at the outline of Africa and the outline of South America and, if you can remember those outlines in your mind, you'll know why this student asked the teacher: Did they ever fit together?

The teacher, perfectly in keeping with scientific wisdom of the day, responded by saying, "Ha-ha, that's ridiculous." We now know that, of course, they did fit together, but the prominent geologists of that day, on into the 1960's, insisted otherwise. A geologist named Tuso Wilson, I believe from Princeton, was practically hooted off a stage when an international scientific group met in Toronto in 1962, because he insisted on the theory of tectonic plates and continental drift. His most eminent colleagues just ridiculed him. Why? Consider that story for a moment; they were looking so closely at small parts of the picture pattern, that they refused to see the larger pattern. They had an assumption in their minds that they refused to challenge. The assumption was something like this: continents are so big, they can't possibly move. Samuel Johnson once refuted Bishop Berkeley's idealist philosophy that nothing can be proved to exist by kicking a stone, and saying, "Thus I prove it." Some assumptions just seem like common sense, and they were absolutely certain that continents didn't move.

There is another assumption today in the minds of people who assert with a great air of authority that global warming isn't real and that global climate change is not a matter of concern. The assumption goes something like this: nature is so vast and so powerful it can't possibly be overwhelmed by the activities of a single species, even humankind. That assumption, too, is wrong. Continents move and humankind is affecting all of nature. The astronauts who went to the moon gave us a view of the earth from the space between the earth and the moon that we have not had since the Apollo program. From that vantage point, we all could see the pictures of the earth and then a very thin blue crust around its edge. The thickness of our atmosphere is about one one-hundredth the diameter of the earth, and human activities have now reached the scale where we are, in fact, capable of overwhelming and dramatically changing the normal function patterns of the atmospheric system on this planet.

Let's look for a minute at the pattern I am referring to that describes what I call a fundamentally new relationship between humankind and this planet. Let's look first at population, because that is one of the places where it is easier to see. If you go back twenty or thirty years, you can see the pattern there, but let's go back farther than that. I had dinner the other night with Richard Leakey, the anthropologist who discovered the oldest human finds and who, with his parents, established that the first human beings,

recognizable as human beings, walked on the surface of this planet between 500,000 and 1,000,000 years ago. That knowledge may be refined. That is our current working knowledge. Let's go back 500,000 years and look at what human population has done. If you will bear with me, I am going to draw a graph. If you go back 500,000 years to the first two people, the population would be two and it would remain unchanged for the first 250,000 years. For the next 150,000 years it would remain essentially unchanged. Then, in the age of agriculture, it would start to go up slightly. In the age of industry it would start to go up slightly. By 1492 when Columbus sailed for the New World, there were one-half billion people in the world. By the American Revolution there were one billion people worldwide. By the end of World War II, in 1945, it reached two billion people. In 500,000 years, until 1945, it reached two billion people. In the last forty years, we've gone from two billion to five billion; in the next forty years we're going from five billion to ten billion. That pattern seems to convey some meaning. That's something brand new in our lifetimes. Ten thousand human lifetimes to get to two billion; one human lifetime to go from two billion to ten billion.

That's not the only pattern which falls into that same shape. Look at the accumulation of methane in the atmosphere. The pattern is exactly the same: a long flat line until our lifetimes and then suddenly, a meteoric rise in the concentrations throughout the world. Carbon dioxide follows, essentially, the same pattern: suddenly, in the industrial age and accelerating in our lifetimes, CO_2 goes straight up. The loss of tropical rain forests in the world follows exactly the same pattern and we are now losing these rain forests at the rate of one football field's worth every second. The accumulation of other greenhouse gases and the depletion of stratospheric ozone follow exactly the same pattern. I was in the Amazon in January and flew across areas that are completely devastated. They have burned an area the size of West Germany during the last eighteen months. I was in Antarctica less than a year ago where they dig back into the ice cores 160,000 years and read the ice the way foresters read tree rings. Going back all of that time, they have never seen concentrations of CO_2 remotely similar, remotely comparable to what we have put into the atmosphere today. The pattern of extinction also follows this same line, and there the flat portion of the line goes back not 500,000 years or a million years, but 65,000,000 years, until our lifetimes, and now, all of a sudden, we are losing living species at a rate one thousand

times greater than at any point in the last 65,000,000 years on this planet.

My religious faith teaches me that we are given dominion over the earth. All religions have a similar story about our relationship to the planet. We are given dominion over the earth, but we are required to be good stewards of the earth—to replenish it, preserve it, protect it. We have no right to act as if our generation can plunder this planet by reaching back through millions of years of geologic time to get the fossil fuels laid down over the eons and, for our comfort and enjoyment, quickly and dramatically transform those millions of years of deposits into pollution that will remain with this planet for millions of years to come. If we witness in our lifetimes, because of our actions, the destruction of what scientists say could well be the loss of more than half of all the living species God put on this Earth, we will have failed in our responsibilities of stewardship, our responsibilities to the future of our species and this planet we call home.

What if the worst consequences don't take place in our lifetimes; what if we manage to delay them until we are dead and our children and grandchildren have to cope with them? Is that okay? I hear some people say, "Ah, well, 30, 40 years—it couldn't happen that quickly"—as if, if it's 50 or 60 years, then it's okay. Where is our sense of perspective? Can't we see this pattern because it's so obvious? They tell us that the computer models now predict that the warming in the lifetimes of the students graduating from this law school could increase as much as five degrees centigrade. That doesn't sound like much perhaps. The last time there was a five degree difference, it was five degrees colder and the land where this tent is located was under two miles of ice. If five degrees colder over thousands of years can produce an ice age, then what does five degrees in a single human lifetime produce? The scientists and computer modelers have predictions, but they say the predictions are uncertain—well, of course they are uncertain! This is an experiment on a global scale to see how much destructive power nature can absorb. We have no right to conduct the experiment. We have to change! Some people say "Well, it would be almost unthinkably difficult to change this! We are used to things the way they are; we can't change that dramatically!" Well, change is in the works, Ladies and Gentlemen, and it is up to us to determine what kind of change will occur. We cannot continue the pattern we are now following, we need to put some new lines on that

graph, we need a sudden dramatic increase in public awareness of the problem here and around the world. We need a sudden change in the pattern of flat unchanging leadership so that suddenly we have a dramatic increase in the proposed solutions for this problem.

Two days ago the morning newspapers told us that the ozone hole in Antarctica was even bigger this year than they had predicted. If we have to redefine our relationship to the sky, is that enough to wake us up? The extra ultraviolet radiation comes through not only in Antarctica, after all. The stratospheric ozone layer above Vermont is about three to four percent thinner today in winter than it was fifteen to twenty years ago. The same is true with varying measurements worldwide—that's not only extra skin cancer and cataracts, but a wide range of effects that have not filtered through the media—such as the suppression of the immune system for all 5 billion people on earth, particularly in the tropics. The effects on the base of the food chain are almost impossible to calculate, but the scientific studies indicate that some of the smaller plankton, the phyto-plankton, pico-plankton, and nano-plankton all have photosynthesis reductions of as much as eighty percent with the ultraviolet increases associated with the ozone hole. I remember the old stories about the little fish eating the plankton and then the big fish eating the little fish and we eat the big fish and so forth—that's the food chain. What if we strip mine the base of the food chain? Should we be concerned about that? Well, I would think so.

The entire pattern of global weather is also at risk. Weather, and I am fully aware that Hurricane Hugo is spending its last even as we meet here, is a global engine for redistributing heat and cold. Hurricane Hugo, originating in the tropics, transferred enormous amounts of energy from the equator to the higher latitudes. The redistribution of heat from the equator to the poles and coldness from the poles to the equator defines the pattern of wind and ocean currents. The ratio of temperature at the poles to temperature at the equator makes up the single most important mathematical equation that sets the pattern of world climate. The greenhouse effect not only warms the earth, it warms it with different increases at the poles than at the equator. The poles in all the models, for reasons that have to do with the change in the reflectivity of the surface when the ice melts, increase about four times more rapidly than temperatures at the equator. What happens

when that basic mathematical formula that sets the pattern of wind and ocean currents changes?

This all sounds like a bad science fiction story and people have trouble taking it seriously, but Ladies and Gentlemen, we have to not only take it seriously, we have to change the way we think, change from looking in a linear hyper-logical fashion at what's going to happen tomorrow and the next day, to looking at it in a systems way, in a circular way. Look at a pattern that is far more complex than 1-2-3. If you change some parts of this climate's system or ecological system, then you may change the pattern. We are part of the pattern. The solutions must be global, national, local, and individual, and the place to start is with the individual because we have to think about the way we think about this problem and then demand that all leaders in politics and business, education, and every other institution respond to the new demands of our circumstances. Some solutions can only come by working together nationally and globally. I have argued that we should define it as a national security issue because threats to our survival have generally been defined in those terms. I have called for a strategic environmental initiative. I think we need one of those a whole lot more than we need a strategic defense initiative because our survival will depend upon whether or not we can restore a healthy relationship between the human species and the Planet Earth.

In closing, let me say that I have frequently noticed the similarity to the period of time we are in now to what happened at the end of World War II when the world seemed new again. At that time, General Omar Bradley said, as they considered the Marshall Plan and revolutionary changes, it is time we steered by the stars and not by the lights of each passing ship. We face a set of revolutionary changes today. The opportunities seem vast. As for geopolitics, Gorbachev seems to be opening up new opportunities. In the economy, the challenge from Asia and a unified Europe will redefine America's role. But most important of all, we must recognize the need to change our impact as a civilization and as a species on the global environment and dedicate ourselves to preserving, replenishing and protecting it.

Thank you very much.