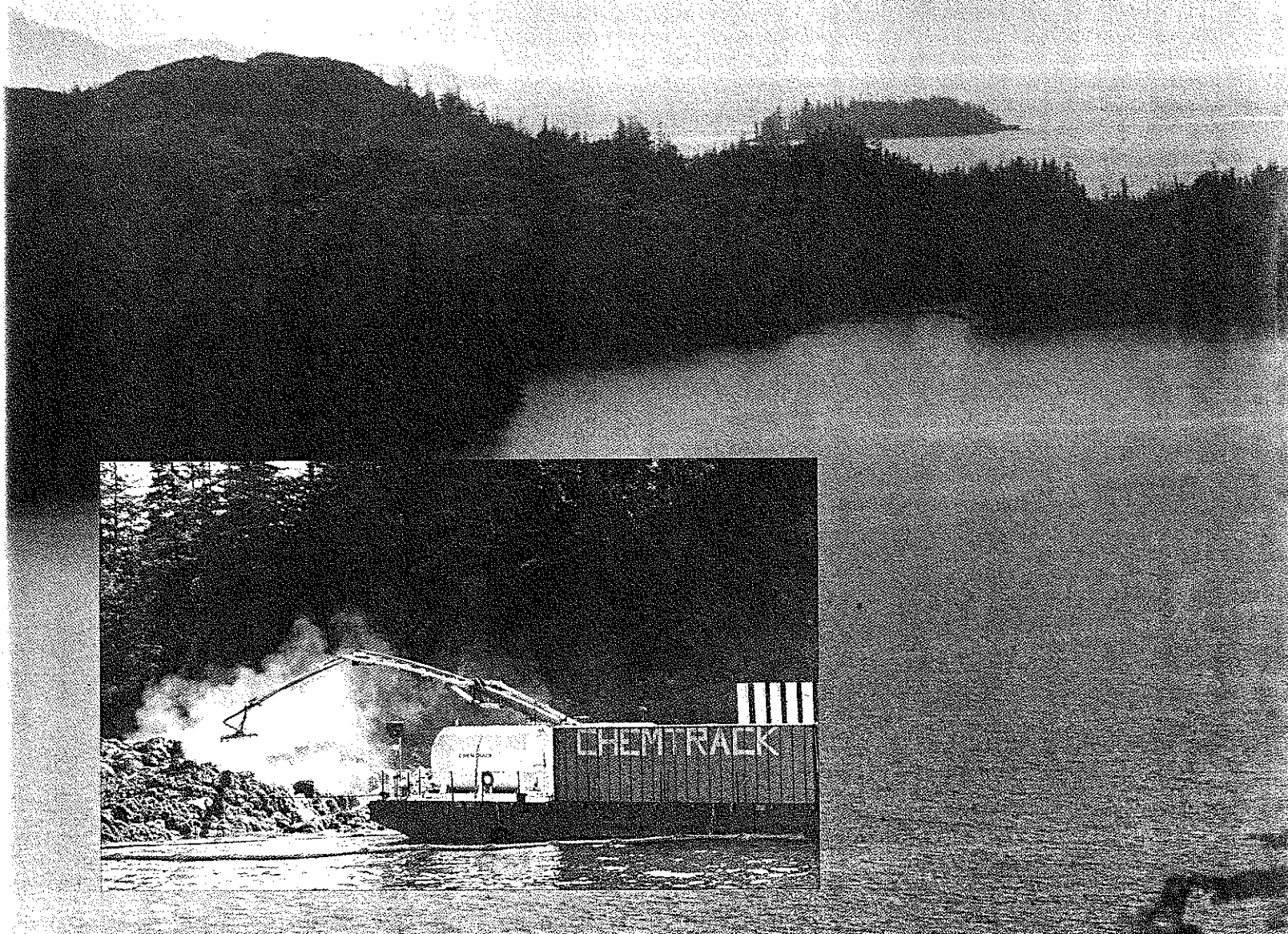
Vassar Quarterly, 86, no. 2 (Spring 1990): 10-14.

Is It Time for an

We Must Rehabilitate Our Views of Nature if We Are to Heal the Wounds of

A vista of Prince William Sound, site of the infamous oil spill in Alaska.

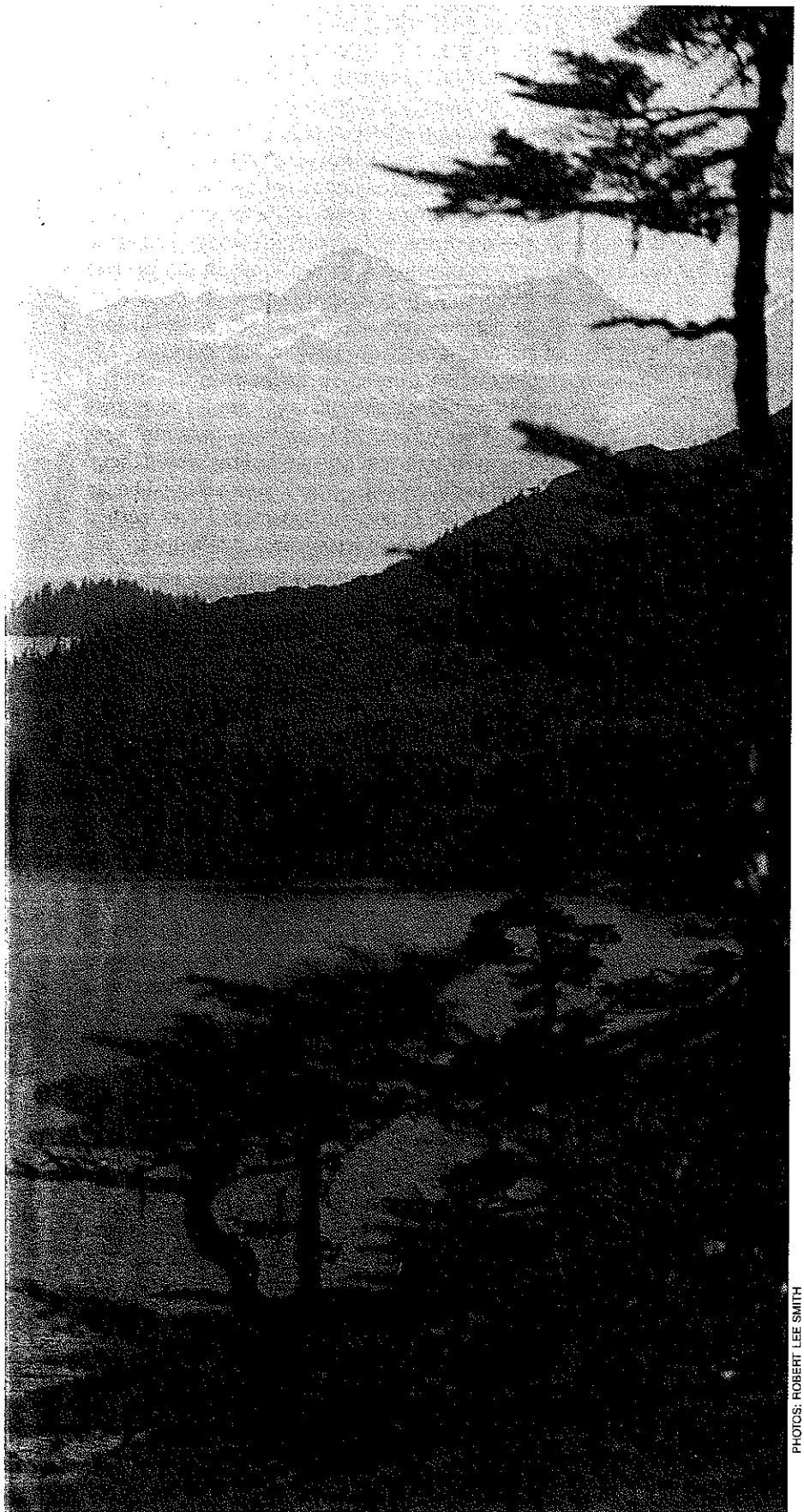
Inset: *A crew steam cleans the oil-soaked shoreline.*



Earth Ethic?

Our Home Planet

by Caroline Merchant '58



PHOTOS: ROBERT LEE SMITH

IN the spring of 1958 a group of senior science majors was preparing to leave Vassar College to enter life beyond the stone walls adjoining Taylor Gate. One was heading for a year of study at Wood's Hole Oceanographic Institute. Another was off to Harvard University Medical School. A third was to enroll in the graduate program in biological chemistry at the University of Michigan. A fourth decided on advanced work in mathematics. Another was set to enroll in graduate work in physics at the University of Pennsylvania. Two decided to forsake chemistry for graduate work in philosophy at Columbia. These seniors, my classmates, were moving out into a world of expanding scientific opportunities propelled by the successful launch in 1957 of the Russian satellite *Sputnik.*

As I sat in Vernon Venable's Philosophy 105 class the year that *Sputnik* was launched, I learned from him that Galileo and Newton in the 17th century had discovered all the fundamental principles necessary for a successful satellite program. Only the technology remained to be developed. In 105 that year, life seemed simple and solutions to the world's problems possible (although neither seemed true of Mr. Venable's philosophy course). Science was thought to hold the key to human progress; indeed, it appeared to be a cohesive social, almost religious force in our culture. An expansive sense of optimism prevailed that science and technology could solve most of the world's pressing social problems, even as it was also creating the most devastating one of all—the possibility of nuclear holocaust.

In 1993, when today's Vassar freshmen exit Taylor Gate for the last time, they will be entering a very different world than the one that awaited our class 35 years ago. Then, a global environmental crisis was only dimly apparent. Today, it is painfully visible: ozone depletion, global warming, the destruction of tropical rainforests and American "old growth" forests, the rapid pace of species extinctions, toxic waste, soil erosion, ocean dumping, the disruption of marine ecology by 30-mile-long drift nets used for fishing. The Alaskan oil spill tragically transformed a pristine shoreline surrounded by lush rainforest into black, motionless, silent beaches of dead birds, seals, sea otters, and contaminated waters devoid of the life that sustained local fishers and their families. *Time* magazine's January 1989 person of the year award went to "The Endangered Earth," graphically illustrated by sculptor Christo as a suffocating globe wrapped in plastic and bound with twine.

With increasing public awareness of environmental problems, public concern has mounted. The debacle in Alaska aroused millions. A *New York Times*/CBS poll in June 1989 found that an astonishing 80 percent of all those questioned overwhelmingly agreed with the statement: "Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost."

Healing the earth's wounds will require the best all of us can give as citizens and offers opportunities to current students thinking about careers in science, technology, government, and industry.

I propose an environmental amendment to the U.S. Constitution that would guarantee the right to a clean, healthful environment.

The words of 17th-century poet John Donne, which I first read in Miss Russell's English literature class at Vassar, pertain just as well to our world in the late 20th century as to the world of his own time. Donne compared the death of the world soul of the Renaissance organic cosmos to the death of a young woman, Elizabeth Drury:

> Sicke World, yea, dead, yea putrified, since shee
> Thy intrinsique balme, and thy preservative,
> Can never be renewed, thou never live.

Every section of Donne's poem, describing the dying world as a cripple, an ugly monster, a wan ghost, and a dry cinder, was followed by the dirge-like refrain, "Shee, Shee is dead; shee's dead." Is this refrain also appropriate to a small blue planet in the late 20th century?

Between the time of my graduation in 1958 and the entry of the newest class of Vassar students this past fall, skepticism about the ability of science to solve the world's problems has increased. Today, classical science as we learned it in the 1950s is viewed as part of the problem, even as it seems essential to the solution. What happened to erode the optimism over science that prevailed during the age of *Sputnik*?

In the 1960s, as the parents of today's freshmen were finishing high school and entering college, the United States was undergoing a revolutionary challenge to the values of the post-World War II era. The civil rights movement erupted in the South and spread across the country, engulfing us in sit-ins, demonstrations, and a wave of legislation aimed at providing equal opportunities for minorities. The Vietnam War protests called into question the principle of a just war, sacred to the World War II mobilization against fascism, anti-Semitism, and the Holocaust. The women's movement emerged in part from women's efforts to play leadership roles in the new social movements and in part from their need to get out of the home and to engage in meaningful creative work. Many lives changed irrevocably, either in sympathy with these social movements or in opposition to them.

In 1970, the year of birth for many current students, the first Earth Day galvanized an incipient environmental movement into national action. An outpouring of citizen concern resulted in the passage of environmental laws and tighter regulations. The National Environmental Policy Act (NEPA) was signed in 1970 and with it the President's Council on Environmental Quality was created. The Clean Air amendments of 1970 strengthened the Clean Air Act, first passed in 1955. In 1972, water regulation was also brought under stricter federal control.

Then in 1973, when most of those who now comprise the class of '93 were still toddlers, we were fretting about the 30-minute-long lines at the corner gas station and contemplating curtailing weekend and vacation excursions. A national energy crisis brought forth an array of alternative energy proposals, from solar heating sources and wind energy supplements to shale oil extraction and home energy conservation.

During the seventies, I was teaching the history of science at the University of San Francisco. My students were aroused by the issues of science and society raised by the environmental and energy crises. They wanted to know how these problems had evolved and what science had to do with them. Excited by the questions they were asking, I began to rethink the history of science as I had learned it in graduate school in the sixties. What were the historical roots of the environmental crisis? What did the 17th-century Scientific Revolution, on which I had done my doctoral dissertation, contribute to the world view of the 20th century? What was the role of women in science and how were society's concepts of women reflected in it? Rethinking the roots of modern science and its role in today's world resulted in my book *The Death of Nature*.

Through my teaching and the research for my book, I came to understand that when nature ceased to be viewed as alive and the earth to be perceived as a nurturing mother, a profound transformation took place in human ways of relating to the earth. For millennia, most premodern peoples experienced the world as alive, filled with spirits and responsive to human action. If a deer was to be shot for food, a tree cut for fuel, a brook dammed for water, seed sown on a freshly plowed field, or even a mine shaft dug for ore, a ritual of propitiation was made to the living spirit of the animal, plant, or earth mother. If the deer escaped, if plants died, or wells ran dry, humans and their rituals were at fault.

In European culture, too, the world was treated as a living organism down through the Renaissance of the 16th century. It had a body, soul, and spirit, and the earth had respiratory, circulatory, and reproductive systems just as humans did. If a harvest failed or disease struck a village, people had not behaved properly toward nature or toward God. They accepted their fate and tried to live better lives.

With the rise of a capitalist market economy and of modern science in the 17th century, human at-

titudes toward the earth changed. Francis Bacon and the experimental scientists of the 17th century taught that the earth should be tortured to reveal her secrets for the sake of humankind. Rather than following nature in her footsteps and learning from her as had farmers, alchemists, and miners, Bacon argued, as I wrote in my book, that nature should be "forced out of her natural state and squeezed and molded." Miners and smiths should "search into the bowels of nature" and "shape her on the anvil." Technology should not just "exert a gentle guidance over nature's course" but should "conquer and subdue her" and "shake her to her foundations."

Other philosophers and scientists such as René Descartes and Isaac Newton conceptualized nature as dead, inert atoms moved by external forces. They removed the soul from the world and the *spiritus mundi* from the heavens. They left the earth as dead matter, devoid of any resemblance to the human being. Nature was described by mathematical laws, God was a mathematician and engineer, human bodies and animals were miniature machines, and the mind resembled a calculating machine that added up perceptions of the outside world in a logical sequence. The "death of nature" metaphorically gave humans power to control and manipulate it for their own benefit. They could intervene and repair the earth from outside, just as God repaired the world machine from on high. Newton believed that God periodically had to set the planets back on their elliptical courses when their orbits were disturbed by a passing comet entering from outside the solar system.

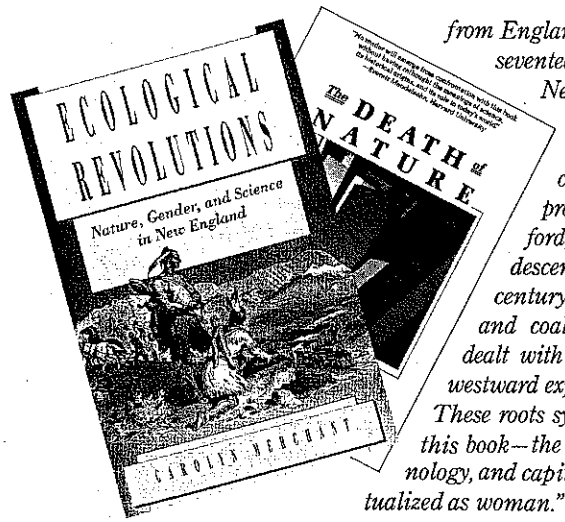
The Enlightenment of the 18th century accepted this philosophy of domination and turned it into tremendous optimism over the capacity of human beings to control their own destinies. This faith in science and its power over nature continued into the 20th century with the discovery and harnessing of nuclear energy, the space program, large-scale hydropower projects, and medical advances. Today it is reflected most strongly in the new field of biotechnology, as scientists search for ways to combat cancer and AIDS and to engineer more resilient crops and livestock.

Yet offsetting these hopes for new medicines and technologies is a profound skepticism about the style of classical science as it was done in the *Sputnik* era. The optimism about the progressive implications of the mechanistic worldview of the Scientific Revolution is being questioned. This year's freshman class begins college as we make the transition into a new decade and at a time when many people are searching for a new relationship between humans and nature. We may be experiencing a scientific revolution as profound as that of the 17th century, one that casts nature and science as partners on the stage of history. The machine image and its control of nature seem to be giving way to something new. Some call the transformation a "new paradigm"; others call it "deep ecology"; still others call it a "postmodern ecological worldview." They suggest that a partnership ethic may be replacing the ethic of domination. They assert that science and nature can indeed work together in mutual benefit.

How can we meet the environmental challenges of the 1990s using a partnership ethic? In addition to the contributions of traditional fields such as chemistry and physics, a number of new scientific fields have recently emerged that are based on an ecological philosophy that everything is related to everything else and that there are no free lunches.

Sustainable development: In developing countries there is a great need for agricultural science and environmental analysis. Working with local peoples, science and policies must be formulated that provide for basic human needs and food security while preserving ecosystemic diversity.

Restoration ecology is the human act of reconstructing original ecosystems that have been polluted or destroyed by human activities. Scien-



"My ancestors migrated from England to New England in the seventeenth century and then to New York State in the nineteenth century. One of my mother's ancestors was convicted of witchcraft and probably executed in Hartford, Connecticut. My father descended from a nineteenth-century railroad general manager and coal company president who dealt with native Americans in the westward expansion of white America. These roots symbolize a major theme of this book—the encounter of science, technology, and capitalism with nature conceptualized as woman."—Ecological Revolutions

Tracking Environmental History

Caroline Merchant

Carolyn Merchant is professor of environmental history, philosophy, and ethics in the department of conservation and resource studies of the University of California at Berkeley. She is the author of The Death of Nature: Women, Ecology, and the Scientific Revolution *(San Francisco: Harper and Row, 1980) and the recently published* Ecological Revolutions: Nature, Gender, and Science in New England *(Chapel Hill: University of North Carolina Press, 1989) as well as numerous articles on the history of science, women and ecology, and environmental history. This article is adapted from an address she delivered to the class of 1993 during its orientation in August. Portions of it appear in the Preface-1990 to the second edition of Ms. Merchant's book* The Death of Nature. *They are used with permission of the author.*

tists physically replant and rebuild prairies, forests, rivers, and lakes, not as dominators of nature but as imitators of ecological patterns. Restorationists are dedicated not to taking nature apart by analysis but to recreating ecosystems by synthesis.

Conservation biology is the effort to preserve biological diversity throughout the world. This includes saving human communities that have used plant and animal species for hundreds of years through successful subsistence ways of life. These *in situ* conservation activities preserve whole ecosystems for future generations. Such efforts require talented scientists, anthropologists, and policy analysts willing to work sensitively with indigenous peoples and local governments.

Agroecology and agroforestry both attempt to combine the wisdom of traditional peoples with the principles of ecological science to create sustainable methods of producing crops, animals, and trees. They imitate natural patterns by using wild plant systems as models.

Feminist science and ecofeminism attempt to apply women's perspectives to ecological problems. During the past decade, women around the world have emerged as ecological activists. In Sweden, they used their traditional talents in gathering and preserving berries to protest the use of herbicides on forests by offering jam made from tainted berries to members of Parliament. In India, they joined the Chipco, or "tree hugging" movement, to preserve fuelwood for cooking in protest over market lumbering. In Kenya's Greenbelt movement, they planted millions of trees in an effort to reverse desertification. Native American women protested uranium mining linked with an increased number of cancer cases on their reservations. At Love Canal near Niagra Falls, housewives demanded action from New York State officials over an outbreak of birth defects and miscarriages in a neighborhood built on the site of a former hazardous chemical dump.

But *Sputnik*-era science has also been challenged at the level of theory. Emerging over the past decade are a number of scientific proposals that question the Scientific Revolution's mechanistic view of nature.

The Gaia Hypothesis: In 1980, atmospheric scientist James Lovelock revived the Greek goddess Gaia as a metaphor for a living earth. He proposed that the earth's biota as a whole maintain an optimal, life-supporting chemical composition within the atmosphere and oceans. Since then a number of conferences have been called to scrutinize his theory and further develop its implications.

Process physics: Theoretical physicist David Bohm draws on some of the same ideas about nature held by ancient Indian and Chinese philosophers in challenging the assumptions of mechanistic science. He argues that instead of starting with atomic parts as primary and building up wholes from them, a physics is needed that starts with a flow of energy called the holomovement. The Newtonian world described by classical physics—the world in which we live and work—actually unfolds from a higher "implicate" order contained in the underlying flow of energy.

Order out of chaos: Another challenge to mechanism comes from the new thermodynamics of Ilya Prigogine. Nineteenth-century thermodynamics had beautifully described closed, isolated systems such as steam engines and refrigerators. Prigogine's far-from-equilibrium thermodynamics suggests that higher levels of organization can spontaneously emerge when a system breaks down. His approach applies to social and ecological systems, which are open rather than closed, and helps to account for biological and social evolution.

Chaos theory: Chaos theory in mathematics proposes that it is perfectly normal for a butterfly flapping its wings in Iowa to cause a hurricane in Florida. Chaos, in which a small effect may lead to a large effect, may be the norm, while the equations we learn in freshman calculus may apply only to the unusual. Most environmental and biological systems, such as changing weather, population, noise, nonperiodic heart fibrillations, and ecological patterns, may in fact be governed by nonlinear chaotic relationships.

What all these developments suggest is the possibility that we need to create a new science and a new worldview to guide us in finding an ecologically sustainable way of life, one to which Vassar's young scientists and philosophers could contribute. A new approach to science and a new ecological ethic, however, must be accompanied by a commitment to the recycling of renewable resources, the conservation of nonrenewable resources, and the restoration of sustainable ecosystems that fulfill basic human physical and spiritual needs.

On April 22, 1990, communities and colleges across the country will celebrate the 20th anniversary of the first Earth Day in 1970. Local, national, and global environmental issues will focus the celebrations. I propose that among the activities on Earth Day 20 be a nationwide signature campaign endorsing an environmental amendment to the Constitution of the United States. It would read, "Every person has a right to a clean, healthful environment. The Congress and the individual states shall have the power to enforce this article by appropriate legislation." With enough citizen backing it could be introduced in Congress and passed by a two-thirds majority in 1990. In the new Environmental Decade of the 1990s, state after state could ratify the amendment, and people could enter the new millennium with constitutionally protected environmental rights. In this way, we of the 20th century could bequeath to our children and to our grandchildren in the 21st century the possibility of a clean, healthful, beautiful earth on which to live.

Re: #33

VassarQuarterly

VOL. LXXXVI NO. 1 WINTER 1989

The *Vassar Quarterly*, USPS 657-080, is published in the fall, winter, spring, and summer by the Alumnae and Alumni of Vassar College (AAVC). POSTMASTER: Send address changes to Record Room, Alumnae House, Poughkeepsie, NY 12601. Second class postage paid at Poughkeepsie, NY. Yearly subscriptions $10.. Single copies $3. Unsolicited manuscripts will not be returned unless accompanied by a self-addressed, stamped envelope.

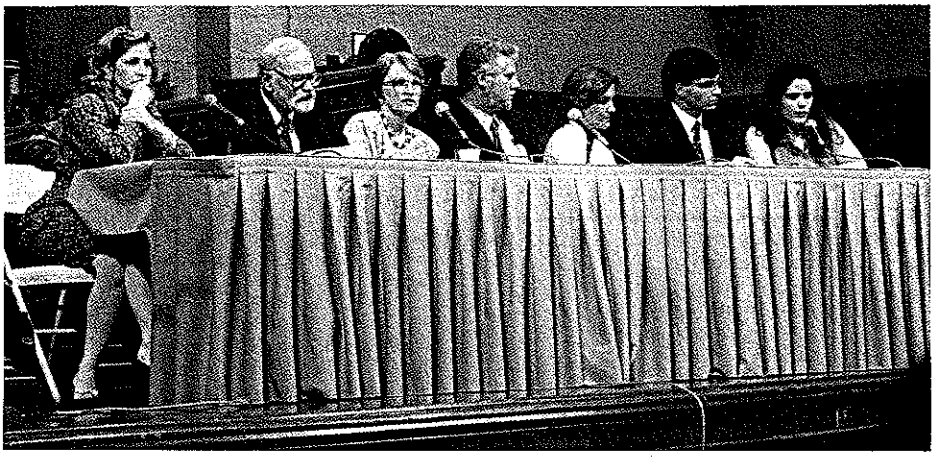
Typeset and printed in Poughkeepsie, NY, by Maar Printing Service. ISSN: 0042-2851.

FEATURES

DEPARTMENTS

'93 kicks off. See page 2.

no: #33



The intellectual theme of this year's Freshman Orientation was "Meeting the Environmental Challenges of the 1990s." The keynote address was delivered by Carolyn Merchant '59 (third from left), professor of conservation and resource studies at UC, Berkeley, and discussed by a panel of faculty and alumnae/i.

of applicants in common, were Brown University, Wesleyan University, Yale, Oberlin, Cornell, Amherst, Harvard, Columbia, Princeton, and Tufts. Others with which there are significant cross applications include Duke, Michigan, Johns Hopkins, Berkeley, Virginia, Williams, Haverford, Swarthmore, and Bryn Mawr.

When compared with other colleges these admitted students considered, characteristics most often rated "best" or "better than most" at Vassar were:

- attractiveness of the campus
- access to faculty
- undergraduate emphasis
- quality of on-campus housing

Characteristics most often rated "worst" or "poorer than most" at Vassar were:

- the surroundings (city, town, etc.)
- prominent intercollegiate athletics
- access to off-campus activities
- cost of attendance

The students were given a list of words and asked to circle all those they felt were widely held images of Vassar. The words most often circled were *liberal, prestigious, intellectual, challenging,* and *personal.* The words least often circled were *impersonal, athletics, average, back-up school,* and *partying.*

Significant differences appear between the images held by enrolling students and nonenrolling students. Of those who enrolled, 73 percent circled *intellectual,* whereas only 49 percent of the nonenrolling group circled the word. Of the enrolling group, 15 percent thought Vassar was isolated, compared with 35 percent of the nonenrollees.

One image that the admission officers hear in their conversations with high school students and college counselors is that Vassar has a reputation of being snobby. Indeed, 31 percent of all respondents reported they had that perception. There was, interestingly, little difference between the groups on this image: 27 percent of the enrolling group and 32 percent of the nonenrolling group circled the word

The average student who was to Vassar last year applied to 7. (including Vassar). Seventeen per admitted students applied to te colleges, while 9 percent applied fewer schools. The average adm dent was accepted at five colleg ing Vassar).

In deciding which school to at dents considered the opinion of the to be most important, followed the opinions of graduate and professional schools. Forty-two percent said the opinion of their guidance counselor was not important. In addition, the opinions of friends and teachers were each rated as not important by 36 percent of the respondents.

With respect to financial aid, 35 percent of all admitted students said that cost was a very important college characteristic, while, surprisingly, another 35 percent said that cost was not important. Sixty-six percent said that Vassar's cost of attendance was about the same as other colleges they considered. Thirty-four percent of enrolling students and 33 percent of nonenrolling students said that financial aid or cost was a significant factor in their decision of where to enroll.

It is worth noting that while Vassar awards all of its financial aid on the basis of need, 27 percent of all admitted students received an offer of financial aid from another institution that was not need-based.

Richard George '85

Rick George is assistant director of admission.

The informal tone of BSC extends beyond games to meals and sleeping arrangements; participants took their meals under vast striped canopies and