

Communicating Silviculture: Values and Benefits for the New Millennium

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Abstract.—Forests have been tied to social progress since the dawn of agriculture 10 thousand years ago. Silviculture, the oldest application of ecological principles, contains all the skills needed to produce forests with the myriad conditions valued by modern society. Historically, we have been success-makers. Yet, our profession faces a crisis. Often we are seen as tree killers, more concerned with timber harvests than with managing forests for multiple uses. Perceptions trace to critical rhetoric by those who are unusually effective communicators. Silviculturists have not responded effectively. We tend to be “doers, not sayers,” but we must break this mold. We stand at the brink between the demise of our profession and a chance to establish our proper place at the table of wise forest management. Moving positively demands commitment to professional renewal and more effective ways of communicating our art. Avenues vary from more effective writing, through one-on-one mentoring and outreach to other disciplines, to involvement in educational programs with a broad ripple effect.

INTRODUCTION

Do silviculturists have a communication problem? Yes. But an ironical indictment since forests and their management have been central to human progress for 10,000 years. “Ecology” was coined by Ernst Haeckel in 1866, but silvicultural concepts clearly predate him. Indeed, silviculture is the oldest application of ecological principles. Primitive silviculture probably was born of the need to protect and restore degraded land. It may trace to the Chou Dynasty (1127-255 B.C.) and the creation of the world’s first forest service following 1,500 years of forest exploitation (Hermann 1976). Silviculture was practiced in the time of the Caesars when trees were planted to commemorate temples and to provide the Roman landscape with respite from the Mediterranean midday sun (Sereni 1974). Silviculture was known to Pliny who, in the first century A.D., cautioned that planting should not occur during winds or high rainfall (Tkatchenko 1930). The Austrian forester Cieslar voiced the same conclusion at the close of the 19th century (Tkatchenko 1930), an early hint of a communication problem emerging among silviculturists.

In Europe, artificial reforestation dates to 1368, when the city of Nuremberg seeded several hundred hectares of burned lands to pine, spruce and fir (Toumey and Korstian 1942). Increasingly, natural forests were felled not only for conversion to agriculture, but also to fuel the smelting of metals for a fledgling industrial society. Pine and spruce were planted throughout much of Europe and management achieved a high level of intensity by the close of the 19th

century. But the silvicultural sophistication practiced in the groomed forests of Europe was not appropriate for the wilderness forests of America. Here, silvicultural principles had to be rediscovered and adjusted for a new land. As Pinchot stated in 1947: “One of our first jobs was to go and find out about what we named the “Silvics” of our trees...we had to learn that we might practice.”

CONCEPTS AND PURPOSE

Evolving Viewpoints

Blasphemous though it seems to some, silviculture attempts to improve upon nature. In 1917, the Finnish Forestry Institute was established with the expressed purpose of overriding the prevailing attitude that “forests take care of themselves” (Finnish Forest Association, 1997). Hawley (1946) admonished those who took a “hands-off, leave-it-to-nature” approach as short-sighted. He advocated *active* silviculture, one employing the science of silvics within economic constraints to meet the aims of the forest owner.

Views on the purpose of silviculture have evolved throughout this century. Today we see our profession as the means by which forests are managed to best fulfill the objectives of the owner and our governing society (Smith et al. 1997). Historically, our view was not so expansive, and our critics seem locked on our past positions. Toumey and Korstian (1947), echoing the views of such early foresters as Fernow, described the main goal of silviculture as the continuous production of wood crops. Bergoffen (1949) said that silviculture was analogous to the culturing of food crops. Baker (1950) agreed that the primary purpose of silviculture was timber crop production. But he recognized that small areas might be managed in “specialized and unusual ways” to favor other “incidental” values, and this marked an important conceptual shift.

Silviculture continued to focus on timber production through the 1950’s, but other goals were emerging. A new silviculture was evolving where wood growth might have low priority, or none at all (Smith et al. 1962). By the close of the seventies, Americans expected sustained wood production to be in harmony with increases in high quality water, wildlife, recreation, and aesthetics (Daniel et al. 1979).

Obscuring the Obvious

Changing social views raise basic questions about the compatibility of multiple objectives. This has not precipitated scholarly debate so much as tension, confrontation, demand for greater public involvement, and burgeoning increases in federal and state regulation. Anticipating this, Daniel et al. (1979) called for a new generation of silviculturists who not only are knowledgeable, versatile, and able to predict the likely outcomes from alternative stand treatments, but who can prescribe activities meeting physiological, ecological,

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managerial, and social constraints, as well. They conclude that “we are surely entering the most challenging and stimulating period in forestry.”

Silviculturists must be conversant and integrative in such fields as botany, cartography, economics, engineering, entomology, genetics, geography, meteorology, plant pathology, plant physiology, soil science, and wildlife biology. Surely this is a time for us to shine as applied ecologists. Yet, the opposite is true. Silviculturists seem dismissed as irrelevant or distrusted by planners, policy makers and the public. In contrast, ecologists have drawn center stage in matters of scientific expertise. Why is this so? Bolstered by heady successes in the political action years of the 1960's and 1970's, ecologists seem ready and willing to move from their own realm of expertise to those where they bear little or no authority (Peters 1995). Papers published in ecological journals often show a naivete of common forestry knowledge and a remarkable ignorance of forestry literature. Often their science is based on natural, relatively undisturbed ecosystems where cause-and-effect relations can only be surmised. Consequently, their ability to predict how forest ecosystems respond to active management is flawed. Trained in observational science more than hypothesis testing, ecologists continue to ask traditional questions, elaborate their answers, refine their approaches, and express their opinions with no real danger of finishing their research (Peters 1995). While this makes good press—and often influences policy makers—it does little to advance our knowledge of sound forest management.

Why has silviculture slipped from grace? Why have silviculturists not prospered, given the issues we face? Perhaps we're poor communicators. As Heinrich Cotta explained in 1816, “the forester who practices much, writes but little and he who writes much, practices little” (Baker 1946). Silviculturists are “doers,” not “sayers.” Most of our reward comes from producing a forest that meets a manager's objectives, not from conversing with people. And in the case of the U.S. Forest Service, perhaps it's due partly to agency policy that scientists and practitioners do not take positions on matters of policy. Instead, we're asked to avoid advocacy and to limit our input to the reporting of facts and the likely consequences of choices. This seems sensible enough, provided that questions are asked of us by decision makers. Increasingly, they are not.

One of silviculture's greatest hurdles is to get forest managers and society to define their wants and needs clearly (Smith et al. 1997). Another is to get someone to listen to what we might offer. Silviculturists are bypassed in the decision-making process because of old notions (perpetuated by intransigence) that we're only concerned with cutting trees. Sound prescriptions are seen as transparent excuses for harvesting. Reid (1983) joked that “silviculture is the science of turning trees into silver” and that sustained yield “is a forest management system designed to generate a steady flow of money until all the trees in the forest are gone” (Reid 1983). Humorous barbs, perhaps—but barbs tipped with poison. Repeated, clever slogans catch the public's fancy, affect attitudes, and shape public policy.

Pseudoscientific publications sway public opinion and the attitudes of policy makers through either gentle persuasion (Maser 1988) or shock (Devall 1993). Such messages are powerful because they impact our feelings. Meanwhile, we are restricted to the reporting of facts. As Mark Twain aptly observed, “A lie can speed half-way around the world while truth is still putting on its shoes.”

MEETING THE CHALLENGE

We're faced with the charge of reversing the prevailing notion that silviculturists “just want to cut trees,” that our interests are limited to the production of timber crops and to detecting the culmination of mean annual increment. Some have stepped forward. Gustafson and Crow (1996) show how silvicultural innovation can address multiple objectives. Even- and uneven-age management systems were contrasted by melding silvicultural knowledge of stand dynamics to spatial analysis of forest structure for a period spanning 150 years. The result was a visual means for comparing alternatives relative to forest edge, opening size, age class distributions, and commodity flow. The value of this to wildlife managers and recreation planners is obvious. Another example of silvicultural innovation is in the field of restoration forestry. Figure 1 shows how careful silvicultural skills have converted a warm, eutrophic stream in an overgrazed pasture to a productive riparian ecosystem in a single decade (Williams et al. 1997). In a short span, silviculturists have transformed a degrading landscape into one with multiple, sustainable values. Silvicultural applications such as these speak powerfully of potential solutions to land management problems. But they may not speak loudly enough.

The Art of Communicating

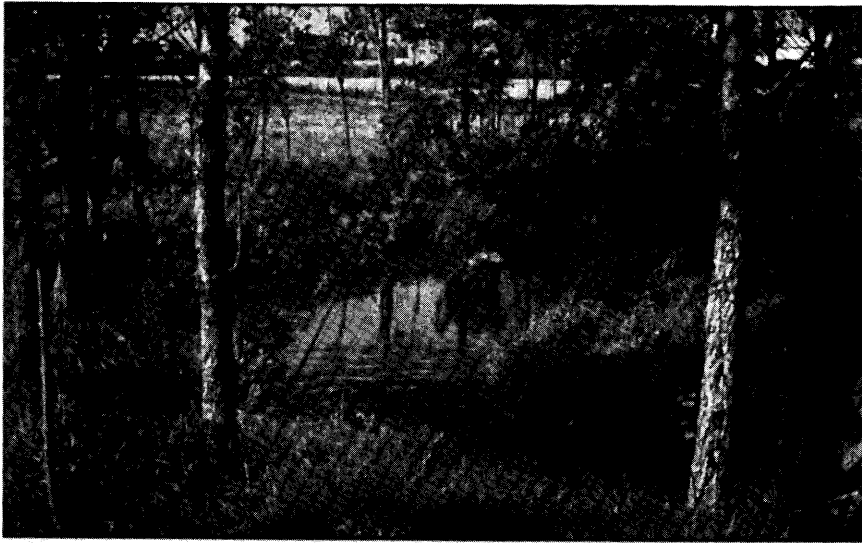
Most of us prefer traditional ways of communicating and practicing our profession. Now we call on you to break beyond the comfortable confines of our professional circles. And why not? Our knowledge rests on a foundation of the basic natural and social sciences. We are the best integrators of scientific knowledge in the forestry field. We understand the dynamism of forest ecosystems and how they respond to treatment. We are the arm of biological technology that carries ecosystem management into action (Smith et al. 1997). This must be communicated in widening circles. Failure spells death for our profession. It means that healthy, resilient forests will not be passed to future generations.

We believe that silviculturists will face the challenge successfully. But success demands commitment, sacrifice, encouragement, reinforcement, and outreach. If silviculturists are to be seen as “success makers,” we must meet the challenge on multiple fronts.

Forest resource issues carry emotional impacts, and our playing field is not level with that of professional communicators. For example, “Majesty and Tragedy: The Sierra in Peril” (Knudson 1991), serialized in a major California newspaper, earned its author a Pulitzer Prize. The title was riveting, and heralded a good discussion of land use issues spiced with provocative, powerful references to John



A



B



C

Figure 1.—Washington Creek, southern Ontario, Canada. (A) As it was prior to rehabilitation in 1985; (B) in 1989 after reforestation with hybrid poplar, maple, and alder and a subsequent biomass thinning; (C) in 1996. Note inputs of large woody debris to the stream. Courtesy of Andrew M. Gordon as modified from Williams et al. (1997).



Figure 2.—New phrases with nebulous meaning compound the communication problem.

Muir's "Range of Light," Brazilian rain forests, Nebuchadnezzar and the cedars of Lebanon, monuments to God, eroding slopes, and mercury-laden mine wastes polluting the water supplies of greater California. Attorneys were quoted on their ecological views. Laced with value-ridden terms like "deforestation," "corn-row forestry," and "clearcut war zones," this publication painted a bleak picture of silviculture in general, and the Forest Service in particular. Literally, such prose sells papers. Scholarly, factual, voluminous reports with such titles as, *Status of the Sierra Nevada. Volume I—Assessment Summaries and Management Strategies. Sierra Nevada Ecosystem Project Final Report to Congress*, can hardly compete for the attention of an uninformed public. We are quick to holler "foul!" when issues are misrepresented in the popular press. But we seem ignorant of ways to improve our own plight. Now this must change.

Communicating with society demands a clear and concise message. But clarity in thought and speech seems blurred by the tumble of wondrous phrases seemingly sanctified beneath the cloak of "ecosystem management" (figure 2). They surface commonly in planning sessions, in discussions with other professionals, and with the public. Despite their veneer of enlightened concepts, usually they convey more fog than clarity. Collectively, we call them "ecobabble." Probably, we have contributed to them.

Some ecobabble phrases, such as "historic range of variability" and "universal fragmentation index" are at least quantitative. They can be described and discussed in a way that conveys their meaning to others. But phrases like "healthy forests," "ancient forests," and "biological legacies" are more subjective. They have a sizable impact on the senses, but their meaning is obscure. We have our own silvicultural jargon, but our terms have clear definitions (Ford-Robertson 1971, Smith et al. 1997). We need a common language. Repackaging old silvicultural terms and concepts into ecobabble does not elevate the stature of our profession. Communication is give-and-take between plain speaking and active listening. Let's say what we mean.

Forest ecosystem management seems a magnet for ecobabble, but we do not impugn the concept. Ecosystem management is a worthy goal, and tomes have been written in ways that appeal viscerally as well as intellectually (Drengson and Taylor 1997). But despite its heralding as a "new paradigm," the concept is familiar to silviculturists. Ecosystem management depends on silvicultural solutions to forest management problems based on careful analysis of the ecological factors involved. This is our traditional arena. Let's reclaim it.

Communication is not only oral. Scientific publication is our major way of communicating silvicultural advances. Yet,

many authors choose a writing style that is meant more to convince reviewers than to entice readers. As Janzen (1996) points out, scientific papers tend to list from the mass of data meant to sway peers. Remaining verbiage then is spent in drawing logical but cautiously conservative conclusions. This pattern is a natural product of the review process by which authors are scolded, prodded, sometimes coerced by their peers to reorganize their writing into a standard mold that is stilted and dry. While lending some assurance that results are valid, the product often seems blunted by the need to placate reviewers. Most scientists admit that rewards are tied largely to numbers of published papers and less so to their quality. But as Gregory (1992) has observed, "Scientists should be judged according to how many times their work is *read*, not cited."

Authors of silvicultural tracts could inject at least *some* personality into their writings. Tradition suggests that personality takes a backseat in scientific prose. Writers fall into passive voice and third-person references with the vague notion that this somehow portrays objectivity. More likely, it means that the reader may be bored to distraction. Writing is "a personal transaction between two people, conducted on paper, and the transaction will go well to the extent that it retains its humanity" (Zinsser 1994). Jansen (1996) offers several suggestions for transfusing life into scientific writing—among them, the willingness to speculate beyond the immediate limits of the data. Careful, measured speculation can be provocative enough to trigger the next level of research. Watson and Crick (1953) offer a classic example. Their landmark DNA paper concluded with this elegant, understated speculation: "It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material."

Continuing Education

During the early seventies, the Bolle Report (1970) criticized the U.S. Forest Service for timber harvesting practices. Along with internal recommendations, this launched the Forest Service Silvicultural Certification Program. keystones included continuing education requirements and demonstrated proficiency. The Society of American Foresters (1977) saw a similar need, and continuing education became a priority national program. Professional renewal through certification, recertification, and program upgrading is absolutely central to maintaining silvicultural excellence. This program is one of the proudest professional accomplishments of the Forest Service. Even with reduced budgets, education must be sustained. Those from other disciplines should participate not only as instructors, but as students. It keeps us on the leading edge. It makes our profession relevant to others.

Mentoring

Forest Service ranks are shrinking and so is our community of seasoned silviculturists. Our silviculturists still are among the world's best, but trends are discouraging. Job openings are scarce. Where they do occur, the pool of qualified

applicants is small. Student enrollments in other forestry fields are stable or slightly up, but both undergraduate and graduate enrollments in forest management have fallen heavily in the nineties. Fewer are being trained with the breadth of skills described by Daniel et al. (1979). Thus, we have a compelling need to pass our knowledge on to others—including those in other fields such as wildlife biology, soil science, and ecology—disciplines that participate in the planning process but lack our peculiar mix of skills. One-on-one involvement is the most effective communication of all. Of course, willingness on our part is only half the equation. The other half requires someone receptive. Mentoring isn't for everyone, but we should try.

Professional Outreach

We must be *visible* in our profession and in the educational activities it sponsors. But let's not stop there. Let's consider professional societies other than our own. Let's be active ambassadors to other groups, raising our profile in forest ecosystem management. We must break the comfortable mold of "just talking to each other." Yet, we must be careful not to squander our energies on "professional adversaries"—those who delight in not reaching accords on matters of forest management. We must extend ourselves to others of good will. We need to make contact, communicate clearly, establish trust.

Silviculturists can be catalysts for meetings that unite, rather than divide. Recently, several agencies co-sponsored a symposium in California entitled, "Whose Watershed Is It?" Watersheds are good rallying points because they're tangible, suggest multiple values, and have a clear silvicultural connection. Yet, watershed values are weighed differently by different interests. A good first step toward bridging differences is to find common ground through a structured symposium. From this, a dialogue begins.

Teaching the Teachers

Educational investments create the widest ripples, and the sooner they're made, the better. But forestry issues rarely surface in primary education. Today's students, however, will become tomorrow's adults, men and women faced with making choices on forestry issues. How informed will they be? Will issues be judged objectively? Or will attitudes be forged early by emotionally slanted rhetoric? Judging from some textbook material, we should be worried.

For instance, in its discussion of Pacific Coast forests, *Environmental Science* (Cunningham and Saigo 1997) states the following: "California redwood, the largest trees in the world and the largest organisms of any kind known to have ever existed...were distributed over much of the Washington, Oregon, and California coasts, but their distribution has been greatly reduced by logging without regard to sustainable yield or restoration." And later, "At these rates (of logging), the only remaining ancient forests in North America in 50 years will be a fringe around the base of the mountains in a few national parks." The authors seemed to have sidestepped Pleistocene glaciation, Holocene plant

migration, and California's Forest Practices Act (one of the strongest in the nation). Apparently, they also dismiss the "ancient forests" in wilderness areas (which now exceed the land areas of Ireland, Italy, and Israel combined), as well as those along wild and scenic rivers, and in research natural areas, state parks, special use areas, and myriad other forests where harvesting is precluded.

Of course, forestry issues are just symptomatic of a larger problem. Moore (1993), appalled by the lack of scientific literacy in our nation, called for a revolution in teaching biology by revising K-16 grade curricula. Science and technology would be emphasized in the teaching of other skills. "We can no longer rely on a single elementary classroom teacher to teach everything," he stated. "Special science teachers will have to be educated."

We agree with the principle of "teaching the teachers" in matters of forest management. The most effective program we've seen is called "FIT" (Forestry Institute for Teachers), which was born of concerns that school children (and future voters) were getting an unbalanced view of forestry activities. FIT was a Northern California Society of American Foresters (1993) concept, but support followed quickly from county superintendents of education and the University of California Cooperative Extension. FIT's objective is to provide K-12 teachers with the knowledge and skills needed to objectively and effectively teach students about forest ecology and forest management practices. Its mechanism is summer training, combining classroom and field exercises. Its aim is for each educator who passes through the FIT program to spread new knowledge to waves of students, who in turn will fan throughout society with better understanding of forestry issues and practices.

Specifically, FIT brings teachers from both rural and urban settings together with natural resource and teaching specialists for one week in a field classroom. Each session accommodates 45 teachers who are provided a basic college-level course in the physical, biological, and ecological concepts of forestry. Assisted by curriculum specialists and materials from "Project Learning Tree" and "Project Wild," they develop K-12 courses for the following school year. Meals, lodging, and materials are provided, as well as a \$300 stipend per teacher once a forestry related course is created for their classroom. Attendees also earn 3 units of graduate credit from a local university. More than 500 teachers have passed through FIT, but such grassroot programs will not be successful without knowledgeable, committed volunteers.

SUMMARY

Our task is to convince the doubters that silviculturists are not "killers of trees." Rather, that silviculture is the sole means by which forests are managed for the purposes of meeting society's needs. By stepping beyond the comfort zone of "talking to each other" we will be rewarded with a restored image of our profession and a more objective and informed public. Communication is the key. Effective communication is a creative art requiring clarity in

expressing our ideas and receiving those of others. Avenues include better writing, personal mentoring, breaking beyond our professional boundaries, and committing our talent to educational efforts—especially those that "teach the teachers." The future of "applied forest ecology" depends on us.

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