

# Biology and Philosophy in Yellowstone\*

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**ABSTRACT:** Yellowstone National Park poses critical issues in biology and philosophy. Among these are (1) how to value nature, especially at the ecosystem level, and whether to let nature take its course or employ hands-on scientific management; (2) the meaning of "natural" as this operates in park policy; (3) establishing biological claims on the scale of regional systems; (4) the interplay of natural and cultural history, involving both native and European Americans; (5) and sociopolitical forces as determinants in biological discovery. Alston Chase's strident *Playing God in Yellowstone* is criticized and used as a test of David Hull's naturalistic philosophy of biology. Biology and philosophy in Yellowstone ought to combine for an appropriate environmental ethic.

**KEY WORDS:** Yellowstone, valuing nature, natural regulation, ecosystem analysis, natural resource policy, national parks, philosophy of biology, environmental ethics.

Yellowstone National Park is a place to go on vacation. Yet a philosopher or biologist will find work to do here — challenges so fundamental that we hardly have intellectual resources adequate to the task. In the field, forest, and range, our theories will look different. For the trip you are about to take, be forewarned. An excursion into biology and philosophy in Yellowstone, at times a pleasant diversion, is also a risky adventure into poorly mapped terrain. In Yellowstone you can get lost — philosophically and biologically, as well as geographically.

That has already happened in fact, and the trip to be taken here will be one of rescue as well as exploration. For several years Alston Chase, with a doctorate in philosophy from Princeton, also degrees from Harvard and Oxford, former professor of philosophy (Macalester College), and sometime wilderness guide, has been trying to rescue biologists in Yellowstone, who, he fears, have gone astray. They did not get lost all by themselves, however; Chase thinks environmental philosophers helped misguide them (Chase 1987; 1988). Unfortunately, as happens sometimes with would-be rescuers, Chase has gotten confused himself in the Yellowstone terrain. Then too, there are degrees of being lost, and the park naturalists, if sometimes disoriented, may not in recent times have been entirely lost. Nor were the environmentalists,

Yellowstone is significant for what it is — vast and spectacular, the

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largest, nearest intact ecosystem in the temperate zone of Earth, visited by millions — and for what it represents: the oldest national park in the world and a model for the world of enlightened care for fauna, flora, and ecosystems. So Chase's search, and ours, is globally and nationally important — the more so because in this region, in the wild, we can find our way only with an environmental ethic that joins biology and philosophy in ways as yet not well mapped.

### 1. VALUING NATURE

In Yellowstone we find that science is necessary but not sufficient for valuing nature. There is public debate about whether the massive fires last summer were a good thing — for humans, for the fauna, the flora, for the ecosystem, John Varley, Chief of Research at Yellowstone Park claims, "The ecological story ... has been a very positive thing" (in Stuebner, 1988). Governor Cecil Andrus of Idaho, Interior Secretary under President Carter, replies, "To let fires burn in July and August is ridiculous" (in Egan, 1988). Chase (1988) finds the present policy neither biologically nor philosophically sound. Once we judged fires to be bad and suppressed them; now it is clear that fires are sometimes good and fire suppression bad. The Department of Interior has appointed a review panel to mix biology and philosophy and decide how much fire is a good thing.

We permitted an epidemic of pinkeye to destroy half the bighorn herd, intending to strengthen the species, thinking it good to let nature take its course. We rescued a grizzly sow and her three cubs stranded after the spring ice breakup on Frank Island in Yellowstone Lake, hoping to save the species, not letting nature take its course. A park official forbade four compassionate snowmobilers from either rescuing or mercy-killing a bison that had fallen through the ice into a river; this seeming callousness was castigated in national newscasts. Once we judged predators to be a bad thing, and eliminated them; now it is clear that the human policy, not the predators, was bad. After fire suppression, the absence of wolves is the greatest departure from a natural ecosystem in Yellowstone. But do we want to reintroduce the wolf?

Carved in stone on the gateway Yellowstone Arch, we assert that Yellowstone is preserved 'for the benefit and enjoyment of the people' by Act of Congress. But to think that this place ought to be only a "pleasuring-ground" (U.S. Congress 1872, par. 1) has come to seem shallow, humanistic arrogance; we value it also as a deeper token and symbol, an archetype of the primeval. The primary purpose of Yellowstone National Park is to preserve natural ecosystems and opportunities for visitors to see and appreciate scenery and native plant and animal life as it occurred in primitive America" (Cole, 1969). It ought to be a biotic whole, a "natural

community" (Leopold *et al.*, 1963; p. 13), untrammelled by humans, where nature takes its course and humans learn to take pleasure in it. "The primary purpose of the National Park Service in administering natural areas is to maintain an area's ecosystem in as nearly pristine a condition as possible" (Houston, 1971).

What we ought to have in Yellowstone, Chase never tires of saying, is sound scientific management. What we have instead, he thinks, is an inflexible ideology — let nature take its course. The policy is "that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man" (Leopold *et al.*, 1963; p. 3). That, Chase laments, is philosophy dressed up like biology, holding that whatever is natural ought to be. It is a natural religion, faith in nature, "a metaphysical ideal" (Chase, 1987; p. 177) that results in less and less scientific management and culminates, disastrously, in no management at all. With managers immobilized by a gospel of noninterference with nature, the park is being destroyed. Chase concludes by carving an epitaph for the park: "Victim of an Environmental Ideal" (1987; p. 375). Ideally, for Chase, management ought to be "scientific" and ignore the word "natural" altogether (1987; pp.175—77).

What eludes Chase is that urging scientific management is an instrumental, not an intrinsic, value judgment. To instruct managers to be scientific is to set only strategic not ultimate goals for them. Science can be used to determine what the spontaneous course of nature was, is, or will be, in order to determine how far human alterations have and will upset it and how far we can restore the original course. But do we value that nature course at Yellowstone? That is a philosophical question. Science can report how far the dynamic biological integrity is gone and whether there is any use trying to recover it. If not, we might scientifically manage what remains, to maximize the show of pseudo-wildlife and to maximize the human pleasures produced. But do we value here a scientifically managed zero — a pleasuring grounds for tourists? That also is a philosophical question.

The Yellowstone philosophy is: let nature take its course — at least in this largest, nearest intact temperate ecosystem remaining on Earth. Such trusting of nature values biology. This might be philosophically wise (were it possible), but biologically foolish, if nature here can no longer take its course and we have assumed an unrealistic goal of primitiveness. Whether the Yellowstone ecosystem, though invaded by human interruptions, has enough recuperative power to heal itself without remedial help is a biological question. Biologists in Yellowstone have believed so at some points, not others, but they have never disclaimed appropriate remedial help, although they have regularly said that the less remedial help the better. That nature, invaded by human interruptions, is impossible to restore to at least relatively natural conditions is a claim in biology, pure

and applied, which biologists in Yellowstone are reluctant to hold. They want to maximize restoration, rather than settle for a compromised nature. At the same time they want the minimal restoration it takes to get the maximum recovery of nature. Where they cannot now regain processes like those operating before the human alterations, they may prefer to give the remaining natural processes free rein, rather than to manipulate them.

Chase alleges that Yellowstone biologists/managers value natural regulation, no matter what happens to wildlife or to the pleasures of tourists. Park policy lets nature take its course and allows most wildlife to vanish, except for the over-populating elk. That policy lets bison drown, bighorns die of pinkeye, grizzlies go extinct. Chase urges scientific management for the benefit of wildlife and the people. He cannot envision the possibility that so far as we can restore or mimic natural regulation, this is for the long-term benefit of wildlife and best for the deepest needs of park visitors. Perhaps it is our human duty here as well. He fails to see that a simultaneously wild and scientifically managed fauna is a contradiction in terms, a logical and managerial impossibility.

Do we prefer a natural grizzly bear population, if we can have one, reduced but viable, at risk of losing grizzlies? Do we augment the population to insure survival? Is a bear, with human interruptions compensated for by feeding, too much a compromised bear? Have we a duty to save the species, even if this requires feeding centers in the wilderness ecosystem, an ecosystem that we also have a duty to preserve as pristine as possible? The soundest scientific management cannot answer these questions. Philosophical analysis is required.

## 2. THE CONCEPT OF THE NATURAL

Chase, the philosopher, can be forgiven for wandering unaware outside the boundaries of science, but we can expect him to keep his bearings doing philosophical analysis. Unfortunately, he becomes as disoriented philosophically as he thinks the park biologists are biologically. He desperately needs analytical help for his uses of the word "natural". Sometimes for him this covers "all things governed by the laws of cause and effect" and includes "the laws of society". All organisms produce waste naturally, humans too; so garbage is as natural as scat. Hence, bears at a Yellowstone dump feeding on oranges from Florida and bananas from Honduras are feeding naturally, "Believing garbage to be artificial was, therefore, not a scientific hypothesis but a cultural bias" (Chase, 1987; p, 177).

On the other hand, since Yellowstone has obviously been affected by humans, nothing here is truly natural, and Chase disparages trying to maintain any primeval landscape as "romantic myth" (Chase, 1987; p. 46), in contrast to sound scientific management. The goal of the Wilderness Act of 1964 is to preserve wilderness areas "untrammeled by man", which

environmentalists interpret as appropriate respect for the biological integrity of place. But this, Chase claims, is an "illusion" driven by an ideology, not science at all. The Leopold report too speaks of creating "a reasonable illusion of primitive America" (Leopold *et al.*, 1963, p. 4). *Newsweek* calls pristine parks "the grand illusion" (Adler, 1986).

Events may be said to be natural in different senses; unless we discriminate among these everyone will get lost (Rolston, 1986; 1988; pp. 32–44). (1) In a law-of-nature sense, all human (and nonhuman) activities are natural; neither humans producing nor bears eating garbage breaks any laws of nature. Nor does hands-on scientific management. It is impossible to be unnatural. (2) Another sense is at issue in Yellowstone. Spontaneous events in wild nature are natural; in contrast, deliberated human activities and their intended or unintended results are artificial, that is, artifacts. Plastic bags with leftover Froot Loops dumped in the middle of the Yellowstone forest are unnatural. Since all actions of human agents interrupt spontaneous nature, it is impossible for managers to be completely natural. The Yellowstone ecosystem has often been interrupted; therefore that nature can simply take its course there is an illusion, a romantic myth. Even protection intervenes: Yellowstone runs by Act of Congress. Certainly scientific management is unnatural.

Torn between the inevitable and the impossible, Chase cannot find his way.

(3) But there is also a relative sense of "natural", one consistent with human management. Some human interventions are more, others less natural, depending on the degree to which they fit in with, mimic, or restore spontaneous nature. Any paint on a campground water tank is unnatural, but green is more natural than chartreuse. Restoration of wolves as predators would be more natural than culling elk by sharpshooters.

Given these distinctions, it does not help to label all restored nature faked, myth, or ideology. Compared with pristine nature, there is diminished naturalness, but the naturalness that remains is not illusory. Some processes were never tampered with; even restored processes, though minus their original historical genesis, are relatively more natural. A broken arm, reset and healed, is relatively more natural than an artificial limb, though both have been medically manipulated. The arm, decades later, is not a "reasonable illusion" of a pristine arm. Except for hairline bone scars it may be indistinguishable from the arm nature gave. Likewise with a restored forest or range, the historical genesis has been partially interrupted. But henceforth, deliberately put back in place, spontaneous nature takes over as before. Trees blow over in storms, coyotes hunt ground squirrels, lightning causes burns, natural selection resumes.

Chase spoofs backpackers with SVEA stoves, freeze-dried steaks, and Gore-tex jackets, enjoying their "primitive chic" in a pseudo-wilderness,

with predators gone and rainbow trout introduced, suffering a park-induced "illusion", "playing at being primitive". Truth is, their life is plastic; but "truth mattered little to most backpackers" (1987; p. 335, p. 337). Chase may report his experience; he does not report mine. I use plastic for comfort and to minimize my impact on the natural, and I go there not to mimic Jim Bridger but to appreciate the relatively natural that remains or has been restored. Much natural history is still there — no illusion but objective biology that I, with the park biologists, value philosophically. Chase's active hands-on scientific management, beyond remedial restoration, would decrease this value and increase illusion.

### 3. SCOPE, SIZE, AND SCALE

In Yellowstone, we get lost in bigscale biology. Chase dislikes ecology. He doubts that ecosystems even exist and holds that ecology is at best a half science (1987; pp. 311–325). But we are not going to find our way in Yellowstone until philosophers and scientists face the difficulties of regional field biology — beyond laboratory, experimental, specialized, or theoretical biology — and find that on the real Earth bigscale biology is as fundamental as anything organismic or molecular. Contrasted with much academic biology, in Yellowstone the emphases are different; there is no talk of selfish genes, sociobiology, kin selection, DNA. Life in the park goes on of course at the molecular level, but here we see landscapes, ecosystems — regionally enough to wonder whether the gene's eye view is itself myopic.

We need to know how three trophic levels interact: vegetation, herbivores, carnivores — how far the carnivores are a determinant of herbivore population size, and herbivores, in turn, a determinant of vegetative condition. Subtract carnivores. What will be the vegetation-herbivore interactions? Subtract the herbivores (an exclosure experiment) and watch the vegetation, but this experiment of course misleads us, since the grasses and forbs have co-evolved with grazing ungulates. Subtract an unknown depth of soil and nutrient capacities that have eroded away as a result of overgrazing. Add (or subtract) errors due to the reliability/unreliability of historical population estimates over the last century. Add disease organisms and parasites; some native, some exotic, with their effects on ungulates stress-aggravated.

Factor in another determinant: fire. Fire resets aspen succession, and the browsing elk depend on twigs to supply critical winter nitrogen for gut bacteria that digest dry cellulose. Subtract the fires the white man has suppressed, clearly unnatural; but should we add in the fires the Indians once started? The Indians started fires elsewhere, but how many fires did they start here? How did that affect this particular ecosystem? Factor out

fire suppression for a century, add fires back for a decade — but only lightning burns, with no prescribed burns that might repair a century of fire suppression.

In the face of rising elk populations, should we abandon the theory that predators are not a significant determinant, or should we revise instead the auxiliary hypothesis that the carrying capacity of this range is about 16000 elk and is much higher than earlier thought? Will they spill out to colonize (or re-colonize) other areas? The theory is that the herd, minus predators, minus some winter range, will nevertheless stabilize in some form of "natural regulation". When do observations (increasing elk — if the censuses are reliable) warrant jettisoning this theory? (Houston, 1982)

Grizzlies have been feeding for a century at the remote garbage dumps. Add the extra food, subtract for any adverse nutritional effect. Also subtract food no longer obtained on now lost habitat. Is there a concentration effect, beneficial or harmful? After closing the dumps, the grizzlies decline in weight and in fertility, but were these higher than normal before, due to the artificial feeding? How many bears are not at the dumps? In decline, are there mechanisms that will compensate with higher birthrates? To what extent have the increased elk, trout, and bison populations replaced the garbage lost since 1970? Add or subtract fire suppression again, depending on what this has done to the always somewhat marginal bear habitat — the lack of fires perhaps permitting a whitebark pine infestation with bark beetle, with the pine nut a principal fall food. Perhaps what the grizzlies lost from fire suppression is compensated for by more elk carcasses to scavenge. Will they switch from a vegetarian diet? Or do the elk eat vegetation that the grizzlies might otherwise eat? The bear feed in part on introduced trout. Are these an added source of nutrition or do they merely replace native trout that were there before?

Can the really big mammals, any more than the migrating birds, really be said to inhabit an ecosystem? Grizzly bears and wolves range over a landscape; they need a biome, perhaps half a continent, in which to evolve. Is the aspen decline due to overgrazing by elk or to fire suppression of serial species that are maintained by fire? After the policy of fire suppression is stopped, lightning-caused fires do not return with the expected frequency. Why? Has the frequency of storms changed, or have the overpopulating elk consumed the fine fuels (underbrush and grass litter) with which range fires ignite and spread? Is there some complicated interaction of elk browsing, fire suppression, climate changes, and the behaviors of the other large herbivores? Are the beaver, now scattered and ephemeral owing to aspen and willow decline, really a keystone species in maintaining riparian areas and park hydrology?

These questions of biology do not model well on computers nor at the genetic or specific level. They reveal how little we know about community structure, succession, evolution at the ecosystem level — a humbling

reminder in these days of spectacular molecular biology, and bold, quantitative evolutionary theory, sociobiology, kin selection theory. It is difficult to establish causal connections in an equilibrating ecosystem, a network of forces pushing and pulling at interweaving levels of structure and process, often with multiple homeostatic peaks. One is dealing with historical ecology, with systems of great complexity, with elements of randomness and openness. Yellowstone may not be a closed, determinate system. It has historically contingent, narrative elements. These park managers face some of the most difficult and unresolved questions anywhere in biology. Philosophers ought to sympathize if biologists in Yellowstone sometimes get lost.

#### 4. NATURAL AND CULTURAL HISTORY

In Yellowstone, biology and philosophy find history. Yellowstone is not, never was, never will be, never should have been preserved as "a place where time stands still" It is a "river of change" (Chase, 1987; p, 6), its fortunes in dynamic flow; only bad biology and bad philosophy think that a misfortune. The park biologists' philosophy, let nature take its course, implies history. When they summarized studies of what was happening to elk on the northern range they concluded with the title: *Wildlife in Transition* (Despain *et al.*, 1986). Their disagreement with Chase is about whether the history here should be natural or culturally modified and how far these can be separated. We value natural history, even when the historical genesis has been culturally interrupted and restored. Yellowstone is a place of natural history, and without that term — sometimes despised by biologists and philosophers — no one can find his way here.

To biology on regional scales we must add biology on historical scales, about which, again, we are often ignorant. On this idiographic landscape in Northwest Wyoming, we know less than we wish about what was happening in spontaneous nature, which is one reason why we cannot predict the outcomes of our management interventions. Yellowstone was tundra 10000 years ago, The carnivore-herbivore-vegetation-climate interactions have been dynamically altering on the scale of centuries. The American West is a relatively recent landscape, drying out since pluvial Pleistocene times, resulting, for example, in fish speciation more rapid than any known elsewhere among other vertebrates.

Many big mammals once in the northern Rockies are now extinct: mastodons, ground sloths, saber-toothed tigers, dire wolves, horses, camels. The speed of natural history here makes comparisons difficult with Africa, relatively stable since the Tertiary. Lodgepole forests, now the dominant cover, tend to be barren of understory, yet favored in the climatic trends. Yellowstone today may be too high, too cold, too dry, too



forested (especially with fire suppression) to support the wildlife that tourists want to see. Still, the wildlife here is spectacular.

Since the Pleistocene, natural history here has been entwined with human history. The Indians long hunted on foot and were partially responsible for some extinctions. There is archaeological evidence of periodic hunting by Indians throughout the park, although apparently not for elk, which may have been sparse here (Wright, 1984). Indian hunting patterns depended on their tribal confederations, their disputes and agreements. They sometimes set fires to increase browse and game. For a century before white men really knew the area, Indians hunted on introduced Spanish horses, about the same period of time that smallpox and other European-introduced diseases began to decimate Indian populations here,

Chase claims there never was a primitive Yellowstone whose condition can now be defined, much less restored. It has always been a historical system, and since Pleistocene times Indian cultures have been ecologically significant here. The claim about biological history may be true; the claim about cultural interruptions may be false. Only archaeological evidence can settle the latter issue; that is a scientific question, mixing biology and anthropology,

Philosophically, however, we will get lost again without the relative sense of natural. Discovery of Indian impacts, more or less, does not require giving up an illusion of the primitive for sound scientific management, Yellowstone with Indians was relatively natural; Yellowstone minus Indians may nevertheless be a viable ecosystem. It is a mistake to think that the goal at Yellowstone "should be to preserve, or where necessary to recreate, the ecologic scene as viewed by the first European visitors" (Leopold *et al*, 1963; p. 13), as though Yellowstone natural history had only a past and no future. That is not historical enough, nor do we wish to preserve Indian impacts.

What our philosophy ought to value here is dynamic *natural* history. In Yellowstone, biology and philosophy meet in a proper-named place. Real biology is never abstract; it is on the ground in locale, on landscape. Bison frequent Hayden Valley; elk, Lamar Valley. Biology is a historical science in a way that physics is not. What we are preserving is this place, with its uniqueness. Let nature take its course *here*.

History continues here when the Europeans arrive, conquering the continent. Yellowstone became a historic locale on which the white man began to rethink his conquistador philosophy of nature. Congress altered the destiny of the region with the Park Act in 1872. From 1886 to 1916, it was the Cavalry (not biologists, much less philosophers!) upon whose opinions the fate of Yellowstone depended. In 1902, plains bison were introduced from the Dakotas, which have mixed genetically with the already present mountain bison. From 1904–1935, the wolves were

eliminated and cougars substantially reduced, along with as many coyotes as possible.

From 1955–1968, the northern elk herd was reduced, under the theory of overgrazing; after 1969, the theory was tested that the ecosystem was intact enough, that reductions were unnecessary even without predators, and that the population would regulate naturally. Reevaluating what was then known about grizzly biology, the Park Service decided to close the dumps in May 1969. The Park Service did disagree with the Craigheads about the validity and interpretation of their research, and in 1971 they declined to accept the conditions of research agreed to by the National Park Service and the Fish and Wildlife Service. Not only does objective, field biology have its history in Yellowstone, but here biological science, applied and pure, is entwined with human history, right up to the recent decades.

## 5. YELLOWSTONE BIOLOGY AND SOCIAL FORCES

Our journey across this wild landscape brings into view, surprisingly, the confluence of biology, philosophy, and society. Recently, we have discovered how biological science is driven by social forces — by the needs of medical technology, of agriculture and industry, by funds available for molecular genetics, but not for biogeography or taxonomy. Biology has become less pure and more pragmatic. Starker Leopold, at a meeting of research scientists and management biologists of the National Park Service, insisted that biological research, according to park policy, must be "mission-oriented," rather than "science for science's sake" (Leopold, 1968). That seems plausible; one does not want irrelevant research. But once we see the sociology of science, we must look further to see whether biological theories are proposed in part because they are politically and bureaucratically convenient. What happens to research that questions management policy? That threatens careers? Chase alleges that the bureaucracy suppressed dissent. They used their permitting and funding authority to shut out independent research that might challenge their theories.

John and Frank Craighead, especially Frank, claimed their research indicated a need for supplemental feeding, at least during a period of weaning from the dumps, but this was contrary to park service policy (except in last resort). How does the demand for "mission-oriented" research fit with the further recommendation of the Robbins' report that "the Park Service should make every effort to support and accommodate independent research effort" and "honor the basic freedom of the independent investigator to pursue his objectives, within the limits of these responsibilities (not to harm the parks), without interference" (NAS, 1963;

p. xiii, p. 68, p. 62)? Somehow, the career interests of scientists must line up with the bureaucratic mission, both line up with funding sources, and all three line up with field biology, as well as with the integrity of the fauna, flora, ecosystems under study, before biology in Yellowstone can make any progress. At least forty research projects are current on Yellowstone's northern range, and a summary of them does seem to strike a balance between inside and outside researchers and funding, without compromising the need for mission orientation (NFS, 1987).

It is difficult enough to establish causal hypotheses in an equilibrating ecosystem, with networks of forces pushing and pulling at multiple levels of structure and process. The difficulty in biology is compounded as we discover how biologists must work in networks of personal and political forces pushing and pulling at multiple societal levels. Should they orient (taxpayer funded) research guided by what the public wants, what their supervisors want, or what they think best, based on their scientific judgments? Should bear and wolf policy be determined primarily on biological grounds? What weight, if any, should be given to protecting humans, to protecting the Park from torts and litigation? Should biologists risk testing whether more bison can overwinter within the park, since if bison leave the park, they may spread brucellosis to domestic cattle, causing them to miscarry? If a few cows are found infected, Montana law can require a rancher to destroy his entire herd. Ethics constrains the testing of biological hypotheses.

These biologists are all philosophical realists in their view of their science. They think to describe how nature takes its course. But the course they themselves follow is so mission oriented, pragmatically guided, bureaucracy thwarted, buffeted by political fortunes, funding dependent, and ethically constrained that it is a wonder that scientists here find their way through field biology at all. The bewildering is not just the wilderness but the culture that drives the science and philosophy here.

## 6. EVOLUTIONARY PHILOSOPHY OF SCIENCE

In relation to the Yellowstone controversies, we can explore theories in philosophy of science that biological science develops through competition, interest groups, and partisan advocacy, as much as through reason and empirical evidence. Such philosophy of science is "naturalistic", "not rationalistic". David L. Hull's *Science as a Process*, the most recent example, is "an account of science that is structurally similar to biological evolution" (1988; p. 3, p. 520), using an evolutionary model of competitive selection processes to understand biologists and the history of biology, as well as natural history and field biology. In Hull's model, what goes on in scientific society at Yellowstone, including the bewildering bureaucratic,

political, personal elements just noted, is an analogue of what goes on in the Yellowstone wilderness itself — the survival of the fittest.

By Hull's account, although we might view such behavior with some dismay, "the political infighting, the name-calling, the parody and ridicule, the arrogance, elitism, and use of raw power" belong in science. This is not simply because scientists are human too and fail to live up to their ideals.

I argue an even stronger thesis: some of the behavior that appears to be the most improper actually facilitates the manifest goals of science. ... Objective knowledge results in science not despite bias and commitment but because of them. ... The existence and ultimate rationality of science can be explained in terms of bias, jealousy, and irrationality. ... Those who make the greatest contributions ... frequently behave the most deplorably (1988; pp. 31–32).

We can use Chase's adventures to evaluate this Darwinized philosophy of biological science, and vice versa. Does Chase's method teach us something descriptively and prescriptively about how biological science and philosophical analysis are and ought to be done? Chase hopes to rescue lost biologists and environmental philosophers, to improve the state of the science and the art. He seems to be testing the views of others. He uses logic when logic serves, data when data serve, but as readily rhetoric, innuendo, selective weighting of evidence, humor, emotional appeal — almost anything that needles his opponents, whom he judges to be blind and hellbent in their non-management philosophy, their know-nothing and know-too-much biology. He attacks persons sooner than arguments. Does this method produce any reliable analysis of causes and effects in Yellowstone biology, or of the social forces and their connections, or of the values and arguments employed in environmental philosophy?

Chase is relentlessly one-sided and mean spirited. Everybody comes off badly — except the few who aid Chase in the pursuit of his thesis. Almost every chapter title is pejorative: "The Perils of Playing God", "Killing Animals to Save Them", "The Grizzly and the Juggernaut", "Gumshoes and Posy Pickers" (park police and interpretive naturalists), "The Wolf Mystery", "An Environmental Ideal and the Biology of Desperation". The architects of bear policy, once employees of the Department of Interior, become influential in environmentalist organizations, forming "an unholy alliance" of "watchdogs" and "wolves" (Chase, 1987; p. 178),

Even after the predator elimination policy was changed, managers exterminated the predators (Chase claims), covering up what they were doing. Later they secretly tried to sneak wolves back (Chase claims), maintaining that they had been there all the time. They conspired to kill off the park's bears. Culling elk is a grisly business, and Chase dwells on the terrified, doomed animals. A killer scientist shoots "mothers-to-be" to examine fetuses, interested in reproductive physiology (Chase, 1987; p. 33, p. 36). Later, the policy of return to the natural meant that "the killing

of elk, of which there are too many, would end, and that the killing of bears, of which there are too few, would begin." (Closing the dumps forces bears into campgrounds, resulting in removing them.) (Chase, 1987; p. 154) "Over the last seventy years nearly every conceivable mistake that could be made in wildlife management has been made by the Park Service in Yellowstone" (Chase, 1987; p. 233).

Yellowstone people are not that stupid or bad. Yet there is ample criticism of park biology and philosophy from respectable persons: the Craigheads on the grizzly question (1971); Gary A. Wright, professor of anthropology at the State University of New York at Albany, on whether elk were present in Yellowstone in pre-Columbian times (1984); James W. Flynn, Director of Montana's Department of Fish, Wildlife and Parks, on elk management (1983); Les Pengelly, professor of wildlife biology at the University of Montana and former president of the Wildlife Society, on elk management (1963); his student, Charles E. Kay, now at the College of Natural Resources, Utah State University, on elk causing aspen decline, rather than fire suppression (1985). James M. Peek, professor of wildlife biology at the University of Idaho, has differed with park judgments on the natural regulation of ungulates (1980). Things do get reevaluated when there are noisy critics. We have long since learned that businesses and politicians need watchdogs; so do Park Service bureaucrats and biologists.

Chase equally ridicules environmental philosophers, more for being rosy-eyed romantics than for being bad and stupid. The chapter titles and descriptions are again pejorative: "The California Cosmologists" (Chapter 19), "scruffy and alienated refugees from Middle and Eastern America" (p. 345) with their upstart gospels and "antipathy to progress, science, and the Judeo-Christian religious tradition" (p. 302); "The Hubris Commandos" (Chapter 18), young environmental activists who topple human arrogance over nature; "The Subverted Science" (Chapter 19), ecology, a quasi-science adopted as a philosophy; "The New Pantheists" (Chapter 16) who, "nonmodern, nonscientific", have "assembled a jumble of ideas picked up from all over the world: from Buddhism, Tao, Russian mystics, pre-Socratics, romantic poets, Indians, and pessimistic German philosophers" (p. 309). Never mind that one commits the genetic fallacy to confuse the origin of an idea with an assessment of its logical soundness. Chase does not even seem to know the technical literature of environmental philosophy, much less to care to analyze it. His strategy is more satire than argument.

Satire is what it takes when arguments are falling on deaf ears. Did not Jesus ridicule the Pharisees for straining at gnats and swallowing camels, looking for dust specks in the eyes of others while they had logs jammed into their own? There is something comic about chicken liberation and rights for rocks. But satire is no substitute for argument. Satire attacks persons; what one really wants is to assess the logic and interactions of

biology and philosophy here. Environmentalism in its various schools has been significant in Yellowstone policy. But does anyone really think that new age Califomians, Zen Buddhists, or chicken liberators have been determinants of Yellowstone mismanagement?

The problem is that Chase's analysis is no better argument or assessment of evidence than he alleges in the positions of those he attacks; neither his biology nor his philosophy operates to improve the situation he thinks he sees and laments. Whatever these extra-rational, competitive, psychologically persuasive, personally biased, partisan forces that operate in science are, they cannot substitute for argument and balanced assessment. Only if they shake loose argument and launch it, will there be real biological or philosophical progress. The Yellowstone naturalists are struggling to find their way through the difficult biological natural history here, mixed as this is with finding their way through the difficult socio-political forces, when attacked by this would-be rescuer. Chase will argue that they need to be bitten by a philosophical deerfly to get moving. More likely, the deerfly has simply distracted their search.

Where does his stinging attack push the inquiry to some advanced level of argument or assessment of evidence? How does he help in the rational selection of the best biology and philosophy for Yellowstone? Chase's work would be philosophically and biologically more productive with the distortions and misquotations, the vituperative allegations and innuendo, the scorn and rage removed. These can be justified only psychologically, if this is what it takes to move bureaucrats and sluggish scientists. But those who have to be so moved cannot be good scientists. Perhaps this is the way it is; it is not the way it ought to be.

Scientific knowledge, Hull claims, does not grow because scientists are interested in truth for truth's sake. It grows when scientists are pushy about their own views, their careers at stake with their theories, fighting for their own interests as much as for the truth. "One of the strengths of science is that it does not require that scientists be unbiased, only that different scientists have different biases" (1988; p. 22). Better science will get selected in the melee. Science grows not "*in spite of*" these seeming flaws but "*because of*" them. If so, the situation Chase alleges and deplores in Yellowstone is the norm, with Chase's "infighting and personal vendettas" (Hull, 1988; p. 26) more of the same — and biology and philosophy here the better for it.

By Chase's account, bias, personal commitment, and self-interest have been inseparably entwined with objective science here, but lamentably not laudably, for neither Chase nor the biologists he criticizes would think of these as norms. Hull might be right so far as one can make a case that the pulling and hauling of these forces driving biology in Yellowstone has been constructive. Certainly much has been learned about Yellowstone in this century, during which those in a position to know well the fights in

wildlife management have called them "range wars" (Despain *et al.*, 1986; p. 112). But biology can advance here only when in this fighting the better argued claim, based on better evaluation of evidence, is being selected. It is hard to see how Chase's animosity helps the process of discovery. Hull's "because of" may be necessary, but it cannot be sufficient for the positive growth of biology. There is nothing about being obnoxious as such that produces sounder argument.

Even if, as a result of his attack, Chase proves to be among the causes of better biology and philosophy in Yellowstone, he himself cannot be relied on rationally to assess biological causal networks or the history and internal logic of biology and philosophy here. A park service rebuttal of Chase's factual errors and distortions as he relates the grizzly episodes is much longer than Chase's original account (NFS, 1986). Others who are more constrained by balanced weighing of evidence and cogency of argument will have to find these things out. Rational assessment of truth is further required, supported by and superposed on partisan advocacy. Chase seldom finds his way this far. For most of their routes, biologists and philosophers in Yellowstone will have to make progress *in spite of*, not because of him.

## 7. PLAYING GOD

When we analyze Chase's deliberately abrasive central metaphor, we discover that "playing God" is empty of descriptive or normative, scientific or ethical content. Therefore it does nothing to help orient us. Discoveries in biology and philosophy in Yellowstone must be made in spite of the metaphor, not because of it. It does not illuminate any issues, either in theory or practice; it does not even mark wrong directions of travel. The metaphor only rhetorically belittles opponents. It is, I fear, symbolic of the whole book, and indicates the limits of Hull's thesis about the progress of science. This counterexample illustrates controversy unproductive of better argument.

Playing God, first round: predators are removed, fires suppressed. But this does not work; it was misguided intervention. Playing God, second round: under the theory of an abnormally large elk population damaging winter range, elk are culled. This does not work; the elk reproduce anyway. Playing God, third round: under the theory that elk populations will be limited by food supply, even minus predators, biologists do nothing and expect natural regulation. They let fires bum, but set no fires. Playing God, round four: the Leopold report recommends restoring the primitive scene as nearly as possible, and Chase faults that too as calling for "intervention far more massive and controversial" than ever (1987; p. 35).

Nothing counts as not playing God. Playing God is intervening to

improve the ecosystem for humans; playing God is restoring the ecosystem; playing God is letting nature take its course. In "giving a blank check to nature," "in taking a passive role they would not have stopped playing God" (1987; p, 41). Having faith in nature, pantheism, or leaving it to the Creator — these are still playing God. Playing God is hands-on management; playing God is hands-off management. The Europeans who came to tame the continent played God. Even the Indians burning range to improve hunting were playing God. "The Indians, too, knew how to play God" (1987; p, 97).

So what is not playing God? What would Chase do? Of all the options that Chase considers, the one he seems to recommend would most deify resource managers: strong, scientific management. We never have a careful definition of the accusative metaphor that alleges bad biology and bad philosophy. The phrase operates to condemn, not to analyze; to attack people, not to reform policies. It operates psychologically, not logically, and for that reason it cannot advance the search for better biology or philosophy in Yellowstone.

Even God comes off poorly in Chase's ever-pejorative vocabulary, as a manipulative cosmic boss, calling all the shots, whom would-be-god humans envy and pretend to be. In contrast to Chase's overly monarchical view, the creative God, in the Biblical account, let Earth bring forth of itself and found the creatures to be very good. God called Noah to save the creatures against human wickedness. God notices and lets sparrows fall. Jesus marvels at the "automatic Earth" that "produces of itself" (Mark, 4.28) and which the meek inherit. If anything in wildlife management can be said to be divine, why not natural regulation, a restrained preserving nature and letting nature take its course? The Creator God is one who loves in freedom. If one wishes a theological metaphor that might advance the search, what God loves and created in Yellowstone is a place that is wild and free. God too lets nature and its creatures freely take their courses; that is what respecting their integrity means.

#### 8. LOVING YELLOWSTONE

Truth for truth's sake is not all biologists and philosophers want in Yellowstone; they want truth for Yellowstone's sake — whether or not they push their careers. If philosophers of biology cannot find this objective concern elsewhere in biology, they ought to visit Yellowstone. At the start this is surely Chase's quest too; he leaves academic philosophy for life in the wilderness. He leaves the wilderness to fight for its preservation. He claims that he gives his career to Yellowstone. But, alas, he gets lost. He loses appropriate respect for the naturalists who also have loved Yellowstone. At the end, it is not really clear whether Chase has an environmental ethic; he disdains most of the biology and philosophy, the



biologists and philosophers he surveys. He disdains letting nature take its course in favor of sound scientific management — as if that were an ethic that valued wildness. He does not trust the naturalists, but, worse, he does not trust nature.

In Yellowstone, if not also elsewhere, managerial control is not love; biology and philosophy here ought to seek to appreciate, rather than to manipulate. Restorative love is sometimes in order, after that, letting nature take its course is the appropriate form of caring for the great bear, the wapiti, the aspen, *Ursus arctos*, *Cervus canadensis*, *Populus tremuloides*, for the ecosystem, for the land, for this wild place.

#### NOTE

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