allowed life to crawl out of the ocean. It is not progress or predetermination that causes meteors to strike Earth. There is nothing inherently "good" or "better" about one particular organism that allows it to survive changing environmental conditions such as nuclear radiation, forest fires, or floods. Species are limited by their genetic heritage in terms of whether they have what it takes to survive disturbances.

Another part of this same idea is that ancestral species are entities in their own right. For as long as they exist, species are not "in a state of becoming," they simply *are*. Evolution is a branching process, not a ladder where one thing is necessarily replaced by something else.

Gould warns that we should move away from thinking about "higher" or "more complex" or "better" when we talk about the environment. These are human constructs, not natural divisions.

In thinking about the history of the national parks and the idea of an "ideal" national park, I think in the back of our minds it's comforting to think that progress is inevitable, that we're going to reach some more perfect state of national park-ness. However, it may be that we should consider thinking about the parks as end products or entities in their own right. Rather than saying that Yellowstone was incomplete or inadequate, or that we had the wrong idea of what Yellowstone should be when we fed the bears, why not admit that we have changed our minds about what Yellowstone should be? Now we have a *better*...no, now we have a *different* conception about what national parks represent. Maybe it has been the ideal Yellowstone National Park—not the ideal national park—all along. Maybe we should stop condemning history and accept it for what it was (and is). In Yellowstone's origins lay the potential of everything the park is and will become: beggar bears, horse-drawn carriages, automobiles, the "Let it Burn" policy, the wildfires of '88. We are stuck with this particular landscape, this geography, and this human history. We can't rewrite the past, and managers can't expect the public to forget the past so quickly. There is much about Yellowstone that people have always loved, there is much that the park has come to mean, and managers need to be sensitive to this history and these meanings when enacting new policies.

YS: Is it fair to describe the historian's job not so much to judge what was done in a previous time, but to set it in the context of that time? In 1872 we didn't have a complete idea of what Yellowstone National Park was or should be, and we've added to that idea over the years.

JM: I think you're exactly right. Our perception of Yellowstone, what it is, what it does to us, has branched over time, grown richer. We haven't forgotten the old experiences, but have added new ones as well. That's what makes management so difficult. Now there are parts of this gloriously bushy Yellowstone experience that conflict with one another. The national park idea, in terms of management policies, I think, has evolved as a linear replacement. In Yellowstone's earliest decades, there really weren't many rules. You could do just about anything you wanted: fish, hunt, build hotels, swim in the hot springs. Now you can swim/soak in the hot springs. OK, you can't really swim in the hot springs, either (not legally), but you can soak in a hot tub, or in the rivers warmed by the hot springs. You can't hunt. And at first you could feed the bears, but now you can't. Now you can hear wolves howl again. I think that the people who were in the park in 1872 felt that Yellowstone was *something*, something *real*. It was not in the state of becoming something else.

YS: That's *within* the park. Certainly it could be argued that within the National Park System there has been branching; we have different parks with different policies.

JM: I think there has been branching, incredible branching, in terms of the Service's attempt to protect nature—look at the national seashores, historic sites, and recreation areas. As the nation's perception broadened as to what sort of nature should be protected, so did the geographic extent and variety of NPS jurisdiction. We now have the NPS protecting and interpreting the Statue of Liberty as well as Sandy Hook. The NPS has been very responsive to the needs of America. But we know that national seashores are different from national recreation areas, which are different from Yellowstone and Glacier. Management of different types of units (such as national recreation areas versus parks) typically is the exchanging of one strategy for another, although I recognize that management strategies are not usually contradictory. Rarely does the Park Service make a 180° change on management policies the way it did in Yellowstone with bears, wolves, or swimming in hot springs.

My point is that even within one park, one place over time, our affection for this place has been an accumulation rather than replacement of meanings. A portion of the public—I'm related to some of them!—still thinks that it's not Yellowstone if you can't feed the bears. That particular part of the Yellowstone experience or expectation is fading, times are changing, but some of us see the little salt shaker bears and other beggar-bear-days memorabilia, and we shudder (or laugh). We know that the Yellowstone that produced those cute bears isn't a "pristine ecosystem" or the "wilderness" we want to think Yellowstone is today. But it was, and still is, an important part of what Yellowstone *means*. We all need to remember that, whether we are park managers, outdoor enthusiasts, environmentalists, whatever! I worry that in our rush to "do the right thing" in terms of ecosystem management and nature preservation we may lose part of the Yellowstone experience that hasn't changed until now, the stasis.

For my dissertation, I looked at everything I could find describing individual tourists' experiences in the park. Initially, I was looking for signs of change. I hoped to track the course of change, the impetus for change, the moments of change. I looked at the earliest accounts first, the "discovery accounts," and tried to make my way chronologically through the literature and noticed that much of the material in the earliest accounts was simply copied into later accounts. Even Ferdinand Hayden, one of Yellowstone's "official discoverers," copied from other explorers' accounts of thermal features in Iceland and New Zealand as well as from descriptions from the Washburn-Langford-Doane and Folsom-Cook-Peterson expeditions to Yellowstone. Nathaniel Langford, too, pretty much knew what he was going to see here and what he was going to say. Once the dis-

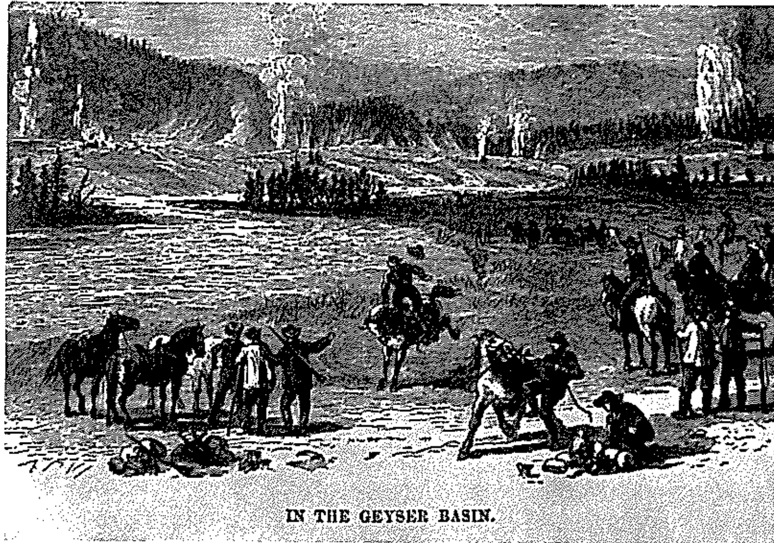
covery accounts were published, however, everyone started copying the Yellowstone experience and it was codified very early. For example, it was standard practice to write that when you pull up to Old Faithful, it will give you a greeting salute. I honestly can't believe that for every person who wrote that when he or she pulled up to Old Faithful, the geyser erupted, it really happened! Or, hundreds of people wrote letters home or wrote in their diaries that "as we said good-bye to Old Faithful and Geyser Hill, Giant, Beehive, Giantess, Grand, Old Faithful, and Castle erupted as if in a parting salute."

YS: Based on the geysers' eruption patterns today, I've always found that very suspect!

JM: But that's not the point. This was a creation myth. We need to be careful not to discount that now, because not everybody got here, and these accounts made other people feel good about Yellowstone, which may be one reason why it's still here.

YS: So do you describe the Yellowstone experience as many different things?

JM: What I tried to say in *Spirit of Yellowstone* is that these historical accounts are not just interesting as Langford's account or Washburn's account. If you look at the accounts collectively, as a body of literature or evidence, there are the origins and subsequent evolution of the elements of the Yellowstone experience that we recognize today. The themes, even the words, I found woven throughout the earliest accounts are still evident today in descriptions of Yellowstone. In my dissertation, I tried to quantify the information in the accounts, I suppose because academics need statistics to verify the existence of anything. I then tried to graph the persistence of certain themes. It turns out that almost all of the earliest accounts remark on the beauty of the park or make some mention of the park as *wild*. That's what was/is important here. Or nationalism or patriotism or respect for the democratic government of this country: that we would establish a *people's* park. Whether it really was a people's park or not, whether minorities came or not, wasn't as important as the *idea* that Yellowstone wasn't going to turn anyone away, that Yellowstone belonged to them, too.



Drawing depicting simultaneous eruptions of many geysers on Geyser Hill in Edwin Stanley's 1880 Rambles in Wonderland.

Historians and other academics like to point out that Yellowstone was popular because is was "commodified." The railroads, especially, but also politicians and others wanting to be rich and/or famous, turned Yellowstone into a commodity—made it available, accessible, and desirable. Yellowstone was marketed to the public, and the public "bought" it, so this school of thought goes. But my point is that whether Yellowstone was created by the words and images of the discoverers or by its marketers (or both), the Yellowstone idea *did* sell, and we *did* save this place. And some of the reasons for saving this place can be traced over time. In the literature, and in people's hearts, there is something about this place that hasn't changed.

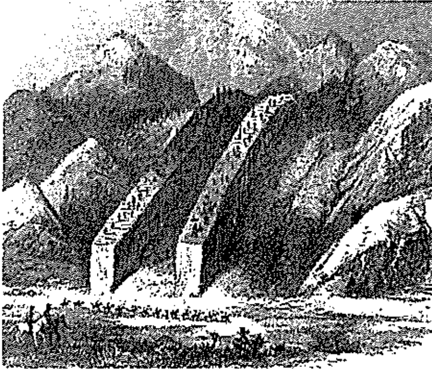
YS: Do you recommend preserving some of those core experiences which have been there all along?

JM: Yes. Some of them can't be saved; they're gone, and for most of them that's a good thing.

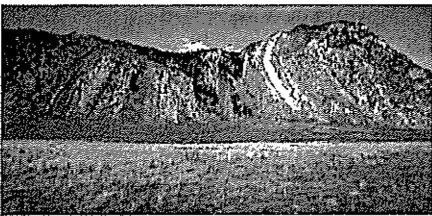
YS: For example, offering the opportunity to feed the bears?

JM: To feed the bears, or swim in a hot spring. I'm worried now that we're moving really fast and some things are being inalterably replaced. The corkscrew bridge on the old East Entrance road is gone because now we have cars and a road that comes up over Sylvan Pass. The swimming pool at Old Faithful is gone. We have discounted history, and the stasis part of the evolution of Yellowstone as place, as being something inferior or incomplete or on its way to becoming what the park is. In terms of where we look to determine management strategies, history is often discounted in favor of science or politics or economics.

When Malcolm Forbes put his ranch just north of Yellowstone up for sale, the government was not especially aggressive in its attempts to acquire the land, despite the fact that the Forbes ranch included a unique landform called the Devil's Slide. Instead, the Church Universal and Triumphant bought the land and it's now known as the Royal Teton Ranch. Someone should have looked at Yellowstone's historical record and noticed that almost every person entering the park from the north, upon coming around the bend in the Yellowstone River and seeing Devil's Slide, said something along the lines of, "What a strange geologic feature! Now I know I'm entering Wonderland." This isn't just an isolated anecdote; this is evidence that Devil's Slide is a part of the Yellowstone experience and should be a part of the park. It is a shame that it's not. If one looks at the historical record, Grasshopper Glacier and the whole Cody Road belongs to Yellowstone. I know it's unfeasible to add these places to the park now (you can't get things through Congress like you could in 1872), but if someone had



Above: Devil's Slide drawn by Thomas Moran for Nathaniel Langford's first article on Yellowstone in Scribner's *in 1871. (This was drawn sight unseen, since Moran didn't make it to Yellowstone until the following year when he came with Hayden.)*
Below: The real Devil's Slide. All photos in this article courtesy the author.



"I think making the roads wider and faster isn't necessarily a good thing. Maybe waiting in line, bumper-to-bumper, is part of the Yellowstone experience, and we don't need to drive 45 miles an hour...people *sacrificed* to come to this place...If they were going to climb mountains, they had to do it on foot...They were going to get dirty. I don't think we need to try so hard to make Yellowstone 'easy' today."

thought to consider the historical or perceptual importance of Devil's Slide when deciding whether to buy the Forbes ranch, this vital piece of Yellowstone might physically be a part of the park today.

YS: Could we preserve those experiences without legislatively changing the boundaries of the park?

JM: Those are just examples. I don't think anything will ever happen to increase the size of the park now, but I think it's important that we understand that history matters and history can be a tool of managers and planners and environmentalists. When we make policy, we need to remember there are cultural experiences in this place, not just ecosystems. Maybe considering history will build a stronger case against adding new recreational activities that don't hurt the environment but just don't belong here.

I think making the roads wider and faster isn't necessarily a good thing. Maybe waiting in line, bumper-to-bumper, is part of the Yellowstone experience, and we don't need to drive 45 miles an hour through the park. It is obvious from descriptions of the park experience that people sacrificed to come to this place. They knew it was going to be hard; it was not necessarily going to be expensive, but there was some hard work involved. If they were going to climb mountains, they had to do it on foot. If they were going to cross streams, they had to ford them. They were going to get dirty. I don't think we need to try so hard to make Yellowstone "easy" today. I really did worry a bit when the hot tubs went in behind the Mammoth Hotel (although I've since soaked in one with about ten other "savages"!) To me, that experience (except for the friends) could have been "anywhere U.S.A." You can do that in a Ramada Inn. That's not part of the Yellowstone experience historically.

YS: There are many people who would vote for you to be a future superintendent. But let's go back to something more basic. I think of geographers as making maps, using maps. Are maps and images still important in helping define this place?

JM: I didn't focus on maps in my dissertation, but I did look at how maps were used in guidebooks. It is interesting that before 1915, when automobiles were first allowed in the park, most Yellowstone guidebooks had a one-page map of the whole park showing the Grand Loop road. Or, there was a big fold-out map tucked inside a pocket glued to the back. In any case, there was a map of the whole park. After 1915, one starts to see guidebooks with maps of different segments of the park: a map of the northeast quadrant, a map of the northwest quadrant. The message sent by the format of the guidebook had changed from "come see the whole park; get a sense of this place" to "come see Mammoth Hot Springs; come see Old Faithful." It is as if the park experience could be broken down into discrete bits or pieces.

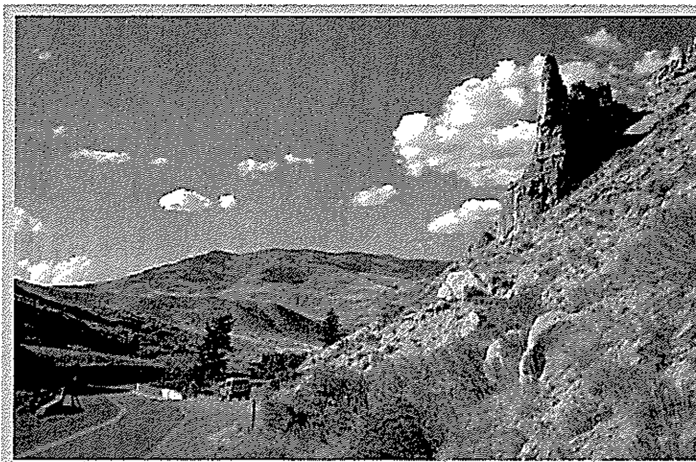
YS: We still present the park boundary that exists today, not some of those historically and geographically important features that you mention. The Devil's Slide, the Cody Road, Grasshopper Glacier aren't on any of the maps. Other specialists such as hydrologists and biologists are annoyed by that very arbitrary boundary. Perhaps for an equally important but different reason the historians and geographers are annoyed by it because it ignores the wholeness of place. Maybe we should try and change what we interpret and promote. The maps could be expanded to include these things as important to the history and the experience.

JM: Someone read at the conference from John Stoddard's 1898 observation of Eagle's Nest Rock, that little piece of sedimentary rock with the osprey nest on top (which was only intermittently occupied) along the Gardiner Road.

YS: And incidentally, has been recently reoccupied.

JM: I thought I saw a nest up there again! Eagle's Nest Rock was such an important stop on a tour of Yellowstone, especially in the 1870s and 1880s, when the United States had just lived through a civil war, and again during and after World War I. The eagle's (or osprey's) presence represented a sort of religious and political sanctioning of the park and of the national park idea. Now, no one stops there; there isn't even a little sign. Maybe that's good, because if osprey are nesting there, we don't want to disturb them. But to those who understand the significance of Eagle's Nest Rock, that place has meaning. Every time I drive by there, I look up and I feel good. I feel good about Yellowstone and the nation.

YS: As we rebuild the park's roads, we talk about whether or not to interpret this piece of natural history or cultural his-



"On three sides this is guarded by lofty, well-nigh inaccessible mountains, as though the Infinite Himself would not allow mankind to rashly enter its sublime enclosure. In this respect our Government has wisely imitated the Creator. It has proclaimed to all the world the sanctity of this peculiar area. It has received it as a gift from God and, as His trustee, holds it for the welfare of humanity. We, then, as citizens of the United States, are its possessors and guardians. It is our National Park. Yet, although easy of access, most of us let the years go by without exploring it! How little we realize what a treasure we possess is proven by the fact that, until recently, the majority of tourists were foreigners!"

John L. Stoddard's Lectures. 1898. Vol. 10., p.208

tory. As we plan to reconstruct the road in the Gardner Canyon we have an opportunity to consider safety of parking and disturbance of little ospreys. Part of what helps us make that decision is having someone point out to us the value of a place, because that may have gotten somewhat lost.

As a researcher, how else would you like to contribute to the body of knowledge about Yellowstone and therefore to its continued management and conservation?

JM: First, I think we need to look at each park individually. Yellowstone's particular model of preservation and use isn't going to work for Indiana Dunes or Sandy Hook or the Everglades or the parks of Kenya or Iceland. The Yellowstone model works for Yellowstone.

Second, I think we need to pay more attention to the people in each park who tell us what is historically appropriate for that particular place. Does that mean we now have to go back and read every single thing ever written about Yosemite and Glacier to understand the sense of place in those parks, or to figure out what is historically appropriate? No, not necessarily. If nothing else, my examination of Yellowstone's evolution as a "place" reveals that the early years are really the most important in terms of setting the stage for the park's development. Everyone copied the discovery accounts. The conditions following Yellowstone's "discovery"—Langford publicizing the park (and himself), Hayden telling tourists where to stop and how to feel—set the stage for subsequent evolution. We don't need to do years of research to get a sense of each park. We should concentrate on the early years.

Gould calls this the importance of initial conditions. He suggests that in biological evolution, the "disturbance" (for Yellowstone, the designation of the national park) and conditions following the disturbance set the parameters for what happens next, who gets a foothold on the available resources or niches. I think the initial conditions that spurred the creation of a park, the effectiveness of the early movers and shakers, and the public's initial response to that park are very important in determining what that park will come to mean as well as be.

YS: You mentioned the automobile as an event that really changed the way we view the park. What were some of other events throughout history that were major changes?

JM: Mission 66 (and the horror of Canyon Village!) This all goes back to my fear of uniformity and the idea that one way of doing things works for everybody. "Hey! Let's build the same buildings in all the parks"—even though that is not in keeping with this place. [*Ed. note: Mission 66 was a major effort begun in the 1950s to modernize roads and facilities in many national parks for visitors and employees; the goal was to complete construction by the National Park Service's fiftieth anniversary in 1966.*]

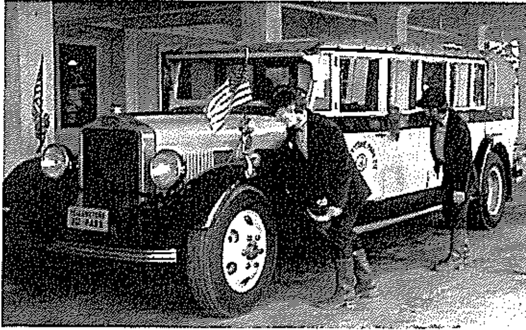
YS: Many park employees have commented "I've worked in this visitor center before, three parks ago! I've lived in this house in another park; it's the same floor plan."

JM: And now that's part of Yellowstone; we have the imprint of Mission 66 and the standardization. This was the nation's real attempt to bring the parks up to snuff, and the only way to do that cost-effectively was to build the same thing in all the parks. But that's presumptuous, that nature is just a stage and we could plop down our artifacts and that they wouldn't disturb the experience or have an impact; they did.

YS: We have this debate as some of the Mission 66 structures approach 50 years old—the point at which we must evaluate them for their potential historic value—and some of us say, "Please, let's have an earthquake before we have to save some of them!" Yet other people comment, only somewhat tongue-in-cheek, that they are also representative of a national trend in the tourism industry, toward making all the hotels into motels that looked familiar and comfortable, so you knew when you set out across the country what to expect. That uniformity in entrance stations and motels and restaurant facilities in parks was an accurate reflection of what society seemed to want at that time.

JM: And Yellowstone accommodated that. But we never tore down the Old Faithful Inn, and we still spend the night there. The uniqueness of place and respecting the influence of the past in making it unique, I think, is evidenced in Yellowstone in such a beautiful way. I worry because the fires of '88 could have taken out the Old Faithful Inn, could have taken out our archives. And the caldera's going to explode, so our time is limited. We don't need to speed up that natural deterioration or change by embracing modernity with open arms at the expense of our past. We need to be careful.

YS: Since you were in the park as a tour guide throughout the early 1980s, what kinds of changes have you observed in



Tom Woods and Lee Whittlesey—in an example of traditions kept alive in the park—polishing one of the old touring cars in anticipation of William Penn Mott's visit for the dedication of the restored ranger station at Lake.

how Yellowstone treats its culture or its sense of history? We think we've come a long way, at least in establishing more positions in cultural resource management and science, but it helps us to have the opinions of other folks on whether we've actually made progress.

JM: The Yellowstone attitude is commendable. I think the Park Service, surrounding communities, and individuals are all paying more and more attention to history. People who care about the park's past are here, working to preserve it. Lee Whittlesey was my teacher in 1980, and now he is the park archivist. Leslie Quinn and Paul Shea were in those first batches of tour guides and tour-bus drivers to be trained in the late '70s and early '80s by Lee; Paul now runs a bookstore in West Yellowstone and Les trains tour guides/ drivers, drives a tour bus, and writes the commentary handbook. There are a lot of people around who are working actively to keep the spirit of the stagecoach drivers alive.

YS: Some of the folks you mentioned, like yourself, point out that the role of the concessioner in portraying Yellowstone, in saving and interpreting its history, is still underrepresented and undervalued.

JM: I definitely had a sense of "Oh, you're just a tour guide; you're not a ranger" when I worked in the park. This came both from the public and from some of the rangers. But I *loved* being a tour guide and preferred the work, I suppose, to that of some of the rangers' jobs. I would much rather travel for three days with a group around the park than give five tours of Old Faithful over the course of the day. But in the eyes of the public and academics, the Park Service is good and concessioners are bad. All concessioners do is speed up and contribute to the "commodification" of the park: "Buy your piece of the park at my souvenir shop and then get out so you can make room for the next person in line." That attitude is absolutely contrary to my experience as a concessioner employee in the park.

YS: Wasn't the concessioners' role—the Haynes' photo shops and the postcards and stereo cards—in documenting and interpreting the park history very important? We've neglected for a long time the important role that the concessioners have had not only in selling the Yellowstone experience but in preserving it.

JM: It was very important. Certainly, concession employees today reach more people than NPS staff. When we talk about Haynes' contribution, academics especially (one of our roles is to critique) say, "Oh, he only promoted the park to make money; he was a business man." No, he did it because he *loved* this place. He did it because he wanted to share the park with the public.

And we all know that if we kick everyone out of here and don't "sell" the park, it will cease to exist. Yellowstone cannot exist solely as an ecosystem for scientists to visit once a year to take measurements. This place lives in people's hearts and minds as the birthplace of the national park idea (although it wasn't really the birthplace; the national park idea was a long time coming before Yellowstone National Park was established). We are all a bundle of purposes. We all love nature. And we all love to buy things. By the same token, many concessioners wanted people to know, understand, appreciate, and appropriate money for Yellowstone. I don't think we should cast all concessioners in a bad light, as greedy capitalists. Most of them were (and are) in love with this place.

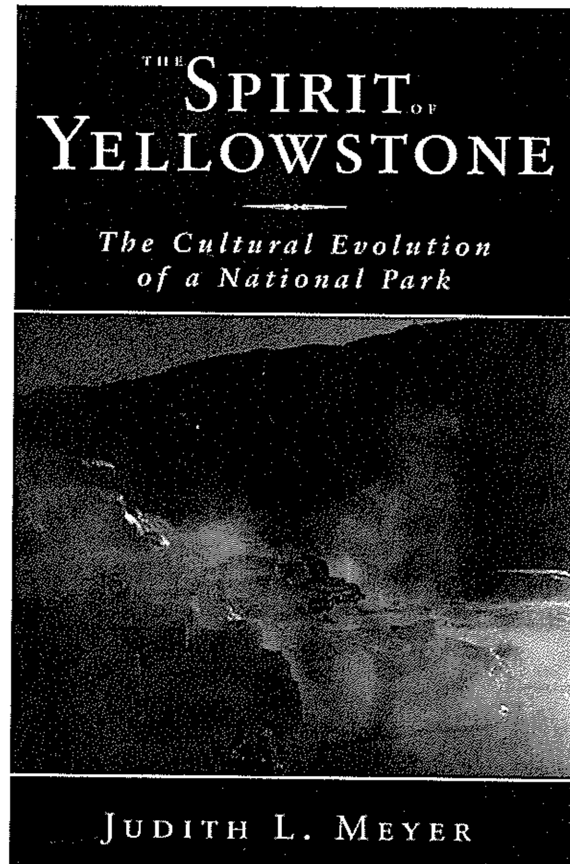
YS: What has stayed the same since 1872 in the sense of place? What are the similar ideas and visitor experiences?

"...we all know that if we kick everyone out of here and don't 'sell' the park, it will cease to exist. Yellowstone cannot exist solely as an ecosystem for scientists to visit once a year to take measurements...[M]any concessioners wanted people to know, understand, appreciate, and appropriate money for Yellowstone. I don't think we should cast all concessioners in a bad light, as greedy capitalists. Most of them were (and are) in love with this place."

JM: I think the general public still sees the park as magnificently beautiful and wild. Unfortunately, what we too often remember is all the little comments we hear along the lines of, "It looked better on the postcard," or "I was here 50 years ago when Old Faithful Geyser was higher, and the mudpots were more colorful." We hear those sorts of things, but we don't hear the people who just stand at Artist Point and look at the falls. People are still moved by the beauty and power of this place. Even though we know that the bison are being shot, that elk populations were managed, trees were cut, and crops were planted, most visitors still respond to the wildness of it all. We respond to the patriotism. We come to be educated and take part in ranger programs, pick up brochures and read about how much travertine is laid down over the course of a year. We come to recreate. We still think hiking in Yellowstone is in some way healthier than walking through downtown Chicago. If we polled visitors at the gates today and asked, "Give me 12 words that describe the purpose of this park or what you got out of your trip," I think the same themes that were in the earliest accounts of a Yellowstone experience would still be there today. ✵

Book Review

The Spirit of Yellowstone: The Cultural Evolution of a National Park *by Judith L. Meyer, Rowman & Littlefield Publishers, Inc., Lanham, Maryland, 1996, 115 pages, $26.95 (hardcover).*



Like many longtime employees of Yellowstone, Judith Meyer came to work for the park concessioner for one summer and found herself returning year after year. "I had no idea how deeply Yellowstone's spirit would touch my soul," she writes. In her own words, "Yellowstone houses a spirit of place: an infectious, irresistible force that stirs something within so many of us." This book, a variation on her doctoral thesis, appears to be her quest to define that spirit of place. As a professor of geography, she applies the rigorous scholarly tools of her trade to this end. Though lyrically written, the general public may find the analysis a bit academic. But the many of us who have also heard the siren's call will appreciate this intriguing and probing attempt to quantify the ideal that we too hold dear. Whether this lofty goal is achievable or not, the book immediately earns an important place in the literature of Yellowstone merely for naming this ethereal concept, "a spirit of place," and inclining us to look at the park in this way.

From its introduction, we come to understand that this book has two primary objectives. First, "it is an examination of Yellowstone's profoundly evocative, affective, and attractive spirit; the park's ability to move us intellectually, physically, and emotionally." It is an investigation of those "taken possession of by it"—the generation of park visitors who, in describing and communicating their experiences to others, created the park as a recognized "place." This book is, at its core, a literature review. In seeking out the evasive spirit of Yellowstone, Meyer delves into the minds of the explorers, park promoters, and early visitors through their writings.

The second objective is even less measurable. In asserting that Yellowstone is not just a national park, it is "place," she calls us to look beyond the park as just an ecological entity. The author suggests that Yellowstone is a human artifact and that it is we who assign meanings to its landscape. In the course of the book, she encourages park managers to take this notion of "spirit of place" into account when making management decisions.

Meyer takes a refreshingly different view of park history. Despite the title of her first chapter, "Revolutionary Ideas and Evolutionary Processes," instead of framing the park's history in terms of society's changing attitudes toward nature, she focuses on what has remained the same. Hers is a history of visitor perceptions. She reviews the literature from 1870 to 1991 and finds six themes that recur across the decades: the park's beauty, its uniqueness, its tourism and recreation capabilities, its wildness, its democratic ownership, and its scientific and educational values. She notes how, in recent times, Yellowstone has been criticized for the changeable nature of its management policies. She quotes former Superintendent Bob Barbee saying that park management "is an uneasy truce between what science tells us is possible and what our value system says is appropriate." She suggests that adopting a new perspective, one "that releases park managers from society's changing attitude toward nature and acknowledges the importance of people's affection for parks as places" may resolve some of the criticism aimed at the NPS and bring about a new appreciation of the national parks.

Meyer acknowledges that the leaders of the three famous expeditions to the Yellowstone were not its true "discoverers." Still, she notes, it was their prolific writings that captured the imagination of the nation. Her analysis of these writings shows that each of the expedition leaders relied heavily on the descriptions of Yellowstone written by those who preceded them. After the park was established, the first guidebooks and the journals of early visitors continued to recite the wonders of Yellowstone in language uncannily similar to the discovery accounts. It was these original works, she proves, which seared an image of Yellowstone into the collective mind of the American people and began to define Yellowstone's spirit of place. Another chapter takes this line of thought deeper by comparing the early accounts of the area's major features: Mammoth Hot Springs, Tower Fall, Old Faithful, the Grand Canyon of the Yellowstone, Upper and Lower Falls, and Yellowstone Lake.

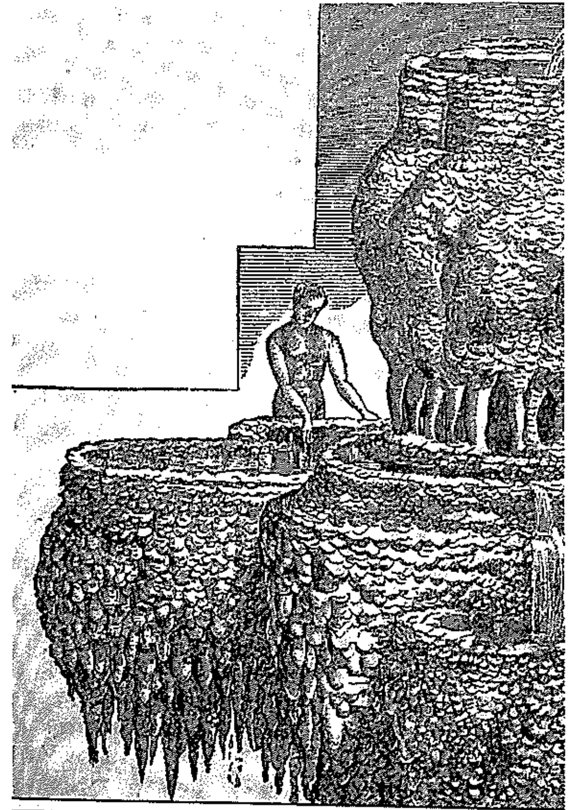
She also notes how the early art of Yellowstone—the sketches, photographs, and chromolithographs that accompanied the discovery accounts —was as integral as the writings in creating the public's image of Yellowstone as "place." As an aside, the book includes interesting comparisons between the artwork Thomas Moran did before he'd been to the park and that which he created after he'd seen

the area for himself. As a result of the early descriptions and artistic renderings, Meyer suggests that, from the outset, people have always come to Yellowstone somewha t "preprogrammed" to encounter and interpret the park in certain ways—and yet such expectations do not "preclude fascination and surprise" in each visitor's experience of the place.

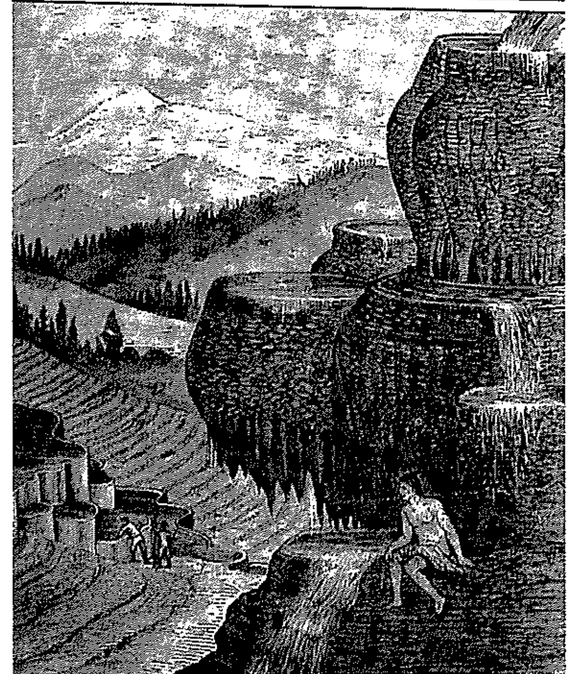
Meyer continues by investigating the changing visitor experience in Yellowstone. She observes that, historically and recently, attempts to provide recreational activities have been blamed for the degradation of park resources. She points out that, from the moment of its inception, Yellowstone was to be a place for the people—a refrain ever familiar to those aware of the dual mandate of the NPS mission. She chronicles this history through the park's infrastructure, from the building of roads, bridges, and hotels to transportation; from stagecoaches to touring cars to individual cars. She notes that the tradition of group travel predates the ranger campfire program, and for that matter, even the NPS itself. Through the diaries of early visitors she documents the companionship of the stagecoaches, the legendary tall tales of the drivers, the camaraderie of the campfires at the tent camps, and the singing of the "savages" that, in her mind, made these early days the glory days of Yellowstone. Meyer laments the loss of this tradition.

I think she is trying to say that, in pondering what recreational uses are appropriate, tradition and a spirit of place should be taken into account. She diverges from scholarly objectivity to occasionally state some strong opinions on various visitor uses such as snowmobiling. While I was not entirely sure where chapter five was taking me, it was an enlightening and delightful journey down Yellowstone's memory lane.

If Meyer's intent was to examine Yellowstone's spirit and those "taken possession by it," then she was successful, unearthing through meticulous research compelling and little-known quotes from the massive body of literature written about the park. Her other objective was to encourage people to think about Yellowstone as more than a national park and to urge managers to incorporate this concept into management decisions. Whether this goal is attained will be up to each reader. However, if an unwritten intent of this book was to get people pondering what the spirit of Yellowstone is to them, then this book succeeds mightily.



A sketch entitled "Ornamental Basin at Mammoth Hot Springs of Gardiner's River" from F.V. Hayden's Twelfth Annual Report. *The sketch is a highly abstracted hot spring and a mythical figure.*



This second sketch from H. Butterworth's Zigzag Journeys *(circa 1892) of similar hot spring formations, clearly indicating the tendancy of the times to mystify the Yellowstone "experience," but with the addition of a more realistic view of the terraces in the background. (The exact same sketch is found in F.K. Warren's* California Illustrated.)

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Stream Ecosystem Responses to the 1988 Wildfires

by G. Wayne Minshall, Christopher T. Robinson, and Todd V. Royer

The 1988 wildfires in the Greater Yellowstone Area (GYA) provided an important opportunity to assess the effects of large scale disturbance on stream ecosystems over time. Research conducted by the Stream Ecology Center of Idaho State University has documented these changes and their effects on stream biota during the last nine years. We examined environmental and biological responses of 20 streams in Yellowstone National Park (Fig. 1) each year for the first five years following the extensive wildfires in 1988 and we studied a subset of these streams in 1994, 1995, and 1997. Our findings demonstrate an integral relationship over time between a stream and its catchment (drainage basin) following large-scale disturbances such as wildfire. However, individual streams varied considerably in their responses, depending on such things as size and local variations in precipitation, geology, and topography, with major ecological changes occurring each year following the fires. We were especially amazed by the major physical changes in streams that occurred even between 1995 and 1997. Indeed, some streams in fire- "ravaged" watersheds such as parts of Cache Creek changed more in the last three years than in the first six post-fire years.

The changes with time and among streams were readily apparent in photographs taken from the same location and position each visit—a form of documentation called re-photography. The conditions were then documented by measurements of channel morphology, substratum particle-size distribution, and accumulations of woody debris. We expect that these changes in habitat conditions will be reflected in differences in the abundances and kinds of organisms found in the streams. Documenting these changes is important, as aquatic insects are the "groceries" that the park's trout consume for sustenance and growth.

Our Working Hypotheses

Current theoretical constructs (ideas) for flowing water (lotic) ecosystems provide a rich framework from which to postulate ecosystem response to large scale disturbances such as forest fire. Paramount to such knowledge is recognition of (a) the integral association between stream ecosystem responses and terrestrial conditions of the surrounding watershed; (b) the crucial linkage between aquatic and terrestrial food bases and the trophic composition of the fauna in streams, and; (c) the importance of stream size as a modifier of land-water interactions.

Based on these fundamental principles of stream ecology, we developed three primary hypotheses:

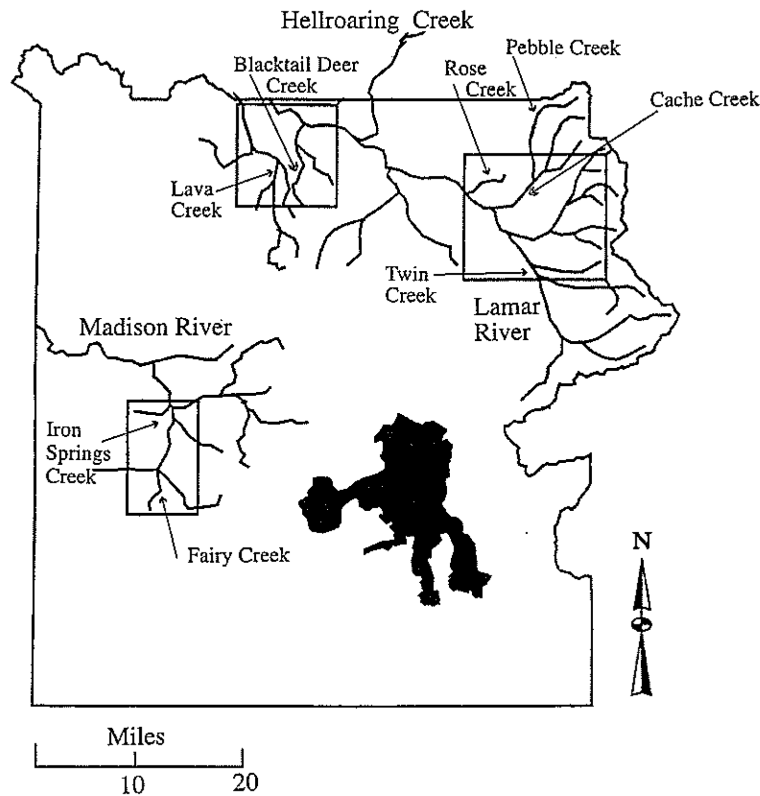

Figure 1. Location of the streams and major water bodies in the study. Rose, Pebble, and Amphitheater (to the right of Pebble) creeks are unburned (in ≤ 5% of catchment) reference streams; the remainder were burned (in ≥ 50% of the catchment) by wildfires in 1988.

1. Stream response will reflect changes in the structure and composition of adjacent terrestrial vegetation following wildfire. Since forest regeneration following wildfire is a long-term process, extending up to 300 years in the GYA, stream ecosystems were expected to respond similarly and to change progressively with temporal changes in plant community structure within a catchment.
2. Changes in environmental conditions will be reflected in the relative differences in amounts of food resources produced within (authochthonous) and outside (allochthonous) a stream and, in turn, the trophic composition of macroinvertebrate assemblages will reflect temporal changes in the food base among streams.
3. Major differences among streams, in terms of intensity of the effects of fire and recovery rates, will occur because of differences in stream size, watershed slope, and aspect. Watershed slope and aspect significantly influence the timing and rate of runoff and the type and amount of riparian and upland vegetation.

More-specific hypotheses addressed major ecosystem components that were associated with the general points above. In addition, we predicted long-term alterations associated with the recovery of riparian and terrestrial vegetation, and consequent shifts of instream food resources and retention characteristics.

Chronology of Changes in Stream Conditions Following Wildfire

It was insightful to separate the temporal responses of streams to wildfire into four periods: (1) immediate changes (the time of active burning to a few days after); (2) short-term changes (from a few days to the end of the first year); (3) mid-term changes (the second year to sometime beyond the tenth year); and (4) long-term changes (from tens to hundreds of years). The precise length of each period depends on the degree of disturbance by fire and the environmental conditions of burned catchments such as weather and climate, topography, geology, soil conditions, and forest type. The immediate and short-term effects were expected to be the most dramatic and to alter stream conditions profoundly, relative to those before the fires. The mid- and long-term changes in stream ecosystems were hypothesized to parallel the successional replacement of the terrestrial vegetation.

Immediate Effects

Beginning in late September of 1988, we examined the fire effects in 18 burned and 4 reference streams (one of each was eventually eliminated from consideration). Losses in upland and riparian vegetation and the almost instantaneous conversion of terrestrial vegetation to charcoal and ash resulted in immediate changes in the amount of light and quality of organic matter, i.e., food resources entering the streams. The most striking immediate changes within stream channels were the incineration and scorching of emergent mosses and heat fracturing (splaying) of rocks in and adjacent to smaller streams. Although most burned trees remained standing, many downed trees and large limbs were observed within and/or bridging streams. We also counted up to 10 dead cutthroat trout in our 250-m long study sections in mid-sized (3rd order) Cache Creek and the West Fork of Blacktail Deer Creek. These are believed to have died as a direct result of the fire (see below). However, we also know of another instance on a tributary to the Little Firehole River where an errant drop of fire-retardant was responsible for a number of fish deaths.

Most dissolved chemical measures increased in streams of burned catchments the first year following the fires. Based on studies by other researchers in 1988 on the effects of wildfire on Glacier National Park streams (Spencer and Hauer 1991), we believe dramatic and rapid increases in stream phosphorus and nitrogen levels occurred during the Yellowstone fires due to inputs from ash and smoke gases, respectively. We speculate that high ammonia levels that entered the water from the smoke were responsible for the observed fish mortalities. Few or no immediate deleterious effects of fire were evident in algae growing on