REAWAKENING THE BEGINNER'S MIND: INNOVATION IN ENVIRONMENTAL PRACTICE

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FOREWORD

In Zen Buddhism, it is said that truth can be found only by reawakening the freedom from preconception of the beginner's mind (Kanter, Kao, and Wiersama). And so it was that nineteen truth-seekers (see Appendix A) began such an intellectual journey in the fall of 2000 at Harvard University's John F. Kennedy School of Government (KSG). Twelve were enrolled for credit (the remainder as auditors) in a special graduate course, *Topics in Environmental Policy*. The course was offered by Charles H.W. Foster, adjunct research associate and lecturer in the Environment & Natural Resources Program of the Belfer Center for Science & International Affairs, and James N. Levitt, Fellow and Director of the Internet and Conservation Project of the KSG's Taubman Center for State and Local Government. Between them, Foster and Levitt could claim more than sixty years' experience in government, business, and non-profit settings. The aims of the course were to introduce future managers to the principles of innovation and entrepreneurship for conservation and the environment and, through readings and case analysis, to provide both encouragement and guidelines for these future practitioners.

The course began with selected readings by specialists in both the for-profit and non-profit sectors (see Appendix B). In addition, the class was given ready access to the Ford Foundation-Kennedy School's *Innovations in American Government Program*, a unique award competition that in fifteen years' time has received more than 15,000 thousand applications.

But the heart of the course was an examination of three case studies: 1) the use of flywheel technology by the for-profit American Flywheel Systems (AFS) to reduce pollution and use energy more efficiently; 2) the origins and future directions of the non-profit land trust movement as exemplified by the Massachusetts-based Trustees of Reservations (TTOR) and the nationwide Land Trust Alliance (LTA); and 3) the creation of environmental trusts in both Alaska and Massachusetts through funds derived from the settlement of pollution cases. Spokespersons for each of these innovations served as visiting lecturers (see Appendix C).

Additionally, a double period mini-colloquium was held to expose students to three pre-selected "great ideas from history": 1) the concept of the national park; 2) Gifford Pinchot's idea of conservation; and 3) the modern proposition of environmental stewardship. Three outside experts joined the class and the invited guests for a half-day discussion of these and other environmental innovations (see Appendix C).

The students formed teams to critique the cases presented. In addition, those enrolled for credit prepared term papers describing and analyzing innovations of their own choosing. The individuals and their topics are listed in Appendix D. The analyses employed a set of innovations criteria and a common format developed in class.

The Kennedy School working paper to follow attempts to capture the essence of the course discussions and findings. Derived therefrom is a set of precepts for the modern environmental innovator and entrepreneur. In preparing this paper, our hope is that future environmental managers will be encouraged to accord innovation and entrepreneurship a secure place in their organization's activities and, over time, add further to the creative tradition that already is so much a part of American conservation.

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INTRODUCTION

Organisms and Organizations

We start by observing the parallels between *organisms* and *organizations* - terms derived from the same Greek and Latin roots meaning tool or instrument - something that can be used to get things done. The analogy serves as a useful introduction to our thinking about innovation.

An *organism*, as defined by the American Heritage Dictionary, is an "individual form of life, such as a plant or animal; a body made up of organs, organelles, or other parts that work together to carry on the various processes of life." In order to live, an organism requires essential elements or resources such as food, water, space, and energy, which it acquires from its physical environment. To help obtain these resources, the organism occupies a particular niche in the larger biological ecosystem of which it is a part. This may involve cooperative, co-evolutionary, or even competitive relationships with other organisms and species. Over time, the organism (and often the entire species it represents) must adapt its behavior to a changing environment and ultimately evolve to compete successfully in an ever-dynamic biological system.

Analagously, an *organization* is defined as "something made up of elements with varied functions that contribute to the whole and to collective function." Like an organism, in order to survive, the organization must also incorporate a variety of functional elements such as production of goods and services, marketing, finance, legal, and research capabilities. Furthermore, to remain in operation, the organization will require a steady input of resources from investors and end users (customers) who contribute because they are attracted to the enterprise's offerings and returns.

The organization, too, identifies and occupies a competitive niche relative to others by offering competing, complementary, or co-evolving products, functions, and services (i.e., attractive *value propositions*). And like an organism, the organization must adapt or evolve over time to meet the demands of changing conditions.

Departing from the analogy with organisms, our framework for organizations includes a human element as well. For example, as we will see later, the quality of an organization's leadership and its sense of timing are often critical factors relevant to an organization's ability to achieve its goals and objectives.

In this paper, we will consider a variety of key attributes related to the success (or failure) of a given environmental or conservation innovation, including those related to the initiative's organization, resource strategy, competitive positioning, adaptability, and human factors.

Innovation and Entrepreneurship

An innovation, by definition, is simply something new (*nova*). An environmental innovation is something new applied in an environmental setting. Thus, the concept of a national park was a significant American environmental innovation which, over time, has come to be replicated and adapted all over the world. The widespread acceptance of land trusts exemplifies the merits of innovation applied at private and local scales. The creation of environmental trusts derived from pollution case settlements is an example of a successful form of innovation achieved through advocacy, administrative, and judicial action. And the ancient concept of the potter's (fly) wheel, as applied to modern, fossil fuel-dependent engines, suggests that even the use of business innovation can play a significant role in improving the environment.

Environmental entrepreneurship, a term borrowed from business, places innovation in more of an individual, managerial context (e.g., an *entrepreneur*). As in business, entrepreneurship usually implies an element of risk. Entrepreneurial actions relating to the environment are especially difficult because of the inherently conservative nature of the field of conservation, for much of conventional environmentalism is devoted to opposing change and keeping things undisturbed by humankind. Environmental innovation and entrepreneurship in practice have four dominant characteristics.

First, they typically contain an *organizational* component, because most environmental innovations require more than single party action. Second, a *program* of some sort will be involved. Rather than just a new idea, the innovation will need to be put to work in an organized and enduring way. Third, to be a true innovation, the event must represent a significant *departure* from the norm, such as a change in the way an organization operates, is administered, defines its basic mission, or carries out its responsibilities. Fourth, as Lynn has observed, the innovation must lead to an original, disruptive, and fundamental *transformation* - something that is relatively rare, new to the organizational scene, substantial in size or impact, and durable over time.

Observers of innovation in practice have highlighted a few aspects that environmental entrepreneurs should be aware of. On the organizational side, structural features such as hierarchical or dispersed authority, and command-and-control characteristics, can materially affect how and when innovation can occur. As Wilson has observed, it is the character of an organization that will most affect its propensity to conceive, promote, and adopt innovations.

Conversely, regardless of the overall favorable climate for innovation within an organization, and evidence of genuine need, authority, finances, and even tradition may stand squarely in the way of change. Unwillingness to tolerate failure is a further constraint that may pose a significant organizational impediment to innovation. It is for this reason that so many public environmental agencies are reactive rather than proactive in nature. And the rule-obsessed environmental agency, in Zegans' colorful words, can seemingly turn the timid innovators into cowards and the bold entrepreneurs into outlaws.

The matter of appropriate timing is crucial for any environmental innovator or entrepreneur. In business, market signals or profitability concerns usually spark innovation. Given the governmental nature of much environmental practice, an event like a change in administration may serve as the primary triggering factor for innovation.

As will be developed in more detail later on, how innovations arise and advance can be important, too. Some will occur internally. Others will be brought in from the outside, often

through the process Gilmore and Krantz call "scaffolding" - creating outside study and advisory structures around existing organizations in order to bring to light potential innovations without directly casting doubt on the host's core character, traditions, and functions. Change can also be induced by simply "groping along" (Golden) in incremental fashion rather than having to await a sudden epiphany. As Kanter, Kao, and Wiersama have observed, practical opportunities for innovation are more apt to be found on the margins of an organization than at its core.

Much of the outcome will depend upon the human dimensions associated with innovation. Aspects of leadership are important but, equally so will be the presence of a supportive followership. The culture of an organization will often dictate whether innovation can really be successful. Some organizations will simply be more change-prone than others. There is a place for tangible incentives and rewards but, as Kanter has observed (1983), the freedom to act is what really rouses the desire to act, resulting in a set of largely intrinsic returns.

Finally, in implementing and replicating innovations, practitioners may find themselves facing what Altshuler and Behn call *quandaries*. For example, while it is clear that organizational conditions of openness, diversity, participation, and dispersal of power help conceive innovations, adopting them has its best chance when what Kanter calls "transactional power" (1997) is concentrated in one not many places. In such circumstances, an executive can simply order the change made. However, this reveals a further anomaly. As Altshuler and Behn have observed, it is the low capacity organization most in need of change that is often the one least able to conceive and implement innovation.

ENVIRONMENTAL INNOVATION IN PRACTICE

With these general observations in mind, let us turn to a closer examination of the three arenas in which environmental innovation and entrepreneurship are most apt to occur: the public, non-profit, and for-profit sectors.

The Public Sector

How and when public agencies for the environment first came into being is a matter of some conjecture, but the current (2000) issue of the National Wildlife Federation's *Conservation Directory* devotes 117 pages to such public environmental agencies just at state, interstate, and federal levels. The numbers for these 2,000 or so major agencies must be multiplied many times if regional and local entities are added. Suffice it to say that environmental bureaucracy is a robust sector of our society, momentarily in some disrepute, but not likely to fade away in the foreseeable future. Innovation and entrepreneurship find some of their most severest challenges in the public arena.

For example, environmental agencies are typically empowered by law and must modify their statutory authorizations if substantial change is to occur. The legislative process required to do so takes two years at best. Agencies are frequently administered by individuals under term appointments. Since the political cycle in the United States operates in two and four year increments, by the time a legal change is accomplished, the person proposing the change is apt to be gone.

Where career personnel are in charge, the protective provisions of civil service and/or union membership can serve to stifle any normal incentive to innovate. Why should employees risk their assured security by attempting something different?

The hierarchical structure of most governmental agencies - one person reporting to another - creates further impediments to change. A good idea usually must run the full gamut from employee to executive. In the process, it can become lost, watered down, or captured by others.

The human environment for change in most bureaucracies is curiously bifurcated. On the top, you have individuals there for short periods of time who, for reasons of personal commitment and even aggrandizement, are anxious to place their imprint on the agency. On the bottom are career employees accustomed to simply surviving changes in administration. In most cases, standoff results but, in the best of times, the right leadership spark, deftly administered,

can ignite an accumulated reserve of employee "fuel" and cause a conflagration of agency innovation and entrepreneurship.

Within the organization, resistance to change can be cultural as well as operational. For example, many of the federal land-managing agencies have long and proud traditions that are constantly reinforced by rules, procedures, and promotional policies. To depart from the norm is to call into question the very essence of the organization.

Outside the bureaucratic setting, environmental agencies have come to be "shadowed" by non-governmental organizations and environmental activists. Quick to react publicly and even to sue, these individuals tend to look first at what the proposed innovation may cause to be lost, not what might be gained. To suggest something different is to risk a firestorm of controversy and delay.

Thus, beset on all sides by executive oversight, internal complexity and skepticism, required legislative review and approval, and private watchdog actions, the potential governmental entrepreneur must run not only a gamut but a veritable gauntlet of impediment. Suspect on all fronts, it is no wonder that the public sector innovator's normal instinct is to be reactive rather than proactive.

Why then does government environmental innovation occur at all? We draw on two sources for possible answers: the Ford Foundation/Kennedy School's fifteen year *Innovations in American Government* awards program, and the work of the *Pricewater-houseCoopers Endowment for the Business of Government*.

Founded in 1998 by one of the nation's largest accounting firms, the Pricewater-houseCoopers Endowment seeks to advance knowledge on how to improve public sector effectiveness. It does so through a program of leadership forums and research. As an example of the latter, the Endowment's November 1999 report (*Profiles in Excellence*) by University of Delaware political scientist Mark W. Huddleston provides a useful set of insights into the Federal Senior Executive Service.

Huddleston believes that four qualities contribute to excellence in governmental leadership: 1) a strategic vision as to where a program should go; 2) an ability to animate (not just motivate) the organization's own competence, enthusiasm, and creativity; 3) an ethic of hard work; and 4) not-to-be compromised qualities of honesty and integrity. We suggest that these are equally-valid guidelines for public sector innovators.

From Huddleston's interviews with 21 winners of the 1997 Presidential Distinguished Executive Rank Awards, a further profile of leadership and innovation emerged. Familiar with the culture of their organizations, functioning as "shock absorbers" between political appointees and their line employees, seasoned in what is likely or not to work in practice, and credible to those who must eventually evaluate and authorize any innovation, these agency managers turned out to be among the key frontline entrepreneurs for their agencies. In confirmation of the observation made earlier, tangible rewards had little to do with their entrepreneurship. Their motivation was more symbolic and psychic. The personal satisfaction of advancing a needed program or overcoming a professional challenge was their real compensation.

Another perspective is provided by the Ford Foundation/Kennedy School annual award program, which to date has recognized 255 innovative programs at all levels of government, including territories and tribal nations. Of the nearly 2,000 applications each year, 100 are selected annually as semi-finalists and 25 as finalists. The 10 winners subsequently receive $100,000 awards; the runners-up receive a $20,000 consolation prize each. All receive public recognition.

Altshuler and Behn conducted and edited a multi-authored review of the *Innovations in American Government* program in 1997. They considered a number of contributing factors to innovation, such as the significance of organizational arrangement, constraints that might apply, rewards that could accrue, and the effects of size on the likelihood of successful program innovation. They looked at the innovation process itself - how much analysis should precede the action and how much experimentation should occur first. And they examined the ultimate questions of authorization, dissemination, replication, and accountability.

Although each innovation will have its own distinctive character, the authors noted that innovation, in general, can have mixed results - hazardous as well as success-ful. For example, an innovation adopted too rapidly can so dominate the scene as to stifle further innovation. An innovation at the margin, by avoiding the real issue, can obscure core problems. Altshuler and Behn concluded that since change is essentially a social process, innovation needs to be adapted carefully to the organization's own environment.

The Non-Profit Sector

With respect to the non-profit sector, environmental innovators confront a whole set of other challenges. To fully appreciate the circumstances, it is necessary to first understand the background and nature of the non-profit movement.

Despite its prevalence in use today, the term "non-profit sector" is less than thirty years old. It was first coined in the Filer Commission's 1973 national inquiry into philanthropy. Yet, the concept of private citizens engaging in independently-supported work actually dates back to the English settlers. Wary of replicating the authoritarian indignities suffered at the hands of the British monarchy, the colonists initially favored community-level, volunteer-led, good works carried out through the "associations of a thousand kinds" that so impressed European observer Alexis de Tocqueville in 1835.

Following the decline of the agrarian family, church, and community in the late 18th century, and the new constitutional provisions permitting the chartering of corporations, the incorporated form of the non-profit organization came to predominate. The provision of associated local, state, and federal charitable benefits hastened this development. Today, a staggering 700,000 tax-exempt non-profits are formally recognized by the Internal Revenue Service. Of this group, the sixteen top national conservation organizations in 1998 had a combined membership of more than 12 million.

The term "non-profit" itself is somewhat illusory, for many such organizations provide products, services, and experiences for a fee. As long as the amounts are offset by a percentage

in public support, calculated over a period of years, and are related to the charitable purposes of the organization, such income sources are permissible under IRS regulations.

But even then, a non-profit entrepreneur cannot entirely escape the shadow cast by the independent sector organization's constant need for funds. For example, innovation will require either new support or funds redeveloped from its existing resources. Since the average non-profit must look elsewhere for at least 50% of its annual needs, innovations that generate new revenues, or prove attractive to potential individual or foundation donors, will inevitably command the highest priority.

The size of the non-profit will also affect its ability to innovate. As contrasted with public sector agencies, most non-profit organizations have less than a dozen staff or key board members, so that the numbers of people available to innovate are likely to be quite modest. But countervailing this reality is the urgent need of most small organizations to find and secure a competitive niche for themselves in order to survive. For this reason, and because there are relatively few procedural or organizational obstacles standing in the way, the non-profit sector tends to be a promising place to engage in entrepreneurial activities.

Because of their modest size, constant needs, and high aspirations, most non-profits must necessarily be venturesome, but they also must be selective. As examples, non-profits are particularly good at reflecting emerging trends and identifying needed initiatives. Their relative impoverishment makes collaboration a generally attractive proposition. Unfettered as they are by geographic, jurisdictional, and procedural constraints, they can roam the environmental issue landscape at will, reaching out to other non-profit, for-profit, and governmental agencies to advance a project or purpose. The public credibility they enjoy as independent organizations make non-profits capable of rallying public, political, and financial support to their cause and reaping the tangible rewards of recognition, respect, and resources.

Scholars of environmental innovation and entrepreneurship in practice have shed further light on the subject. Wondolleck and Jaffee, for example, have observed that innovation occurs for several reasons. For example, fragmentation of interests can lead to a state of impasse so

extensive that it sets the stage for resolution by innovative means. Public alienation from government and other large institutions, and a decline in what Robert Putnam calls social capital, have spurred efforts to undertake innovative forms of civic environmentalism. As John and Shutkin have documented, the movement away from purely top-down, command-and-control regulation to science and information-based, participatory forms of governance has spawned a new generation of entrepreneurial environmental activists dedicated to building place-based, sustainable communities of interest. This has served to enhance the symbolism and psychological power of innovation itself.

In examining the near-ten year experience of the Kellogg Foundation's *Environmental Partnerships in Communities* (EPIC) initiative, Richardson found that innovation has played a key role in rural development. She cites numerous examples of individual entrepreneurship occurring at local meetings. The steady stream of applications for Kellogg seed grants has reflected the rural citizen's willingness to act innovatively. Although the innovations under EPIC have usually been specific to certain situations and settings, the process seems to follow a common path: first, the recognition of a problem or need; next, the emergence of a catalytic individual or organization; and finally, implementation and/or adaptation of actions toward a remedial outcome.

As Berry and Gordon have observed, entrepreneurial environmental leadership depends on six elements: employing both leadership and followership, thinking about and preparing for change, developing breadth and flexibility in possible approaches, learning to listen to others, operating from a strong ethical base, and committing to career-long education and experimentation.

Snow's earlier survey of non-profit environmental organizations found that most were simply managing for the bottom line rather than the social change for which they were originally created. Embracing innovation, Snow felt, would help reduce the sense of isolation, stagnation, and frustration that so many non-profit environmental leaders seem to feel today.

The For-Profit Sector

Private sector innovation and entrepreneurship is, of course, the subject of many decades of distinguished scholarship. The purpose of this section is to highlight several of the points from that body of research that are salient to environmental and conservation innovators in the private sector, focusing on the topics of *organization*, *resources*, *competitive position*, and *adaptability*, as discussed at the outset of this paper. These topics will be considered from the vantage of several private organizations that span a continuum of scales: a large, publicly-held global enterprise, BP p.l.c. (formerly BP Amoco, or British Petroleum); a small, privately-held company that is marketing a new flywheel technology used in energy storage applications, AFS Trinity Power Corporation (AFS Trinity); and a group of family ranchers in Montana that is collaborating with The Nature Conservancy (TNC) and the Artemis Wildlife Foundation to produce and market Conservation Beef.

Organization. As explained by Chandler, the modern, large-scale, integrated corporation had its North American genesis in the nineteenth century, with the advent of privately-held railroad and telegraph networks. Railroad and telegraph companies, by dint of their geographic spread and the complexity of operations, required hierarchically arranged, multi-functional organizations, incorporating into their vast structures a variety of necessary elements, including production, marketing, finance, human resource management, legal services, and accounting. Today, in the early twenty-first century, such modern corporations dominate global commerce.

BP is one such modern day organization. It has worldwide operations that produce oil, gas, petrochemicals, and other commodities; distribute these goods around the world through a system of pipelines, ocean tankers, trucks, and other means; market gasoline through a worldwide network of service stations; and pursue a variety of other business interests, including the production and sale of solar cells through its subsidiary, BP Solar, the largest photovoltaic enterprise in the world. BP has a large, vertically integrated, organizational structure, including production, distribution, marketing, legal, and accounting functions, through which it manages its

global operations. It has taken advantage of that structure to pursue corporate innovation to benefit the environment, mounting an internal emissions-trading system that aims to reduce total corporate greenhouse gas emissions (or GHGs, as BP calls them) by 10% in 2010 as compared to 1990 levels. BP's global scale facilitates the effort, as efficiency gains achieved, for example, in a refinery in Asia can be used to offset expanded marketing operations in, say, the United Kingdom or North America.

AFS Trinity, in contrast, is a privately-held organization that from time to time has chosen to go outside its own organization to work with "strategic partners" on the implementation of critical corporate initiatives. For example, AFS Trinity, in December 2000, announced a strategic partnership with Calpine c*Power to market Trinity's flywheel technologies for "reliable power systems designed to service datacom ports." Similarly, Montana ranchers find organizational strength in allying with one another and with outside partners such as TNC to cooperatively market Conservation Beef.

Resources. Across the spectra of scale, size, and scope, each of the private sector organizations being considered here has fundamental, ongoing requirements for financial resources, including both investment capital and income from ongoing operations. BP, which has a market value of more than one hundred billion dollars, secures its financial capital from public debt and equities markets. AFS Trinity, a much smaller concern, has principally relied on private investments for its capital. And the family ranches, many of which have been in existence for multiple generations in association with a single family line, have generally run their operations on contributed capital (that is, out-of-pocket money invested by the family into the ranch), with debt obtained from a local commercial bank, and by building up "sweat" equity (i.e., adding to retained earnings over time).

Beyond capital investment, private concerns need to produce financial resources from ongoing operations. To survive, a private concern must present to the marketplace an attractive offering or value proposition - a bundle of product attributes that can win potential customers' business. By joining with The Nature Conservancy and the Artemis Wildlife Foundation to

create an innovative Conservation Beef brand, family ranchers in Montana (and elsewhere) are attempting to craft such an attractive offering. Conservation Beef, essentially, is beef raised on ranches that adhere to land management practices worked out by TNC and local ranchers to both conserve biodiversity habitat on the ranchland and produce a distinctive, high quality line of beef that can be marketed to consumers, presumably at a premium price (TNC actually pays the ranchers a premium per pound of beef produced for adhering to conservation-minded management practices).

As discussed by Corey, to keep the Conservation Beef product line healthy, its marketing team will have to address, on an ongoing basis, four key strategic elements: the product/market selection; the price at which to market the product; the distribution system to be employed (also known as "place"); and the market communications program (also known as "promotion"). If they are able to do so successfully, yielding a continuing flow of financial resources from ongoing operations, it is much more likely that the Conservation Beef program will be adopted by an increasingly broad circle of ranchers, resulting in both economic and conservation benefits for the community.

Competitive position. Each of the businesses under consideration must face a variety of competitive forces in the marketplace, and within the broader competitive environment. As explained by Porter, the key forces governing competition in an industry include jockeying for position among current competitors, the threat of new entrants into the industry, the threat of substitute products or services, the bargaining power of customers, and the bargaining power of suppliers. As discussed by Christensen, disruptive technologies which may initially seem like faint threats to established competitors may, with adoption by key early customers, pose overwhelming competitive threats, triggering the wholesale structuring of entire industries. This may occur in a wide variety of market settings, including energy and environmental services, as seemingly unimportant and expensive technologies oust incumbents and become dominant.

AFS Trinity, allying with Calpine c*Power in offering its flywheel technology as part of a reliable power system to corporate customers with mission-critical power quality requirements,

is hoping to disrupt the status quo, displacing the more conventional technologies (for example, banks of chemical batteries) that its potential customers rely on today for backup power. AFS Trinity's systems will compete in the marketplace not only with such conventional systems, but also with systems offered by other flywheel vendors, and with the systems offered by alternative power storage technology vendors (e.g., Plug Power, the vendor of novel fuel cell systems). To compete effectively, AFS Trinity will have to deal effectively with this wide range of competitive forces.

The family ranchers enrolled in the Conservation Beef program are less probable to be major disruptors in the consumer market for beef in the near future. More likely, they may be able to achieve success by carving out a distinct niche selling beef to conservation conscious consumers. To do so, Conservation Beef vendors may find it advantageous to ally their marketing efforts with other environmentally-oriented food products, such as the line of Conservation Coffee (presently unaffiliated with Conser-vation Beef) that is being promoted by Conservation International along with such coffee vendors as Green Mountain Coffee and Starbucks. An effective collaborative structure could evolve into a vertically and horizontally linked "business ecosystem" such as that described by Moore (1997), which could establish a defensible competitive position.

BP, by investing in BP Solar, is both burnishing its image as an environmentally-conscious company and hedging its bets by gaining a leadership position in a technology that may prove in the long term to be a substitute for oil and gas as a source of energy. By keeping abreast of such alternative technologies, BP is better able to anticipate shifting demand patterns in a variety of global energy markets and thereby defend its competitive position.

Adaptability. To have a substantial impact over an extended period of time, innovative programs and organizations need to be able to evolve. As Collins and Porras point out, "Companies that enjoy enduring success have core values and a core purpose that remain fixed while their business strategies and practices endlessly adapt to a changing world." It is

impossible to know whether BP, AFS Trinity, or the Montana family ranchers will be sufficiently adaptable to survive and thrive over coming decades.

BP prides itself on being able to think clearly about the future. Its internal emissions trading scheme, for example, is evidently designed to get out in front of potential regulatory and societal change. AFS Trinity is the successor to American Flywheel Systems and Trinity Power. The newly combined entity is working diligently toward establishing a leadership position in an emerging field. The Montana family ranchers have been called upon, time and time again, to reconfigure their businesses to stay on the land, and the Conservation Beef effort shows a clear willingness on their part to try new ranching practices and work to serve new market segments. Time, changing external conditions, and the human factors critical to the growth of any enterprise - leadership, sense of timing, courage to change, and skill at team building - will be key factors in the future success of these and other private organizations that are striving to bring lasting environmental innovations to life.

PRECEPTS FOR THE ENVIRONMENTAL PRACTITIONER

And so who can be an environmental entrepreneur? The answer is virtually any person with initiative, ideas and ambition. As business has learned, given the accelerated pace of information, technology, and discovery today, creative individuals are priceless assets to any organization. For the environment, given the extent to which these trends are threatening the integrity of natural systems, innovative approaches have become necessities. Thus, four specific scenarios are now offered to help guide the environmental practitioner toward successful entrepreneurship and innovation.

The Employee as Innovator

Those engaged in the day-to-day tasks of environmental protection and management are among the most promising, potential environmental innovators for, as front-line employees, they encounter firsthand the strengths and weaknesses of the programs they are charged with carrying out. Assuming that a potential innovation comes to light, what the employee does next can be crucial.

The first step should be to involve peers at work in a review of the proposed innovation. This produces two benefits: first, an independent analysis and validation of its merits and potential; and second, the creation of an internal, critical mass of interest and support on its behalf within the ranks of the organization itself.

Next, the idea should be brought to the attention of the employee's immediate superior. This will enable the proponent to enlist higher level interest and support and to initiate a discussion of the best strategies for accomplishing the change in an organizational context. The ambitious employee should resist the temptation to jump the chain of command to a higher level, for adoption of an innovation in any large organization will invariably involve building pyramids of successively higher levels of support. The risk of having the suggestion appropriated by the superior without attribution will be counterbalanced by the presence of a peer support group

that knows the true origins of the idea. As one veteran Forest Service supervisor once advised the senior author, the best way to get ahead in a hierarchical organization is to deliberately attribute an innovation to the manager above. He then gets promoted and recommends you as his successor. In this fashion, you will not only get the advancement you seek, but have a grateful friend in high places looking out for you for the rest of your career.

The Program Manager as Innovator

Business management experts (e.g., Kanter, Kao, and Wiersama) frequently cite the 30/4 rule - that 30% of sales are likely to come from products less than four years old. This underscores the dollar value of innovation. In public or non-profit environmental work, the returns may be harder to measure in economic terms, but they are just as real. In any case, the program manager is usually the key person in the organization to bear the burdens and reap the benefits.

At this point, other business concepts come into play. As Thomas Edison is said to have declared (Clegg), to have a great idea, be sure to have many of them. As Kanter, Kao, and Wiersama have reported, the Dupont Company estimates that it takes an average of 250 ideas to generate one marketable product. For that reason, Jack Welch, the legendary CEO of General Electric, has moved to create what he calls a "boundary-less" organization to encourage a free-flow of ideas across established business units. Thus, while awaiting suggestions from below, the smart environmental program manager might take actions of his own to stimulate innovation within his own unit.

One such possibility would be to adopt what the 3 M Company calls its 15% rule - that employees spend no less than 15% of their time on projects of their own choosing. The classic outcome of this policy in 3 M was the invention of the "Post-it", an employee-developed product that grew out of ordinary slips of paper that kept falling out of a Sunday hymnal.

Another would be to engage in what efficiency experts call "value engineering." By subjecting commonly-used equipment, techniques, and approaches to systematic, critical

appraisal, opportunities for greater efficiencies and economies can often be revealed. For instance, an examination in Massachusetts of the efficacy of median concrete highway ("New Jersey") barriers found that the use of natural plantings would be cheaper, more aesthetically pleasing, and even save lives. That this innovation was never adopted speaks to the political dimensions of innovation that we will mention later.

A third managerial initiative might be to establish a recognition, if not a tangible reward situation, for employee innovations. These could be left to occur *de novo* or stimulated through leading questions by the manager about areas of special interest and concern. The example mentioned before of the Kennedy School's American government innovation awards, now permanently endowed by the Ford Foundation, is a case in point. Still another is the recognition offered for innovation by ECOS, the Environmental Council of the States. But note the important distinction between seeking responses from the bottom and imposing innovations from the top.

Finally, in highly structured organizations, it will be important to periodically move line employees into staff functions. By forming special committees or task forces to address unit-wide issues or prospects, the manager can engage individuals across functions, disciplines, or even sectors and effectively cross-pollinate creativity. As a significant, side-benefit of such action, the manager will be able to spot employees with genuine promotional promise. In 1975, for example, the Massachusetts Executive Office of Environmental Affairs constituted special task forces of agency program personnel to devise a workable plan for carrying out the third phase of its legislatively-directed reorganization mandate.

The Executive as Innovator

The environmental executive typically arrives on the scene bearing high personal and public expectations. Honest and efficient operations are not enough; genuine change must be accomplished. The individual is there to either carry out the intentions of the appointing authority, or to perform acts of notable, individual initiative. Since most executive appointments

are for a term of years, time is of the essence. Given the fact that the intentions are often made public in advance, the latitude for systematic perfusion and production of ideas within the organization suggested earlier is quite limited. Yet, as a prominent figure, the executive can stimulate the process and bring important attributes to the innovation table - the ability to reach outside the organization for expert assistance, to rally a supportive constituency, and to find or commit resources for implementation.

However, most incoming environmental executives make the mistake of trying immediately to impose their own ideas and convictions upon their organizations. One attractive alternative is to introduce the proposed innovation in concept form only and charge others with developing the particulars. This will give the organization itself perceived ownership of the initiative and, rather than being locked into an idea that may not work in practice, the executive will be able to benefit from those with firsthand knowledge of the scene. If the innovation is unsuccessful, there will be others to share the blame. A classic example of this principle occurred in 1970 when Lieutenant General Frederick Clarke constituted the Corps of Engineers' first Environmental Advisory Board to help "green" his agency (Reuss). By personally attending the meetings and bringing with him all of his top policy staff, but also by rotating the meetings among the Corps' field division headquarters, Clarke was able to set the stage for environmental innovation emanating from the rank-and-file as well as the leadership.

Another pitfall encountered by environmental executives is getting too involved in the details. Rather than doing so, a number of effective executives limit themselves to preparing the seedbed for the innovation, selling the concept to those whose approval must be gained, and committing resources to carrying out the eventual implementing actions. For significant acts of entrepreneurship, it will be a full-time job informing others and seeing that credit is allocated properly. Dealing with the politics of innovation are usually as crucial as the program aspects themselves.

The Consultant as Innovator

As environmental issues have grown more complex, and public and private resources have become more limited, a new professional has come to the fore - the environmental consultant. Consultants provide services for a fee. They are equally at home in each of the three sectors we have been discussing. Consultants can provide technical skills and experience - for example, facility planning, design, and engineering. They can offer management services such as personnel recruitment, fiscal advice, and systems analysis. Even hard science is now among their specialties. Consultants are invaluable because their firms are usually flexible enough to satisfy needs in combination on a one-stop basis. But more than anything, they are set up to address problems.

Beyond simply problem-solving, consultants are engaged for a number of reasons. The most straightforward are situations where the client has an episodic need and cannot (or prefers not to) staff up to resolve the matter itself. A variant is where the matter is so sensitive that a measure of distance must be placed between the problem and the party responsible. Under such circumstances, if all goes well, a solution will be found and the client will reap the resultant credit. If not, the consultant is available to shoulder the blame.

Consulting assignments vary as well in degrees of specificity. Many will appear in a formal, competitive, *Request for Proposals* (RFP) process where the requirements, time span, and limits of compensation are spelled out in some detail. But in others, the scope will be described only broadly, leaving the consultant to be resourceful in devising an approach that will attract the interest and commitment of the client. In such cases, the consultant will not only have to do the work, but persuade the client that the work is worth doing. A principal hazard of the consulting profession is an unresponsive or indifferent client.

In addition to client relationships, consulting can be a tricky business proposition, long on apparent profit potential but short on actual bottom-line success. The profession is incredibly time and dollar sensitive. For example, a delicate balance must be struck between the demands of the client and the sums available. Many consultants fail because they devote too much time to

the research and allow too little for the evaluation, report writing, and client relationships. In a course on consulting he taught at the Yale School of Forestry & Environmental Studies, where students were required to organize a "firm", keep track of their time and other expenses, and undertake assignments for nearby "clients", the senior author considered it a pedagogic success if the student consulting firm foundered before the end of the term for precisely those reasons.

Yet, for purposes of environmental innovation, the opportunities in consulting are quite promising. The artful consultant will end up not only addressing the dominant issue in innovative fashion, but suggesting other areas that warrant exploration - naturally, with the help of the consultant. It is axiomatic in the consulting world that most of its business derives from previous work well done. If called upon for innovative advice, the consul-tant should keep in mind the following.

First and foremost would be to determine pragmatically whether there is sufficient competence in-house to undertake the assignment. Many consulting firms assume mistakenly that the necessary personnel can always be hired. Indeed, experts can be engaged for special purposes, but there needs to be a core capacity already present to take primary responsibility for the project. These individuals need not be technically proficient in the subject area designated, but they must be able and experienced in project management.

The second caveat is assure oneself that the appropriate individual or individuals will be available to serve as day-to-day client contacts, possibly on several levels within the client organization. Environmental consulting is as much a people as an environ-mental business, and it is easy to get stuck with a contact with simply operational rather than entrepreneurial inclinations. As mentioned earlier, there must be a receptive institutional environment for innovation to flourish.

Third, after the initial contacts and discussions have taken place - often at the consultant's own expense - there must be a clear understanding of the work to be undertaken and the compensation to be earned. A detailed, written contract should be in hand before a dollar is committed or spent.

Once the investigation is underway, it will be important for the consultant to be given open access to those familiar with the problem. The consultant should expect an initial level of resentment from those who might feel their own expertise is being questioned, but one of the most valuable services the consultant can perform is to provide a switchboard for individuals who for hierarchical or other reasons are not effectively in touch. These third party, intermediary services can not only clear communications clogs, but allow innovative ideas to surface. To build enthusiasm and support, the consultant should assign the highest priority to innovations that are endemic. Those of his own, to the extent possible, should be cast as the contributions of others.

At least midway in the process, the consultant should frame a set of options for further investigation and present them to the client. In fact, some consultants actually start out by outlining their likely final report. By concentrating the time available on areas the client is willing to entertain, the consultant will not only spend the available sums efficiently, but heighten the chances that the recommendations will be well-received and implemented. The final report should be a virtual mirror in which the client can see itself.

But those genuinely committed to environmental innovation should brace themselves for a dark side to consulting. The nature of the business is so transitory that rarely will it be possible to see an innovation through to completion. For a dedicated professional, it can be heartbreaking to have to abandon a promising idea in which much of oneself has been invested in order to take on yet another assignment.

LESSONS FROM PRACTICE

The course colloquium participants, reflecting decades of experience in academic, public, and private settings, offered final insights into the actual practice of environmental innovation and entrepreneurship. They are applicable to all four scenarios outlined.

Innovative ideas, they declared, need be neither original to the organization itself nor immutable. Expect many to migrate in from the outside and be picked up and adapted by others in quite different forms and at many different levels. Also, expect innovation to be influenced materially by the politics of democracy. Thus, innovators may need to build around, and even through, political institutions and processes in order to accomplish the changes sought.

Innovation, the visitors said, is likely to occur under four circumstances: 1) when there is an open organization; 2) when there is a supportive authorizing environment; 3) when there is a chance to employ new approaches; and 4) when the context rather than the detail is the driving force. But before people can be asked to consider change, we were advised, they must become accepting of the limits of the present. Blind adherence to ideology (real or mythical) can serve as a serious impediment to innovation. Even basic paradigms should remain open to challenge.

In what contexts are opportunities for environmental innovation likely to be found? These practitioners especially favored occasions where close relationships exist between people and particular environmental places - also innovations set within already socially-acceptable mosaics, missions, or programs.

Finally, what should environmental practitioners keep in mind as entrepreneurial opportunities are sought? Six rules of thumb were offered by our visiting experts: 1) start by building a shared information base; 2) be sure the potential innovation is well-fitted to the particular context; 3) invite in other parties and collaborators;
4) take advantage of the right moment in time; 5) maintain a humanistic perspective throughout; and 6) always remain flexible.