

The naturalist ALDO LEOPOLD not only gave the wilderness idea its most persuasive articulation; he offered a way of thinking that turned the entire history of land use on its head

BY T. H. WATKINS

Leopold's shack (left), a much-renovated chicken coop, is now a National Historic Site. At right, the naturalist in 1924.



The trouble began at midmorning on Wednesday, April 21, 1948, when a neighboring farm's trash fire got out of control. Flames skittered across the grassy farmyard and began chewing swiftly through a marsh toward the "plantation" of white and red pines that the professor and his family had been nurturing diligently on their 120-acre patch of worn-out Wisconsin farmland since 1935. He, his wife, Estella, and their daughter "Estella Jr." had driven up from Madison four days earlier, settling in at the renovated chicken coop they called "the shack" and preparing for the annual spring planting of even more trees in the family's ongoing effort to recreate the land as it had been before farmers and loggers had stripped it clean of its original forests.

The three of them had managed to get a couple of hundred trees in the ground by Wednesday morning. The professor had also done some serious bird counting; that morning alone, he noted in his journal, he had been pleased to tick off 871 geese streaming across the quickening sky, even though these were but a sorry remnant of the successive waves of migrating birds that three generations before had blocked the sun through

the Land

much of the Mississippi River Valley. "A man can't find any but remnants of wildlife nowadays," he had remarked to his daughter Monday night.

It was about ten-thirty in the morning when the family spotted the pall of smoke rising from the east. They loaded the car with an assortment of fire-fighting equipment, including gunnysacks, a shovel, a sprinkling can, and a small hand-held fire pump, then raced off to meet the flames being driven across the marsh by the wind. Leaving his wife near the car with the instructions to wet a gunnysack in the marsh and try to keep the flames from jumping the road into the young trees—and if that failed, to get in the car and

measure of dignity just before a branch of the fire flickered across his body and moved on. The dignity would have been important to him.

Sixteen years later, on the sunny afternoon of September 3, 1964, President Lyndon B. Johnson took pen in fist at a little table in the Rose Garden outside the White House and scrawled his name across the Wilderness Act, passed by Congress a few days before. The men and women who had gathered on the steps behind the President to watch him do this knew that they were witnessing history. Like the Omnibus Civil Rights Act that preceded it and the Voting

Wilderness Preservation System was alive to stand there with them—not Robert Marshall, the government forester who had actually surveyed and hiked through most of the biggest primitive areas left in the national forests, who had prodded the Wilderness Society into being in 1935, and who had died in 1939 at the age of thirty-eight; not Olaus Murie, the great wildlife biologist who had served as the Wilderness Society's president from 1946 until his own death in 1963, most of the time administering the tiny Washington, D.C.-based organization out of a log cabin in Moose, Wyoming, with his wife, Margaret; not Howard Zahniser, the bespectacled erstwhile poet who had left his job as an editor with Rachel Carson at the U.S. Biological Survey in 1946 to become executive secretary of the society, principal author of the Wilderness Act, and its most indefatigable Washington lobbyist before exhaustion killed him just a few months before the legislation was passed.

And not Aldo Leopold, the lanky, bald, hound-faced ex-forest ranger and renowned wildlife ecologist in whose supremely rational mind the romantic dream had first bubbled up more than forty years before. Until he lay down to die in the smoke and flames at the edge of his tiny imitation wilderness in 1948, his scholarly authority and graceful diction had given the wilderness idea its most persuasive and memorable philosophical articulation. The concept, he had written in September 1935, demonstrated, among other things, "an intelligent humility toward man's place in nature." He was himself not unaware of the importance of his work and his place in his field and could defend both with some acerbity, but he did not assume that they were of any particular interest to the cosmos.

In his greatest and most lasting work, *A Sand County Almanac and Sketches Here and There*, he offered a definition of what conservation meant. "It is a matter of what a man thinks about



Leopold surveys a slice of New Mexico's Carson National Forest; made head of it in 1912, he instituted vigorous reforms.

escape—the professor and his daughter moved down the road to measure the dimensions of the threat. Finally, telling his daughter to run to a neighbor's farm and telephone for help, he took the fire pump and disappeared into the smoke.

There was no one to witness Aldo Leopold's last moments. He was not found until early in the afternoon, when the last of the flames were beginning to diminish and the gray, still-smoking landscape slowly began to reveal itself. At some point as he walked along the edge of the fire, he apparently had suffered a heart attack. It had not killed him immediately. He had been given enough time to put down the fire pump, stretch out on his back, fold his arms across his chest, and die with some

Rights Act that would follow it, the Wilderness Act of 1964 validated an important idea in the evolution of human behavior. It was the wish of Congress, the act says, "to secure for the American people of present and future generations the benefits of an enduring resource of wilderness," and in a moment of sudden poetry it defines wilderness to be "an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain . . ."

A moment worth celebrating. But the witnesses also had to be conscious of a pervasive irony in this otherwise triumphant afternoon: Not one of the four men who had given the greatest substance to the dream of a National

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Very truly yours,

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By: CHARLES E. RANDALL, Acting.

LEOPOLD, ALDO

From WO INFORMATION DIGEST for April 23, 1948

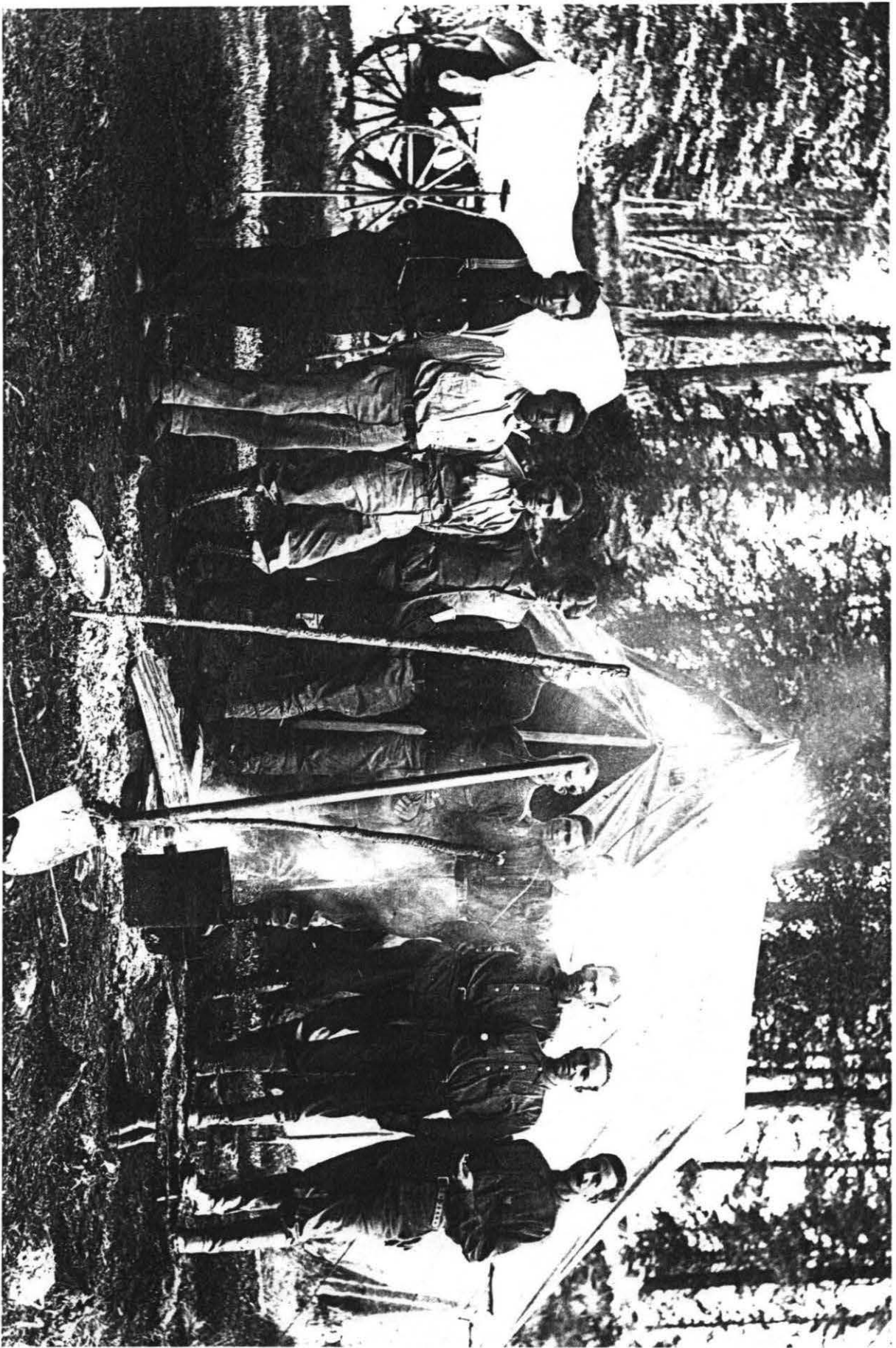
1819

Death of Aldo Leopold. "Baraboo, Wis., April 21. - (AP) Dr. Aldo Leopold, 62, nationally known conservation authority, died today while helping to fight a grass fire near his summer home. He was a past president of the American Wildlife Society, served on President Roosevelt's special committee on wildlife restoration in 1934 and was the author of several books and magazine articles on forest and game management."-- WASHINGTON POST, April 22.

Mr. Leopold was a member of the Forest Service from 1908 to 1917 and 1919 to 1929. He served as Forest Supervisor of the Carson National Forest from 1912-13, for several years was in charge of "educational cooperation" in Region 3 and in 1919 became Assistant Regional Forester in charge of Operation in that Region. He transferred to the Forest Products Laboratory as Assistant Director in 1924, resigning from that position in 1929.

originals in Bio-Photos-herpet, Aldo



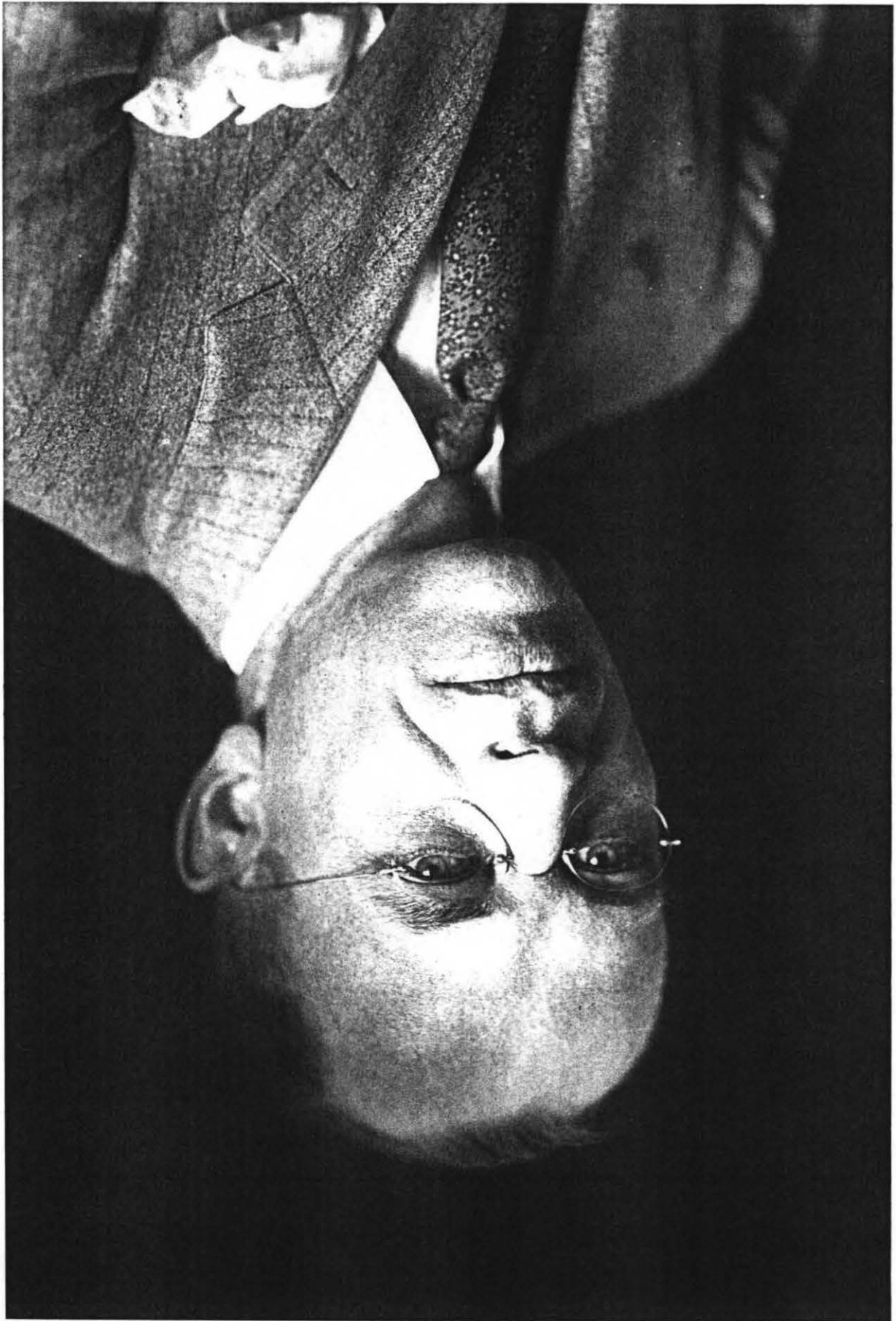








1910



, LEOPOLD, ALDO

Extract from Mr. Watts' letter of sympathy to Mrs. Aldo Leopold,
I-~~INFORMATION~~-General of April 22, 1948. Dictated by C. E. Randall.

"With you, we mourn his passing. Because he was so long a member of the Forest Service, Aldo Leopold has always been to us one of the Forest Service family, and a valued and esteemed friend and co-worker. More than that, he had a big part in shaping our basic Forest Service policy and in the development of our program. He helped to build up the multiple-use management policy which is now a keystone of national forest administration. He was a pioneer advocate of the preservation of wilderness areas. He laid the foundation for much of our wildlife management work."

"I hope you can find some consolation in the fact that Aldo Leopold has had a real and significant part in the growth of the whole conservation movement in America, and his work will live on with lasting influence and benefit."

FOREST SERVICE
Public Information
REFERENCE COPYTHE FORESTRY OF THE PROPHETS

By Aldo Leopold

Asst. District Forester, U. S. F. S.

(From "Journal of Forestry" - May 1920, pages 412-419)

Who discovered forestry? The heretofore accepted claims of the European nations have of late been hotly disputed by the Piutes. I now beg leave to present a prior claim for the children of Israel. I can hardly state that they practiced forestry, but I believe it can be shown that they knew a lot about forests. (Also, if any of them set fires, they knew better than to admit it.) The following notes, gleaned from a purely amateur study of the Books of the Prophets of the Old Testament, may be of interest to other foresters, and may possibly suggest profitable fields of research for competent Hebraists and physiographers.

The most interesting side of forestry was then, as it is now, the human side. There is wide difference in the woodcraft of the individual prophets - the familiarity with which they speak of forests, and especially the frequency with which they use similes based on forest phenomena. It appears that in Judaea, as in Montana, there were woodsmen and dudes.

Isaiah was the Roosevelt of the Holy Land. He knew a whole lot about everything, including forests, and told what he knew in no uncertain terms. He constantly uses the forest to illustrate his teachings, and in doing so calls the trees by their first names. Contrast with him the sophisticated Solomon, who spoke much wisdom, but whose lore was city lore - the nearest he comes to the forest is the fig tree and the cedar of Lebanon, and I think he saw more of the cedars in the ceiling of his palace than he did in the hills. Joel knew more about forests than even Isaiah - he is the preacher of conservation of watersheds, and in a sense the real inventor of "Prevent forest fires." David speaks constantly and familiarly about forests and his forest similes are especially accurate and beautiful. Ezekiel was not only a woodsman and an artist, but he knew a good deal about the lumber business, domestic and foreign. Jeremiah had a smattering of woods lore, and so did Hosea, but neither shows much leading toward the subject. Daniel shows no interest in forests. Neither does Jesus the son of Sirach, who was a keen business man, a philosopher, and a master of epigram, but his tastes did not run to the hills. Strange to say the writer of the Book of Job, the John Muir of Judah, author of the immortal eulogy of the horse and one of the most magnificent essays on the wonders of nature so far produced by the human race, is strangely silent on forests. Probably forests were his background, not his picture, and he took for granted that his audience had a knowledge of them.

Forest Fires in the Holy Land

Every forester who reads the Prophets carefully will, I think, be surprised to see how much they knew about fires. The forest fire appealed strongly to their imagination and is used as the basis for many a simile of striking literary beauty. They understood not only the immediate destructive effects of fires, but possibly also the more far reaching effects on watersheds. Strangely enough, nothing is said about causes of fires or whether

any efforts were ever made toward fire suppression.

The book of Joel opens with an allegory in which the judgment of God takes the form of a fire. This is perhaps the most convincing description of fire in the whole Bible. "Alas for the day!" says Joel. "The herds of cattle are perplexed, because they have no pasture; Yea, the flocks of sheep are made desolate. O Lord, to thee do I cry, for a fire hath devoured the pastures of the wilderness, and a flame hath burned all the trees of the field. Yea, the beasts of the field pant unto thee, for the water brooks are dried up. Blow ye the trumpet in Zion, and sound an alarm in my holy mountain; let all the inhabitants in the land tremble! For . . . a fire devoureth before them; and behind them a flame burneth: the land is as a garden of Eden before them, and behind them a desolate wilderness!"

Joel's story of the flames is to my mind one of the most graphic descriptions of fire ever written. It is "a day of clouds and thick darkness," and the fire is "like the dawn spread upon the mountains." The flames are "as a great people, set in battle array," and "the appearance of them is as horses, and as horsemen, so do they run. Like the noise of chariots on the tops of the mountains do they leap, . . . they run like mighty men; they climb the wall like men of war; and they march every one on his way; They break not their ranks: neither doth one thrust another; they march every one in his path. They leap upon the city; they run upon the wall; they climb up into the houses; they enter in at the windows like a thief. The earth quaketh before them; the heavens tremble; the sun and the moon are darkened, and the stars withdraw their shining."

Joel is evidently describing a top fire or brush fire of considerable intensity. Is there at the present time any forest cover in Palestine of sufficient density to support such a fire? I do not know, but I doubt it. If not, it is interesting to speculate whether the reduced forest cover is a cause or an effect of the apparent change in climate. Isaiah (64-1) adds some intensely interesting evidence as to the density of forest cover in Biblical times when he says: "when fire kindleth the brushwood, . . . the fire causeth the waters to boil." Have there been any fires in this country, even in the Northwest or the Lake States which caused the waters to boil? One writer, who had to take refuge in a creek during one of the big fires in the Northwest in 1918, states that falling brands caused the temperature of the creek to rise "several degrees," which sounds very tame in comparison with Isaiah's statement. In fact, Isaiah's statement seems almost incredible. Was he telling fish stories? Or is there some special explanation, such as a resinous brushwood producing great heat, or drainage from a sudden rain on a hot fire, or a water hole containing bitumen or oil from a mineral seep? I will leave this question for some one personally familiar with the country.

That top fires actually occurred in the Holy Land is abundantly proven by many writers in addition to Joel. Isaiah says (10-19) that a fire "shall consume the glory of his forest, and of his fruitful field . . . and the remnant of the trees of his forest shall be few, that a child may write them." "It kindleth in the thickets of the forest, and they roll upward in thick clouds of smoke." The individual tree at the moment of combustion he likens most effectively to a "standard-bearer that fainteth." Those who have actually seen the "puff" of the dying tree, as the fire rushes up through the foliage, will not miss the

force of this simile. Ezekiel says (20-46): "A fire . . . shall devour every green tree . . . and every dry tree: the flaming flame shall not be quenched."

Surprisingly little is said about how fires started. Man-caused fires were no doubt frequent, as were to be expected in a pastoral community. Tobacco fires were of course still unknown. (Samuel Butler says the Lord postponed the discovery of tobacco, being afraid that St. Paul would forbid smoking. This, says Butler, was a little hard on Paul.) Lightning was no doubt the principal natural cause of fire. Very heavy lightning seems to have occurred in the mountains. David, in the "Song of the Thunderstorm" (Psalm, 29) says: "The God of glory thundereth, . . . the voice of the Lord breaketh the cedars; Yea, the Lord breaketh in pieces the cedars of Lebanon." His voice cleaveth the flames of fire . . . and strippeth the forest bare." It is not ~~entirely~~ entirely clear whether this refers to lightning only, or possibly also to subsequent fire.

How much did the prophets really know about the effects of fires? Joel has already been quoted as to the effects on streamflow, but there is a possibility that he meant that his "water-brooks" dried up, not as the ultimate effect of fires, but as the immediate effect of a drouth prevailing at the time of the particular fire which he describes. David (Psalm, 107) plainly states that changes in climate occur, but no forest influences or other causes are mentioned. I think it is quite possible that the effect of forests on streamflow was known empirically to a few advanced thinkers like Joel, but it is quite certain that their knowledge went no further or deeper. The habit of thinking of natural phenomena as acts of God instead of as cause and effect prevails to this day with a majority of people, and no doubt prevailed at that time in the minds of all. But even if the prophets were ignorant of science, they were wise in the ways of men. "Seemeth it a small thing unto you to have fed upon the good pasture, but ye must tread down with your feet the residue of your pasture? And to have drunk of the clear waters, but ye must foul the residue with your feet?" (Ezekiel, 24-18) Here is the doctrine of conservation, from its subjective side, as aptly put as by any forester of this generation.

Forest Utilization in the Holy Land

The old Hebrew used both saws and axes in cutting timber. Isaiah (10-15) says: "Shall the axe boast itself against him that heweth therewith? Shall the saw magnify itself against him that shaketh it?" "Shaking" the saw is a new bit of woods vernacular that leads one to wonder what the instrument looked like. Here is more woods vernacular: ". . . he shall cut down the thickets of the forest with iron, and Lebanon shall fall by a mighty one." While I am not competent to go behind the translation, the word "iron" seems to be used here in much the same way as our modern engineers used the word "steel," that is, to indicate certain manufactured tools or articles made of steel.

Very close utilization of felled timber seems to have been practiced. Solomon (Wisdom, 13-11) tells how a woodcutter sawed down a tree, stripped

off the bark, carved the good wood into useful vessels, cooked his dinner with the chips, and used the crooked and knotty remainder to fashion a graven image. Expertness in whittling then, as now, seems to have been a trait of the idle, for Solomon says the wood-cutter shaped the image "by the diligence of his idleness, and . . . by the skill of his indolence." Isaiah (44-14) also tells how a man plants a fir tree, and after the rain has nourished it, he cuts it down and uses a part to warm himself, a part to bake bread, a part to make utensils, and a part to fashion a graven image. Graven images, if one is to believe the prophets, must have been an important product of the wood using industries of that day.

Here is an unsolved mystery in woods practice: "The carpenter . . . heweth him down cedars, and taketh the holm tree and the oak, and strengtheneth for himself one among the trees of the forest" (Isaiah, 44-14). What is meant by "strengtheneth for himself?" Some process of seasoning? Some custom of individual branding such as is practiced on bee trees? Some process of lamination in wood-working to give strength and lightness?

Ezekiel (27-4) records some interesting data on the sources and uses of timber in his satire on the glories of Tyre. "They have made all thy plants of fir trees from Senir: they have taken cedars from Lebanon to make a mast for thee. Of the oaks of Bashan have they made thine oars; they have made thy benches of ivory inlaid in boxwood, from the isles of Kittim." Isaiah (2-18) also mentions "the oaks of Bashan." Oak would seem to be a bit heavy for the long oars used in those days.

Who made the first cedar chest? Ezekiel (27-24) says that "chests of rich apparel, bound with cords and made of cedar" were an article of commerce in the maritime trade of Tyre. The use of cedar chests for fine clothing seems to be nearly as old as the hills. Solomon's palanquin was also made of cedar. Here is his own description of it, as taken from the Song of Songs (3-9): "King Solomon made himself a palanquin of the wood of Lebanon. He made the pillars thereof of silver, the bottom thereof of gold, the seat of it of purple, the midst thereof being inlaid with love from the daughters of Jerusalem." (I doubt whether Solomon "made himself" this palanquin. He does not give the impression of a man handy with tools. No doubt he had it made by the most cunning artificers of his kingdom.)

Cedar construction in Biblical days seems to have been a kind of mark of social distinction, as mahogany is today. (Witness also the marble-topped walnut of our Victorian forbears!) Solomon's bride boasts (Song of Songs, 1-16): "Our couch is green. The beams of our house are cedars, and our rafters are firs." Jeremiah (22-14) accuses Jehoiakim of building with ill-gotten gains "a wide house . . . with windows . . . ceiled with cedar, and painted with vermillion." "Shalt thou reign," ~~explains xxxxxxxxxxxxxxxx~~ exclaims Jeremiah, "because thou strivest to excel in cedar?"

The cedar seems to have grown to large size. Ezekiel, in a parable (31), says of one tree: "The cedars in the garden of God could not hide him; the fir trees were not like his boughs, and the plane trees were not as his branches." This cedar was Pharaoh, and the Lord "made the nations to shake at the sound of his fall."

The close utilization which seems to have been practiced at least in some localities, the apparently well developed timber trade of the coast cities, and the great number of references to the use and commerce in cedar, would lead to the surmise that the pinch of local timber famine might have been felt in the cedar woods. That this was actually the case is indicated by Isaiah (14-7). After prophesying the fall of Babylon, he tells how all things will rejoice over her demise. "Yea, the fir trees rejoice at ~~thine~~ thee, and the cedars of Lebanon: 'Since thou art laid down, no feller is come up against us.'" This impersonation of trees is characteristic of the Biblical writers; David (Psalms, 96) says, "Then shall all the trees of the wood sing for joy."

The relative durability of woods was of course fairly well known. Isaiah (9-10) says: "The bricks are fallen, but we will build with hewn stone; the sycamores are cut down, but we will change them into cedars." Ecclesiasticus (12-13) likens the permanency and strength of wisdom to "a cedar in Libanus, and . . . a cypress tree on the mountains of Hermon."

Fuel wood was evidently obtained not only from cull material, as already indicated, but by cutting green timber. Ezekiel (39-9) predicts that after the rout of the invading army of Gog, "they that dwell in the cities of Israel shall go forth, and make fires of the weapons and burn them, . . . and they shall make fires of them seven years; so that they shall take no wood out of the field, neither cut down any out of the forests." It would seem that Biblical fuel bills were either pretty light, or else Gog left behind an extraordinary number of weapons.

Hebrew Silviculture

There are many passages in the books of the Prophets showing that some of the rudimentary principles of silviculture were understood, and that artificial planting was practiced to some extent. Solomon (in Ecclesiastes 2-4) says that he planted great vineyards, orchards, gardens and parks, and also "made me pools of water, to water therefrom the forest where trees were reared." Isaiah (44-14) speaks of a carpenter who planted a fir tree, and later used it for fuel and lumber. The context gives the impression that such instances of planting for wood production were common, but probably on a very small scale. Isaiah (41-9) seems to have had some knowledge of forest types and the ecological relations of species. He quotes Jehovah in this manner: "I will plant in the wilderness the cedar, the acacia tree, and the myrtle, and the oil tree; I will set in the desert the fir tree, the pine, and the box tree together." He also makes the following interesting statement (55-13) which possibly refers to the succession of forest types: "Instead of the thorn shall come up the fir tree, and instead of the brier shall come up the myrtle tree."

Some of the peculiarities of various species in their manner of reproduction are mentioned. Isaiah (44-4) says: "They shall spring up among the grass as willows by the watercourses." He also speaks of the oak and the terebinth reproducing by coppice (6-12). Job (14-7) also mentions coppice, but does not give the species. Ezekiel (17) in his parable of the Eagles and the Cedar, tells about an eagle that cropped off the leader of a big cedar and planted it high on another

mountain, and it brought forth boughs, and bore fruit, and was a goodly tree. I do not know the cedar of Lebanon but it sounds highly improbable that any ~~cedar~~ conifer should grow from cuttings. I think this is a case of "poetic license."

Isaiah (65-22) realized the longevity of some species in the following simile: "They shall not build, and another inhabit; they shall not plant, and another eat; for as the day of a tree shall be the day of my people, and my chosen shall long enjoy the work of their hands." Isaiah disappoints us here in not telling the species. Unlike Solomon and Daniel and Ecclesiasticus, he is not given to calling a tree just "a tree."

Miscellaneous

Barnes has written a very interesting article on grazing in the Holy Land, and there is much additional material on this subject which would be of interest to foresters. One matter which some entomologist should look up occurs in Isaiah (7-18). Isaiah says: "And it shall come to pass in that day, that the Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt, and for the bee that is in the land of Assyria. And they shall come, and shall rest all of them in the desolate valleys, and in the holes of the rocks, and upon all thorns, and upon all pastures." What fly is referred to? The Tsetse fly, or the Rinderpest?

There is also considerable material on game and fish in the Old Testament, and additional material on forests in the historical books, both of which I hope to cover in future articles.

In closing, it may not be improper to add a word on the intensely interesting reading on a multitude of subjects to be found in the Old Testament. As Stevenson said about one of Hazlitt's essays, "It is so good that there should be a tax levied on all who have not read it."

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PART 1 - WORK ORDER

THE WILDERNESS AND ITS PLACE IN FOREST
RECREATIONAL POLICY

BY ALDO LEOPOLD

U. S. Forest Service

When the National Forests were created the first argument of those opposing a national forest policy was that the forests would remain a wilderness. Gifford Pinchot replied that on the contrary they would be opened up and developed as producing forests, and that such development would, in the long run, itself constitute the best assurance that they would neither remain a wilderness by "bottling up" their resources nor become one through devastation. At this time Pinchot enunciated the doctrine of "highest use," and its criterion, "the greatest good to the greatest number," which is and must remain the guiding principle by which democracies handle their natural resources.

Pinchot's promise of development has been made good. The process must, of course, continue indefinitely. But it has already gone far enough to raise the question of whether the policy of development (construed in the narrower sense of industrial development) should continue to govern in absolutely every instance, or whether the principle of highest use does not itself demand that representative portions of some forests be preserved as wilderness.

That some such question actually exists, both in the minds of some foresters and of part of the public, seems to me to be plainly implied in the recent trend of recreational use policies and in the tone of sporting and outdoor magazines. Recreational plans are leaning toward the segregation of certain areas from certain developments, so that having been led into the wilderness, the people may have some wilderness left to enjoy. Sporting magazines are groping toward some logical reconciliation between getting back to nature and preserving a little nature to get back to. Lamentations over this or that favorite vacation ground being "spoiled by tourists" are becoming more and more frequent. Very evidently we have here the old conflict between preservation and use, long since an issue with respect to timber, water power, and other purely economic resources, but just now coming to

be an issue with respect to recreation. It is the fundamental function of foresters to reconcile these conflicts, and to give constructive direction to these issues as they arise. The purpose of this paper is to give definite form to the issue of wilderness conservation, and to suggest certain policies for meeting it, especially as applied to the Southwest.

It is quite possible that the serious discussion of this question will seem a far cry in some unsettled regions, and rank heresy to some minds. Likewise did timber conservation seem a far cry in some regions, and rank heresy to some minds of a generation ago. "The truth is that which prevails in the long run."

Some definitions are probably necessary at the outset. By "wilderness" I mean a continuous stretch of country preserved in its natural state, open to lawful hunting and fishing, big enough to absorb a two weeks' pack trip, and kept devoid of roads, artificial trails, cottages, or other works of man. Several assumptions can be made at once without argument. First, such wilderness areas should occupy only a small fraction of the total National Forest area—probably not to exceed one in each State. Second, only areas naturally difficult of ordinary industrial development should be chosen. Third, each area should be representative of some type of country of distinctive recreational value, or afford some distinctive type of outdoor life, opportunity for which might disappear on other forest lands open to industrial development.

The argument for such wilderness areas is premised wholly on highest recreational use. The recreational desires and needs of the public, whom the forests must serve, vary greatly with the individual. Heretofore we have been inclined to assume that our recreational development policy must be based on the desires and needs of the majority only. The only new thing about the premise in this case is the proposition that inasmuch as we have plenty of room and plenty of time, it is our duty to vary our recreational development policy, in some places, to meet the needs and desires of the minority also. The majority undoubtedly want all the automobile roads, summer hotels, graded trails, and other modern conveniences that we can give them. It is already decided, and wisely, that they shall have these things as rapidly as brains and money can provide them. But a very substantial minority, I think, want just the opposite. It should be decided, as soon as the existence of the demand can be definitely determined, to provide what this minority wants. In fact, if we can foresee the demand, and make provision for it in advance, it will save much cash and hard feel-

ings. It will be much easier to keep wilderness areas than to create them. In fact, the latter alternative may be dismissed as impossible. Right here is the whole reason for forehandedness in the proposed wilderness area policy.

It is obvious to everyone who knows the National Forests that even with intensive future development, there will be a decreasing but inexhaustible number of small patches of rough country which will remain practically in wilderness condition. It is also generally recognized that these small patches have a high and increasing recreation value. But will they obviate the need for a policy such as here proposed? I think not. These patches are too small, and must grow smaller. They will always be big enough for camping, but they will tend to grow too small for a real wilderness trip. The public demand for camp sites and wilderness trips, respectively, are both legitimate and both strong, but nevertheless distinct. The man who wants a wilderness trip wants not only scenery, hunting, fishing, isolation, etc.—all of which can often be found within a mile of a paved auto highway—but also the horses, packing, riding, daily movement and variety found only in a trip through a big stretch of wild country. It would be pretty lame to forcibly import these features into a country from which the real need for them had disappeared.

It may also be asked whether the National Parks from which, let us hope, industrial development will continue to be excluded, do not fill the public demand here discussed. They do, in part. But hunting is not and should not be allowed within the Parks. Moreover, the Parks are being networked with roads and trails as rapidly as possible. This is right and proper. The Parks merely prove again that the recreational needs and desires of the public vary through a wide range of individual tastes, all of which should be met in due proportion to the number of individuals in each class. There is only one question involved—highest use. And we are beginning to see that highest use is a very varied use, requiring a very varied administration, in the recreational as well as in the industrial field.

An actual example is probably the best way to describe the working of the proposed wilderness area policy.

The Southwest (meaning New Mexico and Arizona) is a distinct region. The original southwestern wilderness was the scene of several important chapters in our national history. The remainder of it is about as interesting, from about as large a number of angles, as any

place on the continent. It has a high and varied recreational value. Under the policy advocated in this paper, a good big sample of it should be preserved. This could easily be done by selecting such an area as the headwaters of the Gila River on the Gila National Forest. This is an area of nearly half a million acres, topographically isolated by mountain ranges and box canyons. It has not yet been penetrated by railroads and to only a very limited extent by roads. On account of the natural obstacles to transportation and the absence of any considerable areas of agricultural land, no net economic loss would result from the policy of withholding further industrial development, except that the timber would remain inaccessible and available only for limited local consumption. The entire area is grazed by cattle, but the cattle ranches would be an asset from the recreational standpoint because of the interest which attaches to cattle grazing operations under frontier conditions. The apparent disadvantage thus imposed on the cattlemen might be nearly offset by the obvious advantage of freedom from new settlers, and from the hordes of motorists who will invade this region the minute it is opened up. The entire region is the natural habitat of deer, elk, turkey, grouse, and trout. If preserved in its semi-virgin state, it could absorb a hundred pack trains each year without overcrowding. It is the last typical wilderness in the southwestern mountains. Highest use demands its preservation.

The conservation of recreational resources here advocated has its historic counterpart in the conservation of timber resources lately become a national issue and expressed in the forestry program. Timber conservation began fifteen years ago with the same vague premonitions of impending shortage now discernible in the recreational press. Timber conservation encountered the same general rebuttal of "inexhaustible supplies" which recreational conservation will shortly encounter. After a period of milling and mulling, timber conservation established the principle that timber supplies are capable of qualitative as well as quantitative exhaustion, and that the existence of "inexhaustible" areas of trees did not necessarily insure the supply of bridge timber, naval stores, or pulp. So also will recreational resources be found in more danger of qualitative than quantitative exhaustion. We now recognize that the sprout forests of New England are no answer to the farmer's need for structural lumber, and we admit that the farmer's special needs must be taken care of in proportion to his numbers and importance. So also must we recognize that any number of small patches of uninhabited wood or mountains are no answer to the real sportsman's need for wilderness, and the day will come when we must admit that his special needs likewise must be taken care of in proportion to his numbers and importance. And as in forestry, it will be much easier and cheaper to preserve, by forethought, what he needs, than to create it after it is gone.

The Last Stand of the Wilderness

FUNDAMENTALLY IMPORTANT
TO OUR NATIONAL CHARAC-
TER IS THE PRESERVATION
OF THE WILD

By
ALDO LEOPOLD

THUNDER CLOUDS THROUGH
A FOREST VISTA IN LITTLE
FREQUENTED BACK COUNTRY
OF CALIFORNIA

*A Plea for Preserving a Few Primitive Forests, Untouched by Motor Cars
and Tourist Camps, Where Those Who Enjoy Canoe or Pack
Trips in Wild Country May Fulfill Their Dreams*

HOW many of those whole-hearted conservationists who berate the past generation for its short-sightedness in the use of natural resources have stopped to ask themselves for what new evils the next generation will berate us?

Has it ever occurred to us that we may unknowingly be just as short-sighted as our forefathers in assuming certain things to be inexhaustible, and becoming conscious of our error only after they have practically disappeared?

Today it is hard for us to understand why our prodigious waste of standing timber was allowed to go on—why the exhaustion of the supply was not earlier foreseen. Some even impute to the wasters a certain moral turpitude. We forget that for many generations the standing timber of America was in fact an encumbrance or even an enemy, and that the nation was simply unconscious of the possibility of its becoming exhausted. In fact, our tendency is not to call things resources until the supply runs short. When the end of the supply



Courtesy United States Forest Service

THE PRESERVATION OF THE WILDERNESS SUPPLIES A UNIQUE NEED IN RECREATION. UNFORTUNATELY, IT IS A NEED THAT MUST BE MET BY FORESIGHT. ONCE DESTROYED, IT CANNOT BE RE-CREATED. "WILDERNESS" IS THE ONE KIND OF PLAYGROUND WHICH MANKIND CANNOT BUILD TO ORDER. THIS ROADLESS AREA LIES IN THE GILA NATIONAL FOREST IN NEW MEXICO, ALREADY UNDER CONSIDERATION FOR INCLUSION IN THE WILDERNESS PLAN



Courtesy Elmer National Park Company

A SECTION OF THE PARADISE VALLEY CAMP GROUNDS

To those who do not object to the crowded conditions and enjoy the more artificial forms of outdoor life, the average large motor camp, with most of the conveniences of civilization, offers everything that is to be desired.

is in sight we "discover" that the thing is valuable.

This has been true of the latest natural resource to be "discovered," namely the group of things collectively called Outdoor Recreation. We had to develop tenements and tired-business-men before Outdoor Recreation was recognized as a category of human needs, though the use of the outdoors for recreational purposes is as old as the race itself. This "discovery" that we need a national policy on Outdoor Recreation is in fact so new that the ink has barely dried on its birth certificate. And, as usual, we are becoming conscious of thousands of wasteful errors in the past handling of recreational resources which an earlier discovery might have avoided.

I submit that this endless series of more or less post-mor-

tem discoveries is getting rather tedious. I for one am piqued in my sense of national pride. Can not we for once foresee and provide? Must it always be hindsight, followed by hurried educational work, laborious legislative campaigns, and then only partially effective action at huge expense? Can not we for once use foresight, and provide for our needs in an orderly, ample, correlated, economical fashion?

The next resource, the exhaustion of which is due for "discovery," is the wilderness. The purpose of this article is to show why the wilderness is valuable, how close it is to exhaustion and why, and what can be done about it.

Wild places are the rock-bottom foundation of a good many different kinds of outdoor play, including pack and canoe trips in which hunting, fishing, or just exploring may furnish the flavoring matter. By "wild



Courtesy United States Forest Service

CARVED OUT OF THE WILD

But in contrast, the quiet and harmony, peace and renewal so necessary to many, is to be found only in such spots as this in the deep woods of Minnesota,—in roadless ways stretching far into the wilderness.

places" I mean wild regions big enough to absorb the average man's two weeks' vacation without getting him tangled up in his own back track. I also mean big areas wild enough to be free from motor roads, summer cottages, launches, or other manifestations of gasoline. Driving a pack train across or along a graded highway is distinctly not a pack trip—it is merely exercise, with about the same flavor as lifting dumb-bells. Neither is canoeing in the wake of a motor launch or down

a lane of summer cottages a canoe trip. That is paddling—and the supply is unlimited. //

Is the opportunity for wilderness trips valuable? Let us apply the test of the market price. Any number of well-to-do sportsmen are paying from \$3,000 to \$10,000 for a single big-game trip to the wilderness regions of British Columbia, Alaska, Mexico, Africa and Siberia.

It is worth that to them. Now how about the fellow who has the same tastes



Photographs by Herbert W. Gleason and R. E. Marble. Courtesy The National Park Service

SHALL OUR WONDERFUL WILDERNESS COUNTRY DISAPPEAR FROM AMERICA BECAUSE WE LACK THE VISION TO SEE ITS VALUE?

In the face of the rapid disappearance of our truly wild country, we cannot afford to longer ignore the need for action. We must at once formulate a definite national policy for the permanent establishment of wilderness recreation grounds. Unless this is done, our larger areas of wilderness will mostly disappear within the next decade. This photograph shows the upper part of the South wall of Kings Canyon, on the John Muir Trail and the oval inset above is of Kintla Lake, in beautiful Glacier National Park.

for wilderness travel but a lesser pocketbook, and who probably has more real need of recreation? He simply has to do without, subsisting as best he can on polite trips to summer resorts and dude ranches. Why? Because the old wilderness hunting grounds, formerly within his reach, no longer exist, having been opened up by motor roads.

Right here I had better explain that motor roads, cottages, and launches do not necessarily destroy hunting and fishing, but they destroy the wilderness, which to certain tastes is quite as important.

Neither do I imply that motors, cottages, summer resorts, and dude ranches are not in themselves highly valuable recreational assets. Obviously they are. Only they are a different *kind* of recreation. We need to preserve as many different kinds as we possibly can. The civilized kinds tend to preserve themselves through the automatic operation of economic laws. But wilderness travel is a kind that tends to disappear under the automatic operation of economic laws, just as the site for a city park tends to disappear with the growth of a city. Unlike the city park, however, the wilderness can not be re-created when the need for it is determined by hindsight. The need for it must be determined by foresight, and the necessary areas segregated and preserved. Wilderness is the one kind of playground which mankind can not build to order.

Since the pilgrims landed, the supply of wilderness has always been unlimited. Now, of a sudden, the end is in sight. The really wild places within reach of the centers of population are going or gone. As a nation, however, we are so accustomed to a plentiful supply that we are *unconscious* of what the disappearance of wild places would mean, just as we are unconscious of what the disappearance of winds or sunsets would mean. The opportunity to disappear into the tall uncut has existed so long that we unconsciously assume it, like the wind and sunset, to be one of the fixed facts of Nature. And who can measure the influence of these "fixed facts of Nature" on the national character? In all the category of outdoor vocations and outdoor sports there is not one, save only the tilling of the soil, that bends and molds the human character like wilderness travel. Shall this fundamental instrument for building citizens be allowed to disappear from America, simply because we lack the vision to see its value? Would we rather have the few paltry dollars that could be extracted from our remaining wild places than the human values they can render in their wild condition?

A national policy for the establishment of wilder-

ness recreation grounds would in some instances be easy to put into operation if we act at once. The National Forests and Parks still contain a few splendid areas of relatively low value for other purposes, which could be readily segregated as roadless playgrounds. Wilderness areas in the National Forests would serve especially the wilderness-hunter, since hunting is not and should not be allowed in the Parks. On the other hand, wilderness areas in the National Parks would serve all kinds of wilderness-lovers except the hunter. In general, I believe that both the Forest Service and the Park Service would be receptive to the wilderness idea, but neither can be expected to execute it with the vigor and despatch necessary to save the situation, unless they can point to a definite crystallized public demand for such action. The public being still largely unconscious that the end of the wild places is in sight, there is as yet no articulate public expression for or against the wilderness plan. Meanwhile the remaining wild areas in both the Forests and Parks are being pushed back by road construction at a very rapid rate,—so rapid that unless something is done, the large areas of wilderness will mostly disappear within the next decade.

This paper is a plea for a definite expression of public opinion on the question of whether a system of wilderness areas should be established in our public Forests and Parks.

Let me illustrate what I mean by saying that administrative officers can not effectively execute a wilderness policy without the help of a definite public demand. District Forester Frank C. W. Pooler has already tentatively designated the headwaters of the Gila

River, in the Gila National Forest, New Mexico, as a wilderness area. It is the last roadless area of any size in the Southwest containing all the best types of mountain wild life and scenery, and by reason of its exceedingly broken topography is the logical location for a wilderness playground. It is Mr. Pooler's belief that the Forest Service should withhold extending its

road system into the Gila Wilderness, and should withhold granting permits for summer homes in it, until the whole wilderness idea has had an opportunity to crystallize into a definite policy, under which a final plan for handling the Gila Wilderness can be laid down.

Now suppose that a timber operator were to apply to build a railroad into this area thus tentatively reserved for wilderness purposes. Suppose the District Forester were to reply: "No. This area is being held

SPEAK OUT

Action to retain our spots of wilderness will only come when those who believe that this should be done speak out again and again. Mr. Leopold's appeal for such action deserves an expression from YOU and you are urged to register your opinion in letters to

AMERICAN FORESTS AND FOREST LIFE.

for public recreation as a wilderness hunting ground." The lumber operator answers: "I haven't heard of the public wanting wilderness hunting grounds. Where is this public, and just what does it want?" Obviously, unless there existed some clear expression of public need, and a definite official policy for meeting it, the District Forester's position would be untenable, no matter how certain he felt that it was right. The point is that governmental policies can not be actually applied without many decisions by administrative officers involving the adjustment of conflicting interests. In such conflicts individual or economic interests may always be counted upon to be articulate.

Group or public interests must likewise be made articulate, else they place the government executive in the

thankless and often untenable position of being at once judge of the conflict and counsel for an absentee. The public interest

must "speak up or lose out." The dangers of delay in formulating a national policy for the establishment of wilderness recreation grounds are strongly emphasized in the present situation of the Lake States. In the last few years many people have begun to realize that wilderness canoe trips are about to become a thing of the past in the Lake States, because of the extension of tourist roads and summer resorts into the remnants of wild country.

The proximity of the Lake States to the centres of population in the Middle West, and the fact that canoe-travel is a distinctive type of wilderness life not to be found elsewhere south of the Canadian border except in

Maine, adds to the vital need for such a project.

But what to do about it is a difficult problem. The national land holdings consist of three little National Forests, The Superior, Minnesota, and Michigan. Their combined area is woefully inadequate. Moreover, they are more or less riddled with private holdings which, until eliminated by land exchanges, constitute serious obstacles to any and all future plans for developing the full public value of these Forests. The Izaak Walton League and the Superior National Forest Recreation Association, with a foresight for which they deserve much credit, have insisted that at least one wilderness area be established in the Lake

States on these national lands.

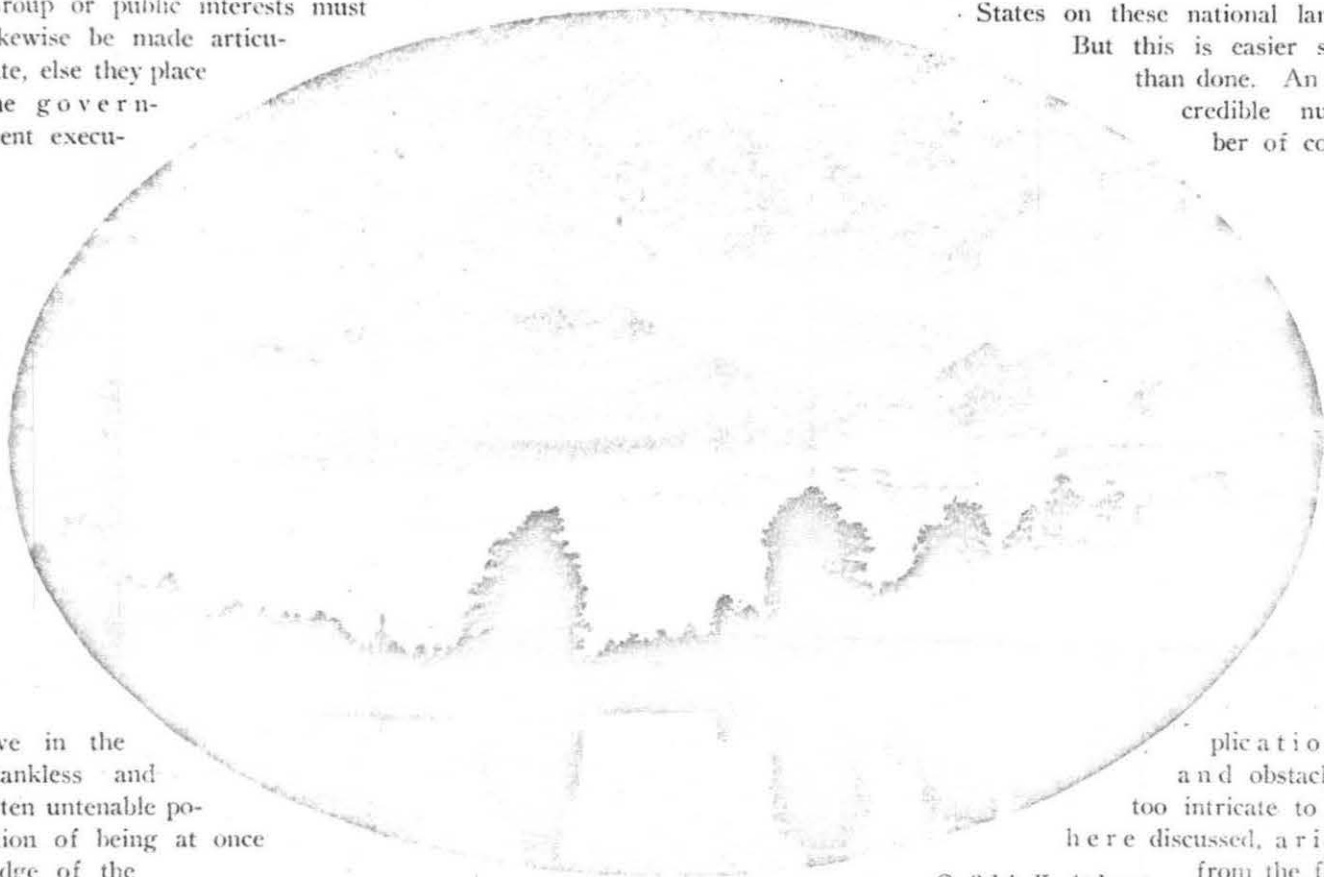
But this is easier said than done. An incredible number of com-

plications and obstacles, too intricate to be here discussed, arise

from the fact that the wilderness idea was born after, rather

than before, the normal course of commercial development had begun. The existence of these complications is nobody's fault. But it will be everybody's fault if they do not serve as a warning against delaying the immediate inauguration of a comprehensive system of wilderness areas in the West, where there is still a relatively unimpeded field for action.

A start toward such a system has already been made at the initiative of the Forest Service. The hinterland around Jackson Hole, including the Grand Tetons and Two-Ocean Pass, are entered as "roadless" in the recreational plans for the future. Likewise, that part of the Absaroka Forest between Boulder Creek and



THE PEERLESS BEAUTY OF THE WILD

© Ralph H. Anderson

Who can measure its influence in shaping human happiness? Or who would hold against such value the few paltry dollars possible of extraction through so-called development.

Idaho Yellowstone Park, the Middle Fork of the Salmon River in central Idaho, and parts of the Clearwater country in Montana are so classified. The Gila area in New Mexico has been already mentioned. What now seems to me important is for the government to undertake and the public to support the establishment of similar areas in every state that still contains National Forest or Park lands suitable for wilderness purposes.

The big thing that stands in the way of such a program is the well-nigh universal assumption that advance action is unnecessary. "Why, this area never will be opened up!" That was said ten years ago about many an area that has since been broken up. I know of five in the Southwest alone. It is being said today, and unless we clearly realize the danger, it will continue to be said until the chances for adequate action are gone.

Let us now consider some of the practical details of how the proposed system of wilderness areas should be administered. It is, for instance, a moot question whether regulated timber cutting should be allowed in them. If the conditions are such that the cuttings would leave motor roads in their wake, I would say "no." But in the Lake States much logging can be done over the lakes, without any trunk roads, so that it seems to me possible, by skillful planning, permanently to use much of the remaining wild country for both wilderness recreation and timber production without large sacrifice of either use.

Another question is that of fire. Obviously the construction of trails, phone lines, and towers necessary for fire control must be not only allowed but encouraged. But how about roads? Wherever the opponents of the idea can argue that unless the country is opened up it will burn up, there is no chance for the wilderness. Let us take the Gila as an example. I think it can be confidently asserted that on the Gila, extension of roads is not necessary for good fire protection. The Forest Service, with its system of lookouts, telephone lines, and trails, is successfully handling the fires, even during the bad years. The percentage of lightning as compared with man-caused fires on the Gila is very high (65 per cent lightning; 35 per cent man-caused). As a rule the greater the percentage of lightning fires, the more serious is the handicap of inaccessibility. The reason for this is that man-caused fires are usually increased by building roads and letting in more transients, whereas lightning fires remain the same. Therefore a heavy lightning region like the Gila ought to be a severe test of the practicability of controlling fires in roadless areas. As already stated, that test has been thus far successful.

I do not imply, however, that this one case disposes of the argument. The game of fire-control is too complicated to be comprehended in "rules of thumb." There may be regions here and there where fire control is impossible without roads. If so, we must have roads in such regions, wilderness or no wilderness. But there

may with equal likelihood be other regions where the reverse is true. The whole fire question in its relation to the wilderness plan is one of skill in selecting and administering each particular area. Such skill is already available among the forest officers who have devoted years of study to fire control as well as a dozen other related forest problems.

The acceptance of the idea of wilderness areas entails, I admit, a growth in the original conception of National Forests. The original purposes were timber production and watershed protection, and these are and must always remain the primary purposes. But the whole subsequent history of these Forests has been a history of the appearance and growth of new uses, which, when skillfully adjusted to the primary uses and to each other, were one by one provided for and the net public benefit correspondingly increased. Public recreation was one of these. When the forests were first established, recreation did not exist in the minds of either the foresters or the public as an important use of the public Forests. Today it has been added to timber production and watershed protection as an important additional public service. It has been proven that skillful administration can provide for both in the same system of Forests without material sacrifice of either.

One wilderness area could, I firmly believe, be fitted into the National Forests of each State without material sacrifice of other kinds of playgrounds or other kinds of uses. Additional wilderness areas could, it seems to me, be fitted into the various National Parks. As far as I can see there would usually be necessary neither new costs nor new laws nor new work—simply a well-pondered administrative decision delimiting the areas, and in such area establishing a permanent "closed season" on roads, cottages, or other developments inimical to the wilderness use.

To urge that wilderness playgrounds are unnecessary because ample forest playgrounds of other kinds are already being established is just as idle as to urge that there is no need for public tennis courts because there are already public golf links. The two things represent differing needs of different people, each entitled to recognition in due proportion to their numbers and importance. The people in need of wilderness areas are numerous, and the preservation of their particular kind of contact with Mother Earth is a national problem of the first magnitude.

Now what do the lovers of wilderness trips have to say about it? The last National Conference on Outdoor Recreation said nothing. This Conference is the official agency for extending recognition to new needs of this kind, dovetailing them with other and possibly conflicting needs, and thus determining for each its place in the sun. If any individual or group believe in the wilderness idea, or have any one place where they believe it should be applied, now is the time to make known their belief.

WILDERNESS AS A FORM OF LAND USE

By ALDO LEOPOLD

FROM the earliest times one of the principal criteria of civilization has been the ability to conquer the wilderness and convert it to economic use. To deny the validity of this criterion would be to deny history. But because the conquest of wilderness has produced beneficial reactions on social, political, and economic development, we have set up, more or less unconsciously, the converse assumption that the ultimate social, political, and economic development will be produced by conquering the wilderness entirely—that is, by eliminating it from our environment.

My purpose is to challenge the validity of such an assumption and to show how it is inconsistent with certain cultural ideas which we regard as most distinctly American.

Our system of land use is full of phenomena which are sound as tendencies but become unsound as ultimates. It is sound for a city to grow but unsound for it to cover its entire site with buildings. It was sound to cut down our forests but unsound to run out of wood. It was sound to expand our agriculture, but unsound to allow the momentum of that expansion to result in the present overproduction. To multiply examples of an obvious truth would be tedious. The question, in brief, is whether the benefits of wilderness-conquest will extend to ultimate wilderness-elimination.

The question is new because in America the point of elimination has only recently appeared upon the horizon of foreseeable events. During our four centuries of wilderness-conquest the possibility of disappearance has been too

remote to register in the national consciousness. Hence we have no mental language in which to discuss the matter. We must first set up some ideas and definitions.

What Is a Wilderness Area?

The term wilderness, as here used, means a wild, roadless area where those who are so inclined may enjoy primitive modes of travel and subsistence, such as exploration trips by pack-train or canoe.

The first idea is that wilderness is a resource, not only in the physical sense of the raw materials it contains, but also in the sense of a distinctive environment which may, if rightly used, yield certain social values. Such a conception ought not to be difficult, because we have lately learned to think of other forms of land use in the same way. We no longer think of a municipal golf links, for instance, as merely soil and grass.

The second idea is that the value of wilderness varies enormously with location. As with other resources, it is impossible to dissociate value from location. There are wilderness areas in Siberia which are probably very similar in character to parts of our Lake states, but their value to us is negligible, compared with what the value of a similar area in the Lake states would be, just as the value of a golf links would be negligible if located so as to be out of reach of golfers.

The third idea is that wilderness, in the sense of an environment as distinguished from a quantity of physical materials, lies somewhere between the

class of non-reproducible resources like minerals, and the reproducible resources like forests. It does not disappear proportionately to use, as minerals do, because we can conceive of a wild area which, if properly administered, could be traveled indefinitely and still be as good as ever. On the other hand, wilderness certainly cannot be built at will, like a city park or a tennis court. If we should tear down improvements already made in order to build a wilderness, not only would the cost be prohibitive, but the result would probably be highly dissatisfying. Neither can a wilderness be grown like timber, because it is something more than trees. The practical point is that if we want wilderness, we must foresee our want and preserve the proper areas against the encroachment of inimical uses.

Fourth, wilderness exists in all degrees, from the little accidental wild spot at the head of a ravine in a Corn Belt woodlot to vast expanses of virgin country—

*"Where nameless men by nameless rivers
wander*

*And in strange valleys die strange deaths
alone."*

What degree of wilderness, then, are we discussing? The answer is, *all degrees*. Wilderness is a relative condition. As a form of land use it cannot be a rigid entity of unchanging content, exclusive of all other forms. On the contrary, it must be a flexible thing, accommodating itself to other forms and blending with them in that highly localized give-and-take scheme of land-planning which employs the criterion of "highest use." By skilfully adjusting one use to another, the land planner builds a balanced whole without undue sacrifice of any function, and thus attains a maximum net utility of land.

Just as the application of the park idea in civic planning varies in degree from the provision of a public bench on a street corner to the establishment of a municipal forest playground as large as the city itself, so should the application of the wilderness idea vary in degree from the wild, roadless spot of a few acres left in the rougher parts of public forest devoted to timber-growing, to wild, roadless regions approaching in size a whole national forest or a whole national park. For it is not to be supposed that a public wilderness area is a new kind of public land reservation, distinct from public forests and public parks. It is rather a new kind of land-dedication within our system of public forests and parks, to be duly correlated with dedications to the other uses which that system is already obligated to accommodate.

Lastly, to round out our definitions, let us exclude from practical consideration any degree of wilderness so absolute as to forbid reasonable protection. It would be idle to discuss wilderness areas if they are to be left subject to destruction by forest fires, or wide open to abuse. Experience has demonstrated, however, that a very modest and unobtrusive framework of trails, telephone line and lookout stations will suffice for protective purposes. Such improvements do not destroy the wild flavor of the area, and are necessary if it is to be kept in usable condition.

Wilderness Areas in a Balanced Land System

What kind of case, then, can be made for wilderness as a form of land use?

To preserve any land in a wild condition is, of course, a reversal of economic tendency, but that fact alone

should not condemn the proposal. A study of the history of land utilization shows that good use is largely a matter of good balance—of wise adjustment between opposing tendencies. The modern movements toward diversified crops and live stock on the farm, conservation of eroding soils, forestry, range management, game management, public parks—all these are attempts to balance opposing tendencies that have swung out of counterpoise.

One noteworthy thing about good balance is the nature of the opposing tendencies. In its more utilitarian aspect, as seen in modern agriculture, the needed adjustment is between economic uses. But in the public park movement the adjustment is between an economic use, on the one hand, and a purely social use on the other. Yet, after a century of actual experience, even the most rigid economic determinists have ceased to challenge the wisdom of a reasonable reversal of economic tendency in favor of public parks.

I submit that the wilderness is a parallel case. The parallelism is not yet generally recognized because we do not yet conceive of the wilderness environment as a resource. The accessible supply has heretofore been unlimited, like the supply of air-power, or tide-power, or sunsets, and we do not recognize anything as a resource until the demand becomes commensurable with the supply.

Now after three centuries of overabundance, and before we have even realized that we are dealing with a non-reproducible resource, we have come to the end of our pioneer environment and are about to push its remnants into the Pacific. For three centuries that environment has determined the character of our development;

it may, in fact, be said that, coupled with the character of our racial stocks, it is the very stuff America is made of. Shall we now exterminate this thing that made us American?

Ouspensky says that, biologically speaking, the determining characteristic of rational beings is that their evolution is self-directed. John Burroughs cites the opposite example of the potato bug, which, blindly obedient to the law of increase, exterminates the potato and thereby exterminates itself. Which are we?

What the Wilderness Has Contributed to American Culture

Our wilderness environment cannot, of course, be preserved on any considerable scale as an economic fact. But, like many other receding economic facts, it can be preserved for the ends of sport. But what is the justification of sport, as the word is here used?

Physical combat between men, for instance, for unnumbered centuries was an economic fact. When it disappeared as such, a sound instinct led us to preserve it in the form of athletic sports and games. Physical combat between men and beasts since first the flight of years began was an economic fact, but when it disappeared as such, the instinct of the race led us to hunt and fish for sport. The transition of these tests of skill from an economic to a social basis has in no way destroyed their efficacy as human experiences—in fact, the change may be regarded in some respects as an improvement.

Football requires the same kind of back-bone as battle but avoids its moral and physical retrogressions. Hunting for sport in its highest form is an improvement on hunting for food in that there has been added, to the test of skill,

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an ethical code which the hunter formulates for himself and must often execute without the moral support of bystanders.

In these cases the surviving sport is actually an improvement on the receding economic fact. Public wilderness areas are essentially a means for allowing the more virile and primitive forms of outdoor recreation to survive the receding economic fact of pioneering. These forms should survive because they likewise are an improvement on pioneering itself.

There is little question that many of the attributes most distinctive of America and Americans are the impress of the wilderness and the life that accompanied it. If we have any such thing as an American culture (and I think we have), its distinguishing marks are a certain vigorous individualism combined with ability to organize, a certain intellectual curiosity bent to practical ends, a lack of subservience to stiff social forms, and an intolerance of drones, all of which are the distinctive characteristics of successful pioneers. These, if anything, are the indigenous part of our Americanism, the qualities that set it apart as a new rather than an imitative contribution to civilization. Many observers see these qualities not only bred into our people, but built into our institutions. Is it not a bit beside the point for us to be so solicitous about preserving those institutions without giving so much as a thought to preserving the environment which produced them and which may now be one of our effective means of keeping them alive?

Wilderness Locations

But the proposal to establish wilderness areas is idle unless acted on before

the wilderness has disappeared. Just what is the present status of wilderness remnants in the United States?

Large areas of half a million acres and upward are disappearing very rapidly, not so much by reason of economic need, as by extension of motor roads. Smaller areas are still relatively abundant in the mountainous parts of the country, and will so continue for a long time.

The disappearance of large areas is illustrated by the following instance: In 1910 there were six roadless regions in Arizona and New Mexico, ranging in size from half a million to a million acres, where the finest type of mountain wilderness pack trips could be enjoyed. Today roads have eliminated all but one area of about half a million acres.

In California there were seven large areas ten years ago, but today there are only two left unmotorized.

In the Lake states no large unmotorized playgrounds remain. The motor launch, as well as the motor road, is rapidly wiping out the remnants of canoe country.

In the Northwest large roadless areas are still relatively numerous. The land plans of the Forest Service call for exclusion of roads from several areas of moderate size.

Unless the present attempts to preserve such areas are greatly strengthened and extended, however, it may be predicted with certainty that, except in the Northwest, all of the large areas already in public ownership will be invaded by motors in another decade.

In selecting areas for retention as wilderness, the vital factor of location must be more decisively recognized. A few areas in the national forests of Idaho or Montana are better than none, but, after all, they will be of limited usefulness to the citizen of Chicago or

New Orleans who has a great desire but a small purse and a short vacation. Wild areas in the poor lands of the Ozarks and the Lake states would be within his reach. For the great urban populations concentrated on the Atlantic seaboard, wild areas in both ends of the Appalachians would be especially valuable.

Are the remaining large wilderness areas disappearing so rapidly because they contain agricultural lands suitable for settlement? No; most of them are entirely devoid of either existing or potential agriculture. Is it because they contain timber which should be cut? It is true that some of them do contain valuable timber, and in a few cases this fact is leading to a legitimate extension of logging operations; but in most of the remaining wilderness the timber is either too thin and scattered for exploitation, or else the topography is too difficult for the timber alone to carry the cost of roads or railroads. In view of the general belief that lumber is being overproduced in relation to the growing scarcity of stumpage, and will probably so continue for several decades, the sacrifice of wilderness for timber can hardly be justified on grounds of necessity.

Generally speaking, it is not timber, and certainly not agriculture, which is causing the decimation of wilderness areas, but rather the desire to attract tourists. The accumulated momentum of the good-roads movement constitutes a mighty force, which, skilfully manipulated by every little mountain village possessed of a chamber of commerce and a desire to become a metropolis, is bringing about the extension of motor roads into every remaining bit of wild country, whether or not there is economic justification for the extension.

Our remaining wild lands are wild be-

cause they are poor. But this poverty does not deter the booster from building expensive roads through them as bait for motor tourists.

I am not without admiration for this spirit of enterprise in backwoods villages, nor am I attempting a censorious pose toward the subsidization of their ambitions from the public treasuries; nor yet am I asserting that the resulting roads are devoid of any economic utility. I do maintain, (1) that such extensions of our road systems into the wilderness are seldom yielding a return sufficient to amortize the public investment; (2) that even where they do yield such a return, their construction is not necessarily in the public interest, any more than obtaining an economic return from the last vacant lot in a parkless city would be in the public interest. On the contrary, the public interest demands the careful planning of a system of wilderness areas and the permanent reversal of the ordinary economic process within their borders.

To be sure, to the extent that the motor-tourist business is the cause of invasion of these wilderness playgrounds, one kind of recreational use is merely substituted for another. But this substitution is a vitally serious matter from the point of view of good balance. It is just as unwise to devote 100% of the recreational resources of our public parks and forests to motorists as it would be to devote 100% of our city parks to merry-go-rounds. It would be just as unreasonable to ask the aged to indorse a park with only swings and trapezes, or the children a park with only benches, or the motorists a park with only bridle-paths, as to ask the wilderness recreationist to indorse a universal priority for motor roads. Yet that is what our land plans—or rather lack of them—are

now doing; and so sacred is our dogma of "development" that there is no effective protest. The inexorable molding of the individual American to a standardized pattern in his economic activities makes all the more undesirable this unnecessary standardization of his recreational tastes.

Practical Aspects of Establishing Wilderness Areas

Public wilderness playgrounds differ from all other public areas in that both their establishment and maintenance would entail very low costs. The wilderness is the one kind of public land that requires no improvements. To be sure, a simple system of fire protection and administrative patrol would be required, but the cost would not exceed two or three cents per acre per year. Even that would not usually be a new cost, since the greater part of the needed areas are already under administration in the rougher parts of the national forests and parks. The action needed is the permanent differentiation of a suitable system of wild areas within our national park and forest system.

In regions such as the Lake states, where the public domain has largely disappeared, lands would have to be purchased; but that will have to be done, in any event, to round out our park and forest system. In such cases a lesser degree of wilderness may have to suffice, the only ordinary utilities practicable to exclude being cottages, hotels, roads, and motor boats.

The retention of certain wild areas in both national forests and national parks will introduce a healthy variety into the wilderness idea itself, the forest areas serving as public hunting grounds, the park areas as public wild-life sanctuaries, and both kinds as public play-

grounds in which the wilderness environments and modes of travel may be preserved and enjoyed.

The Cultural Value of Wilderness

Are these things worth preserving? This is the vital question. I cannot give an unbiased answer. I can only picture the day that is almost upon us when canoe travel will consist in paddling in the noisy wake of a motor launch and portaging through the back yard of a summer cottage. When that day comes, canoe travel will be dead, and dead, too, will be a part of our Americanism. Joliet and LaSalle will be words in a book, Champlain will be a blue spot on a map, and canoes will be merely things of wood and canvas, with a connotation of white duck pants and bathing "beauties."

The day is almost upon us when a pack-train must wind its way up a graveled highway and turn out its bell-mare in the pasture of a summer hotel. When that day comes the pack-train will be dead, the diamond hitch will be merely rope, and Kit Carson and Jim Bridger will be names in a history lesson. Rendezvous will be French for "date," and Forty-Nine will be the number preceding fifty. And thenceforth the march of empire will be a matter of gasoline and four-wheel brakes.

European outdoor recreation is largely devoid of the thing that wilderness areas would be the means of preserving in this country. Europeans do not camp, cook, or pack in the woods for pleasure. They hunt and fish when they can afford it, but their hunting and fishing is merely hunting and fishing, staged in a setting of ready-made hunting lodges, elaborate fare, and hired beaters. The whole thing carries the atmosphere of a picnic rather than that

of a pack trip. The test of skill is confined almost entirely to the act of killing, itself. Its value as a human experience is reduced accordingly.

There is a strong movement in this country to preserve the distinctive democracy of our field sports by preserving free hunting and fishing, as distinguished from the European condition of commercialized hunting and fishing privileges. Public shooting grounds and organized cooperative relations between sportsmen and landowners are the means proposed for keeping these sports within reach of the American of moderate means. Free hunting and fishing is a most worthy objective, but it deals with only one of the two distinctive characteristics of American sport. The other characteristic is that our test of skill is primarily the act of living in the open, and only secondarily the act of killing game. It is to preserve this primary characteristic that public wilderness playgrounds are necessary.

Herbert Hoover aptly says that there is no point in increasing the average American's leisure by perfecting the organization of industry, if the expansion of industry is allowed to destroy the recreational resources on which leisure may be beneficially employed. Surely the wilderness is one of the most valuable of these resources, and surely the build-

ing of unproductive roads in the wrong places at public expense is one of the least valuable of industries. If we are unable to steer the Juggernaut of our own prosperity, then surely there is an impotence in our vaunted Americanism that augurs ill for our future. The self-directed evolution of rational beings does not apply to us until we become collectively, as well as individually, rational and self-directing.

Wilderness as a form of land-use is, of course, premised on a qualitative conception of progress. It is premised on the assumption that enlarging the range of individual experience is as important as enlarging the number of individuals; that the expansion of commerce is a means, not an end; that the environment of the American pioneers had values of its own, and was not merely a punishment which they endured in order that we might ride in motors. It is premised on the assumption that the rocks and rills and templed hills of this America are something more than economic materials, and should not be dedicated exclusively to economic use.

The vanguard of American thought on the use of land has already recognized all this, in theory. Are we too poor in spirit, in pocket, or in idle acres to recognize it likewise in fact?

From NO INFORMATION DIGEST for April 23, 1948

1819

Death of Aldo Leopold. "Baraboo, Wis., April 21. - (AP) Dr. Aldo Leopold, 62, nationally known conservation authority, died today while helping to fight a grass fire near his summer home. He was a past president of the American Wildlife Society, served on President Roosevelt's special committee on wildlife restoration in 1934 and was the author of several books and magazine articles on forest and game management."-- WASHINGTON POST, April 22.

Mr. Leopold was a member of the Forest Service from 1908 to 1917 and 1919 to 1929. He served as Forest Supervisor of the Carson National Forest from 1912-13, for several years was in charge of "educational cooperation" in Region 3 and in 1919 became Assistant Regional Forester in charge of Operation in that Region. He transferred to the Forest Products Laboratory as Assistant Director in 1924, resigning from that position in 1929.

PEOPLE YOU KNOW

*Calif. Ranger
2/7/41*

ABRAHAM LINCOLN--1809-1865

The birthday of Abraham Lincoln, the great emancipator, is next Wednesday, February 12. Lincoln was a man of the soil. His background was the pioneer farming and rural life which was typical of the outer edge of America's westward-moving frontier. The farming he knew in his youth was pioneer exploitation rather than settled cultivation.

In an address before the Wisconsin State Agricultural Society at Milwaukee on September 30, 1859, Lincoln warned against uneconomical use of land, labor and machinery. Prophetically, he said, "Population must increase rapidly -- more rapidly than in former times -- and ere long the most valuable of all arts will be the art of deriving a comfortable substance from the smallest area of soil. No community whose every member possess this art can ever be the victim of oppression in any of its forms. Such community will be alike independent of crowned-kings, money-kings and land-kings."

In 1862, during his administration, the Department of Agriculture was organized and the Homestead Act, under which 234 million acres of public domain was transferred to private ownership, and the Land Grant College Act became law.

Adapted from "Washington, Jefferson, Lincoln and Agriculture" by the BAE)



The Man Who Moved Mountains

by Tom Butts

Aldo Leopold has been described as the "father of wildlife management," the "Dean of Deans" of that profession, a "prophet" of the wilderness preservation movement in America, and the father of ecological ethics. This year—1987—is the 100th anniversary of his birth. As tribute, some mention of his extraordinary contributions to the art and science of resource conservation seem appropriate.

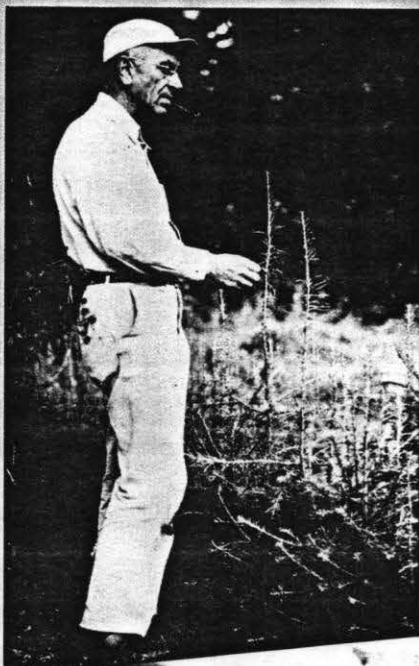
Born in Burlington, Iowa, in 1887, Leopold grew up midst the bluffs and bottomlands of the Mississippi River where his parents encouraged an interest in hunting, fishing, bird-watching, and natural history. In 1906, he entered the Yale School of Forestry, studying for a career that appealed to his love of the outdoors. The doors of that profession

were just beginning to open. The previous year, about 100 million acres of federal forest preserves, set aside beginning in 1891, had been turned over to the newly designated U.S. Forest Service (USFS), a branch of the Department of Agriculture.

Graduating from Yale in 1909, with a master's degree in forestry, he was hired by the USFS. Except for a year when he was employed by the Albuquerque Chamber of Commerce, he worked for that agency until 1924. He was stationed in the American Southwest where he rose in the ranks from boss of a field reconnaissance crew to supervisor of the Carson National Forest by 1912, and to assistant district forester in charge of operations by 1919.

He spent much of his time during the early years with the Forest Service organizing game and fish research in the Southwest. In 1916, he wrote: "I am organizing game protective associations over both states [Arizona and New Mexico], securing the reintroduction of locally extinct species, stocking hundreds of waters with trout, fighting suits for violation of game laws, giving illustrated lectures to the public, hammering on game protection through the newspapers, raising a fight on predatory animals, and have written a book outlining plans, ways, and means. While making good progress, I think the job will last me the rest of my life." When not hunting doves or ducks in his spare time, he was also secretary of the New Mexico Game Protective Association and editor of its newspaper, *The Pine Cone*, and was involved in national battles for federal legislation concerning refuges and migratory waterfowl.

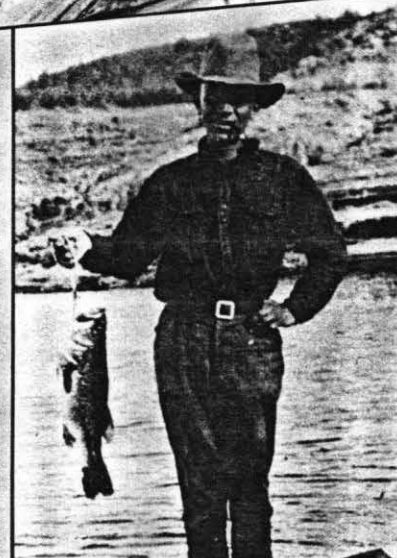
In his later years with the USFS, he was an administrator responsible for business organization, finance, personnel, roads and trails, and fire control. In her excellent study of Leopold, "Thinking Like a Mountain," Susan Flader commented of these years: "...along with his very real accomplishments in developing more efficient personnel practices, fire control procedures, and methods for inspecting forests went a deep and active commitment to other less traditional concerns of the Forest



Leopold inspects one of the thousands of trees he and his family planted on their farm in Wisconsin. Always prepared, Leopold never missed an opportunity to expand the emerging science of wildlife management.



Leopold's ecological insights stemmed in large part from his lifelong interest in hunting and fishing.



photos courtesy of the Leopold family and Gary Laib

Service, such as watersheds, wildlife, and wilderness. He helped stimulate research on erosion control and prepared a watershed handbook for the district....Not the least important was the groundwork he laid for administrative designation in 1924 of more than a half-million acres in the Gila National Forest as wilderness...."

In the book "Wilderness and the American Mind," Roderick Nash devoted an entire chapter to Leopold's contributions to development of wilderness protection. Nash noted, "Leopold felt that what was at stake in keeping some wild land was the quality of American life—the welfare of the nation beyond its material needs." Nash continued: "Wilderness preserves, then, were not just for fun. They maintained the opportunity for successive generations of Americans to acquire the characteristics of pioneers and to acquaint themselves firsthand with the conditions that shaped their culture. Speaking for himself, Leopold declared: 'I am glad I shall never be young without wild country to be young in. Of what avail are forty freedoms without a blank spot on the map?'"

In a tribute to Leopold shortly after his death in 1948, biologist Paul Errington commented that the Leopold papers published between 1916 and 1919 were mostly short pieces in *The Condor* and *The Journal of Forestry* on ornithology, game, and game refuges. One paper published in the latter journal discussed national forests as the last free hunting grounds in the nation. Papers published by Leopold in the early 1920s dealt with "ornithology, hunting and game management, erosion control, ecological consequences of forest fires, and wilderness values. Included is one [Errington regarded] as his first great paper: 'Wilderness as a form of land use,' published in the *Journal of Land and Public Utility Economics*, 1925."

Leopold accepted a transfer in 1924 to become associate director of the U.S. Forest Products Laboratory in Madison, Wis., where he worked for four years. Flader suggests these must have been frustrating years for Leopold. He had more or less been promised the position of director, which he never was given.

The laboratory was concerned with the utilization of trees once they were cut down, but Leopold's interests had always been with the living environment, and many of his suggestions were ignored. During this time, he was also working on a book about game management in the Southwest, a project he eventually abandoned.

In 1928, Leopold left the laboratory and struck out on his own in a new field: game management. With funding provided by the Sporting Arms and Ammunition Manufacturers' Institute, he began a game survey of the north central states. His goal was to show people at the local level that more game could be raised by looking at the environmental factors affecting productivity and altering these, rather than simply creating refuges, or raising and releasing pen-reared stock. He also chaired a large committee in charge of formulating a game policy in America that was adopted by the 17th American Game Conference in 1930. In this policy were strong statements suggesting the United States should strive for some management of its game but would do well to avoid such intensive management—as practiced in Europe—that the wildlife wasn't wild anymore. Leopold wrote, "The recreational value of a head of game is inverse to the artificiality of its origin, and hence in a broad way to the intensiveness of the system of game management that produced it."

Leopold's ideas on the role of the predator had changed by now, compared with his early USFS days when he had written: "It is going to take patience and money to catch the last lion or wolf in New Mexico. But the last one must be caught before the job can be called successful." By now he was against the "ruthless suppression" of predators and advocated "light, local, seasonal, and selective handling of the predator factor."

By 1931, funding by the Institute ran out. The Depression was well under way and Leopold had a wife and five children to support. He used this time to write "Game Management," published in 1933, the original statement of the modern science of game management, and still a classic today. In it he

explained what game management meant to him at the time: "The game manager manipulates animals and vegetation to produce a game crop. This, however, is only a superficial indication of his social significance. What he really labors for is to bring about a new attitude toward the land....Game management...promulgates no doctrine, it simply asks for land and a chance to show that farm, forest, and wildlife products can be grown on it, to the mutual advantage of each other, the landowner, and the public."

Errington commented on this period of Leopold's writing, "Among the changes in professional emphasis to be detected in his publications, 1929-35, is one from the survey to the intensive method of research and another from game management for shooting to far broader versions of management involving native prairie flowers and song birds as well as game and game habitats."

Flader points out in her book that during this period Leopold was beginning to incorporate the ideas of ecology into his thoughts, but still conceived of management as control: "Management was the purposeful and continuing alignment, or control of these forces (the axe, plow, cow, fire, and gun). In his emphasis on management, Leopold simply extended to wildlife, through the medium of rudimentary ecological science, a faith in the possibility of intelligent control." She continues: "His plea was for ecological understanding, for the extension of ethics from the realm of human social relations to the whole land community of which man was an interdependent member. But...the emphasis was not so much on the concepts of ecology as on the use of tools—tools economic, legal, and political as well as scientific and technical—to create a more enduring civilization."

In 1933, the University of Wisconsin at Madison created a position for Leopold, the first in game management. He set up a small graduate study program and began to emphasize "deep-digging research" to get beyond simple habitat manipulation. His continual press for establishment of research programs at the state level resulted, in 1935, in

creation of the Cooperative Wildlife Research Unit Program, nine research units across the country at select land-grant colleges.

A subtle and highly significant shift in Leopold's orientation occurred during the mid-1930s. Flader listed three significant events in 1935 that shaped this shift. First, Leopold, Bob Marshall, and others formed The Wilderness Society. Flader wrote: "This new attitude involved a commitment to preserve threatened species, especially predators such as wolves and grizzlies, which Leopold now realized were essential to the healthy functioning of ecosystems. The year 1935 marked a reorientation in his thinking from a historical and recreational to a predominantly ecological and ethical justification for wilderness."

Second, in late spring of 1935 the Leopolds bought a farm on the Wisconsin River that was to become a challenge for Leopold in putting his ideas of conservation to work. It was also to become the setting for many of the sketches in "A Sand County Almanac."

The third event of that year was a fall trip to Germany where Leopold studied German wildlife management and forestry. In this intensively managed situation, Leopold re-evaluated many of his objectives of wildlife and forest management. He began to feel it was important to encourage diversity, as Flader put it, in the "widest possible realm in which natural processes might seek their own equilibrium." Leopold mused: "We Americans yearn for more deer and more pines, and we shall probably get them. But do we realize that to get them, as the Germans have, at the expense of their wild environment and their wild enemies, is to get very little indeed?"

From this time until his death from a heart attack in 1948, Leopold's primary work was developing what he termed "an ecological conscience." By about 1937, his writings had begun to stress the need for man to be less of a manipulator and more of a participant in the processes of nature. He became impatient with the prevailing emphasis of wildlife managers in producing something to shoot and implored, "In

the nature of things, we are mediators and moderators, and unless we can help rewrite the objectives of science our job is predestined to failure."

In 1940, he told a meeting of professional wildlife managers: "We find we cannot produce much to shoot until the landowner changes his ways of using the land, and he in turn cannot change his ways until his teachers, bankers, customers, editors, governors, and trespassers change their ideas of what land is for. Thus we started to move a straw and end up with the job of moving a mountain."

Shortly after his death, "A Sand County Almanac" was published. The collection of his writing includes "The Land Ethic" which many consider his strongest statement about man's responsibility for the health of the land: "A land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for its fellow members, and also for the respect of the community as such. A thing is right," he concludes, "when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise."

Susan Flader summarized Leopold's accomplishments: "Leopold's intellectual development mirrors the history of ecological and evolutionary thought, while his career spanned the first half-

century of the movement for conservation and resource management in America. His enduring achievement was to integrate the two strands—the scientific basis and the conservation imperative—in a compelling ethic of our time." She continued, "It was the land ethic, his concept of land health, or the philosophy of a natural self-regulating system, coupled with his assertion of individual obligation, that represents his (greatest) contribution."

Aldo Leopold—philosopher, prophet, father of many professions, prolific and often poetic writer, professor, wilderness and wildlife advocate, ecologist. The list goes on. It would be easy to let such a man become a legend. Let us, however, heed the words spoken by Leopold's friend Paul Errington shortly after Leopold's death: "Let no one do him the disservice of fostering Leopoldian legends or Leopoldian dogmas. Knowing him as I have, I can say he would not wish them to arise from his having lived...."

"In some respects, we might look upon wild beauty, as such, whether in back yard or in remote places, as a most fitting memorial to him and to his kind. Let us recognize our obligations to a philosophy of living that has goodness in it beyond selfish objectives; and moreover, that we honor him according to the way we, ourselves, live and lead." ■



Aldo Leopold — Commemorative Year 1987

Aldo Leopold — 1887-1948

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Dear Director:

I think your subscribers will find most interesting a new book to be published by our Press, and we would like to solicit your help in letting them know of the project.

Its title is Thinking Like a Mountain: Aldo Leopold and the Evolution of an Ecological Attitude Toward Deer, Wolves and Forests, and the author is Susan L. Flader. Formerly with the Institute for Environmental Studies at the University of Wisconsin at Madison, she is now Assistant Professor of History at the University of Missouri at Columbia. Much of the material presented in this book is derived from several years of research with the Leopold reports; unpublished materials in national, state, and university archives; offices of government agencies and private organizations; and personal files of individuals associated with Leopold. Dr. Flader has interviewed and made field trips with members of the Leopold family, his students and associates, and personnel of various government agencies. In this volume she brings knowledge of how Aldo Leopold formulated his attitudes toward wildlife, wilderness, and the use of the land as a whole. This work serves as further study for the professional, the student, and the lay ecologist.

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NEWS

U. S. DEPARTMENT OF AGRICULTURE

50th WILDERNESS ANNIVERSARY CEREMONIES SET:

WASHINGTON, April 29--Secretary of Agriculture Earl L. Butz, Governor Bruce King of New Mexico, and other dignitaries will celebrate the golden anniversary of wilderness, June 2, at a site in New Mexico which is surrounded by the nation's first designated wilderness.

Television and radio personality Arthur Godfrey will be master of ceremonies for the fiftieth anniversary celebration at Gila Cliff Dwellings Visitor Center near Silver City, N.M.

The Department of Agriculture (USDA) pioneered the wilderness concept in the United States just a day later 50 years ago, June 3, 1924, when the 750,000-acre Gila Wilderness Area was designated by USDA's Forest Service. Its establishment is generally credited to the efforts of one of the nation's wilderness pioneers, Aldo Leopold, a Forest Service employee at that time.

For the next forty years the number of designated National Forest wildernesses increased steadily. Congress endorsed the wilderness concept in 1964 when it created a 9.1 million-acre National Wilderness Preservation System composed of 54 National Forest wilderness areas.

With an additional 13 National Forest areas, as well as new wildernesses created in National Wildlife Refuges and National Parks, the System now contains 95 units covering nearly 11 million acres, 97.3 percent of which are in National Forests. Others are expected to be added soon from among those recommended by all three agencies to meet a September 1974 deadline set by Congress for study and recommendation of areas encompassing many million more acres.

- more -

In addition, the Forest Service has identified 274 other roadless areas totaling 12.3 million acres--primarily in the West--for study and possible recommendation to Congress.

The commemoration ceremony in New Mexico will be one of several actions planned for the golden anniversary. Silver City residents have arranged an arts and crafts fair June 1-2, and a barbecue June 2. A special medallion has been struck, and during June, Post Office cancellations citing the anniversary will be used in several major cities around the country. Singer John Denver is composing a ballad about America's wild lands especially for the anniversary.

USDA 1189-74

A Biographical Study of Aldo Leopold
Thinking Like a Mountain



Susan L. Flader

ON THE FIRST DAY of April 1944, Aldo Leopold sat down with sharpened pencil and a pad of yellow blue-lined paper, prepared to acknowledge in writing that he himself had once felt very differently about what he now regarded as the essence of an ecological attitude.

"A deep chesty bawl echoes from rimrock to rimrock as it rolls down the mountain and fades into the far blackness of the night," he began. "It is an outburst of wild defiant sorrow, and of contempt for all the adversities of the world." The deer, the coyote, the cowman, the hunter, in each the call instilled some immediate, personal fear or hope. "Only the mountain," he wrote, "has lived long enough to listen objectively to the howl of a wolf." Leopold's own conviction that there was a deeper meaning in that howl dated from the day, back in his southwestern years, when he shot a wolf and watched it die:

We reached the old wolf in time to watch a fierce green fire dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes — something known only to her and to the mountain. I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunter's paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.¹

In this essay, entitled "Thinking Like a Mountain," Aldo Leopold compressed into one dramatic moment a realization that had required years. It was a realization that grew, as he went on to suggest, out of his lifelong experience with the management of deer on wolfless range:

Since then, I have lived to see state after state extirpate its wolves. I have watched the face of many a newly wolfless mountain, and seen the south-facing slopes wrinkle with a maze of new deer trails. I have seen every edible bush and seedling browsed; first to anaemic desuetude, and then to death. I have seen every edible tree defoliated to the height of a saddlehorn. . . . In the end the starved bones of the hoped-

for deer herd, dead of its own too-much, bleach with the bones of the dead sage, or molder under the high-lined junipers.

A buck taken by wolves, he concluded, could be replaced in two or three years, but a range browsed out by an overpopulation of deer "may fail of replacement in as many decades."

The wolf, as one of the large carnivores, belonged at the very apex of the biotic pyramid, the image employed in ecology to represent the energy circuit of nature. Through millenia of evolution the pyramid had increased in height and complexity, and this elaboration and diversification, in Leopold's thinking, contributed to the smooth functioning, or health, of the system. Man with his arrogance and his engines of violence now presumed, in his solicitude for deer and cattle, to lop off the large carnivores from the apex of the pyramid, making food chains shorter and less complex and thus disorganizing the system. Standing at the apex of the pyramid, the wolf became a symbol of the pyramid itself, of land health. Leopold did not elaborate this symbolism in "Thinking Like a Mountain," but it is there. It is the hidden meaning in the howl of the wolf. One who could listen objectively to that howl — who could visualize the wolf in its relation to the total life process of the ecosystem through time, not just as it might affect one's own immediate interests — was thinking ecologically, like a mountain.

During his early years in the national forests of the Southwest, Leopold had listened far from objectively. He was a leader in a campaign by sportsmen and stockmen to eradicate wolves, mountain lions, and other large predators from the deer and cattle ranges of Arizona and New Mexico. "It is going to take patience and money to catch the last wolf or lion in New Mexico," he had told delegates to the National Game Conference in New York in 1920. "But the last one must be caught before the job can be called fully successful."²

It was the deer which had had a special place in Leopold's affections in those days, and he had written of them as the "numenon," or inner meaning, of the mountains:

To the deer hunter or the outdoorsman, deer are the numenon of the Southwestern mountains. Their presence or absence does not affect the outward appearance of the mountain country, but does mightily affect our reaction toward it. Without deer tracks in the trail and the potential presence of deer at each new dip and bend of the hillside the Southwest would be, to the outdoorsman, an empty shell, a spiritual vacuum.³

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Details and generalizations in this biographical study were drawn from materials in the Aldo Leopold Papers in the University of Wisconsin Division of Archives; Forest Service records in the National Archives, the Federal Record Centers in Denver and St. Louis, and various Forest Service offices; records of other governmental agencies and private organizations; and interviews with Mrs. Aldo Leopold, other members of the Leopold family, and colleagues, friends, and students of Aldo Leopold. Background details were drawn from some of the standard histories and policy studies in the natural resource field, from annual reports of various federal and state agencies, and other documentary and secondary materials. This article is the introductory chapter of a book to be published by the University of Wisconsin, tentatively entitled, *Aldo Leopold, Evolution of An Ecological*

¹"Thinking Like a Mountain," 1 April 1944, General Files — Aldo Leopold, Series 9/25/10-6 Box 18, University of Wisconsin Division of Archives [hereafter cited LP 6B18 (Leopold Papers, Series 6, Box 18)].

²"The Game Situation in the Southwest," *Bulletin of the American Game Protective Association*, 9:2 (April 1920), p. 5.

³"Southwestern Game Fields," ca. 1927, LP 6B10

By 1944 when he wrote "Thinking Like a Mountain," the destructive potential of too many deer was all too apparent, and the wolf had taken the place of the deer in Leopold's sentiment as a symbol of ecological integrity.

"Thinking Like a Mountain" was written as one of a series of nature sketches and essays which Leopold intended to publish in book form, to illustrate the process of ecological perception and to follow out some of its implications. At the time he despaired of having his ideas on deer and wolves accepted by the public or his book of essays accepted by a publisher, and he wrote the essay at least in part in response to the urging of a former student of his, H. Albert Hochbaum. Hochbaum, director of the Delta Duck Station in Manitoba, who at the time was preparing pen-and-ink drawings for the proposed book, felt that the essays as a whole breathed too deeply of regret and of aloof sourness toward man's despoliation of nature. "If we always regret what we have done," he wrote Leopold, "we must regret that we are men. It is only by accepting ourselves for what we are, the best of us and the worst of us, that we can hold any hope for the future." What had always impressed him in his personal contacts with Leopold, Hochbaum noted, was Leopold's unbounded enthusiasm for the future and his common sense way of thinking, "not that of an inspired genius, but that of any other ordinary fellow trying to put two and two together." He urged Leopold to acknowledge somewhere in his writings that he himself had not always felt the way he did now: "Because you have added up your sums better than most of us, it is important that you let fall a hint that in the process of reaching the end result of your thinking you have sometimes followed trails like anyone else that led you up the wrong alleys." In particular he pointed to Leopold's role in planning the extermination of wolves in New Mexico.⁴

The writing of "Thinking Like a Mountain" was thus a milestone for Leopold. And he realized its significance. He sent a copy immediately to Hochbaum and included it with a dozen other essays he was sending around to potential publishers. He had once thought to call his book "Marshland Elegy—And Other Essays," he explained to publishers, but "it now strikes me that 'Thinking Like a Mountain' might be a better key to its contents."⁵ As it was finally published five years later, the book had quite a different title, *A Sand County Almanac*, and a greatly augmented selection of essays. But "Thinking Like a Mountain" remains the most

graphic piece in it, and the only one in which Leopold acknowledges a major change in his thinking over the years.

ALDO LEOPOLD'S INTELLECTUAL DEVELOPMENT mirrors the history of ecological and evolutionary thought, while his professional career spans the first half century of the movement for conservation and resource management in America. His enduring achievement was to integrate the two strands, the scientific basis and the conservation imperative in a compelling ethic for our time.

Ecological science had its roots in the evolutionary thought of Charles Darwin. The term ecology is usually credited to the German Biologist Ernst Hæckel, who coined it in 1866 of two Greek words: *oikos*, meaning household or living relations, and *logos*, study of. He defined it as "the whole science of the relations of the organism to the environment including, in the broad sense, all the 'conditions of existence'." Hæckel used the term in his efforts to interpret to the scientific world of Germany the significance of Charles Darwin's theory of natural selection and evolution and his concept of "the economy of nature," as presented in the *Origin of Species* (1859). To Darwin, rather than to Hæckel, belongs the principal credit for describing the complex functional inter-relatedness of organisms and environment and the tendency of the evolutionary process to elaborate and diversify the biota to produce what ecologists today speak of as a system in dynamic equilibrium.

The ecological implications of evolutionary thought were all but lost in the furor over the very fact of evolution, including religious and social implications of the animal origins of man. Evolutionary research progressed along a number of discrete lines in various scientific disciplines, and rudimentary "ecological" research did likewise (although without the unifying value of a common rubric, Hæckel's term "ecology" having failed to catch hold). Among the fields which began to develop environmental lines of investigation during the late nineteenth and early twentieth centuries were developmental and response physiology, hydrobiology, economic entomology, botany, and zoology; but many of the potentially most significant contributions to a modern functional ecology remained isolated, imbedded in the laboratories and literatures of the separate disciplines.

Ecology as a scientific discipline is a product of the twentieth century. In the United States around the turn of the century it was plant ecology that gained attention and set the style for ensuing decades, with the work of Frederic E. Clements on "plant formations" and "climax" vegetation in the state of Nebraska and Henry C. Cowles's studies of vegetational succession on the sand dunes of Lake Michigan. Strongly influenced by the conceptual

⁴H. A. Hochbaum to Aldo Leopold [hereafter, AL], 4 February 1944, 11 March 1944, 22 January 1944, LP 6B5.

⁵AL to Clinton Simpson (Knopf's), 8 June 1944, LP 6B5.

frameworks and investigative techniques developed by the Cowles and Clements schools of plant ecology, early animal ecologists like V. E. Shelford and C. C. Adams contented themselves largely with adding animals to the successional picture. The approach of all these people was primarily descriptive rather than functional.

Thus ecology, as Aldo Leopold would first have encountered it, was a theoretical construct in botany, useful for describing vegetational patterns and related aspects of animal distribution. It was basically a subject matter, not a point of view, intriguing and no doubt exciting to those scientists who knew about it but still far from being a tool for integrating knowledge in a wide range of disciplines. Cultural geographers of the nineteenth century like George Perkins Marsh or natural philosophers like Henry David Thoreau or early conservationists such as John Muir, although in their own way intent on probing the interrelationships of organism and environment, had scarcely heard of the term. The transformation of ecology from a descriptive schema in botany to a functional approach to the total environment — a concern with processes and relationships, with causes and effects — would occur in subsequent years, and Aldo Leopold would be involved in working out the implications of that transformation. At the start, however, it is probably safe to say that he was attracted more by his love of the outdoors and the excitement of the new conservation movement than by the intricacies of ecology.

ALDO LEOPOLD WAS BORN in Burlington, Iowa, on January 11, 1887, the son of a prominent manufacturer of finest-quality walnut desks and grandson of a German-educated landscape architect who designed a number of public buildings and parks in Burlington. He grew up in a mansion high atop a limestone bluff overlooking the Mississippi River, where the thin, stony soil meant the family had to work unceasingly to encourage the array of wildflowers, trees and shrubs they so enjoyed. Down the bluff and across the railroad tracks was the big river itself, migratory pathway for a quarter of the ducks and geese of the continent, its bottomlands a year-round wildlife wonderland for a growing boy. In those days there were no restrictions on hunting methods or seasons or bag limits, save only those evolved as a personal code by the sportsman himself, and Aldo Leopold in later years recalled how his father had voluntarily quit shooting waterfowl in the spring, even though he still felt it was all right for his sons to shoot. During his school days in Burlington, at Lawrenceville Prep in New Jersey, and in Sheffield Scientific School at Yale, Leopold maintained a lively interest in field ornithology and natural history and began a lifelong practice of recording his observations daily in a journal.

In 1906 he began studies at Yale for a career in

forestry, newest and most appealing of the outdoor professions. Forestry only the year before had been enhanced as a career choice by transfer of some 100 million acres of federal forest reserves from the Department of Interior to the Department of Agriculture for administration by the newly designated U.S. Forest Service, headed by Gifford Pinchot. The reserves had been set aside beginning in 1891 because of fear of impending timber shortage and the effects of forest destruction on water supply, but they had not been adequately administered. Pinchot's accomplishment was to win support for public retention of the forests "for the permanent good of the whole people;" and to forge an organization of scientifically trained professionals capable of managing them for sustained production of timber, protection of watersheds, and grazing. The concept of sustained yield and wise use of resources, of management according to high standards of professionalism, efficiency, and public purpose, was the essence of the conservation idea espoused by President Theodore Roosevelt and elevated to the status of a national cause during the years when Aldo Leopold was studying forestry at Yale. The Yale Forest School, the first graduate school of forestry in the United States, had been established in 1900 with an endowment by the Pinchot family to provide a supply of "American foresters trained by Americans in American ways for the work ahead in American forests."

When Leopold graduated with a master's degree in June 1909, he joined the Forest Service and was sent off to Arizona and New Mexico territories, where national forest administration was being organized in a new Southwestern District (District 3). That first summer, an utter greenhorn from the East, he was assigned to head a six-man reconnaissance party mapping and cruising timber in the wilderness fastness of the Blue Range, in the Apache National Forest of east central Arizona. The seasoned locals and one Harvard tenderfoot on his crew were not as enamored as Leopold of roughing it on beans and biscuits; they did not appreciate his leaving them with the work while he went off exploring or chasing after Indians who were "making jerky"; and they considered his management of the technical reconnaissance as entirely incompetent.

But experience and promotions came fast in those days, and by 1912 Leopold was supervisor of the Carson National Forest in northern New Mexico, a million acres supporting 200,000 sheep, 7,000 cattle, 600 homesteads, and a billion feet of timber. He married Estella Bergere of a prominent old Spanish land grant family, built a home near the forest at Tres Piedras, and revelled in the responsibilities of being a forest supervisor, to his mind far and away the most satisfying post in the Service. In April 1913, while settling a range dispute in a remote area of the forest, he chanced to get caught

in a flood and then a blizzard and had to sleep in a wet bedroll. Within days inflammation set in in his knees, so severe he could not ride. A country physician, wrongly diagnosing it as rheumatism, prescribed the worst possible treatment, and by the time Leopold got to a doctor in Santa Fe he was bloated and near death, a victim of acute nephritis.

Eighteen long months of recuperation followed before he was strong enough to undertake even light office work. He had plenty of time in the interim to read, to fish, and to think. We are not certain what he read, but we can imagine he turned to the eleven-volume Riverside edition of Thoreau's works he had received as a wedding gift, and to southwestern history and the narratives of the explorers and naturalists — Lewis and Clark, James O. Pattie, George F. Ruxton, Francis Parkman, John Burroughs, Ernest Thompson Seton — which fascinated him all his life. One of his colleagues on the Carson, Raymond Marsh, has suggested that these months of enforced inactivity and contemplation marked a decisive change in Leopold's outlook. By the time he returned to work as acting head of the office of grazing at District 3 headquarters in Albuquerque, he was beginning to realize there was no hope of resuming the strenuous, glorious field existence of a forest supervisor. A recurrence of the disease, which could be brought on by overexertion, was considered in all cases fatal. It was at this juncture that Leopold became involved in wildlife conservation work.

Americans had so depleted their stock of native wildlife by indiscriminate hunting, whether for market or sport, and in some instances by wholesale destruction of habitat, that by the late nineteenth century many species were in imminent danger of extinction and the future of sport hunting appeared bleak indeed. Certain segments of the public, notably sportsmen from the eastern states, had begun to organize to promote stricter game laws and enforcement, abolition of market hunting, and creation of game preserves for threatened species. Theodore Roosevelt organized a select group of politically well-placed big-game hunters into the Boone and Crockett Club in 1887; the National Association of Audubon Societies dates from 1902; William T. Hornaday put together his Permanent Wildlife Protection Fund during 1910-1912; and in 1911, on a somewhat different tack, the American Game Protective and Propagation Association was founded, with partial funding from sporting arms and ammunition manufacturers, to begin developing scientifically grounded wildlife conservation programs. Also during these years practically all the states established some sort of fish and game administration, although these agencies tended at first to be inadequately staffed by political appointees.

In the southwestern mountains, which did not attract substantial Anglo-American settlement until after about 1885, wildlife scarcity was just be-

ginning to be felt when Aldo Leopold arrived on the scene. Although most of the remaining game animals, especially deer and turkeys, were on national forest lands, the Forest Service had no legislative mandate to administer its lands for wildlife or recreation or indeed for anything but timber production and watershed values. In the case of wildlife, an added problem involved jurisdiction. Under English common law tradition dating back to the Magna Carta, wildlife was regarded as the property of the people as a whole. Historically, it fell to the jurisdiction of the several American colonies and subsequently to the states, rather than to the private landowner, as in the continental European system, or to the federal government, which even today owns a third of the land area of the nation. But the new states of Arizona and New Mexico, admitted to the Union in 1912, did not have enough game wardens to effectively patrol the vast roadless acreages of the forests. Ever alert to strategic opportunities for building a constituency who would support federal retention and management of the forests, the Forest Service quickly concluded cooperative agreements with Arizona and New Mexico under which forest officers would be deputized to help enforce state game laws. Rangers were on the ground anyway and could apprehend violators while performing their other duties. So went the theory, but in practice not a single arrest was made up to the time Aldo Leopold became involved in 1915.

Leopold may have been responsible for overseeing the cooperative agreements as acting head of the office of grazing. In any event, by June 1915 he managed to get himself assigned almost full-time to organizing game and fish work in the Southwestern District. He immediately prepared a mimeographed "Game and Fish Handbook," explicitly defining the duties and powers of forest officers in cooperative game work, which attracted favorable attention back in Washington and in other forest offices around the country as well as in the Southwest. In October he was host to Dr. William T. Hornaday, director of the New York Zoological Park, president of the Permanent Wildlife Protection Fund, prolific writer and longtime crusader in the cause of wildlife conservation, who spent several days in Albuquerque on a western tour to drum up support for the "Hornaday Plan" for national forest wildlife refuges. Hornaday had evolved from an avid hunter to a strict protectionist, bitterly opposed to most hunting whether for meat or for sport. He could be notoriously caustic toward fellow conservationists less extreme than himself, but there was no question about his ability to muster public sentiment.

Whether inspired by Hornaday or by his own consciousness of needs and opportunities, Leopold devoted the next few months to stumping the district. He met with local forest officers and citizens

to organize local game protective associations, and promoted strict enforcement of game laws, eradication of predatory animals, creation of game refuges, and restocking of depleted lands and waters. His unabashed use of the term game rather than wildlife was itself evidence of his commitment to perpetuate sport hunting. W. T. Hornaday notwithstanding. Extraordinarily persuasive in personal contact, he proved himself a master at appealing to diverse interest groups including not only sportsmen and foresters but businessmen, for whom he painted a glowing picture of the region's potential as the most valuable vacation ground in the world, ranchers, whom he attracted to the refuge idea by the prospect of securing sportsman cooperation in the predator war, and even Indians in pueblos bordering the forests. We have his own description of his feats, prepared for his Yale class record, in which his ardor for the cause got the better of his modesty:

We have about twenty million acres of Forest in this District, part of which is unfit for livestock, and on these waste lands I ultimately plan to raise enough game and fish to provide recreation for twenty thousand people and bring \$25,000,000 a year into the country. This is an ambitious project but I know it can be done and I have got the public to where they are about ready to believe me. I am organizing game protective associations over both states, securing the reintroduction of locally extinct species, stocking hundreds of waters with trout, fighting suits for violation of the game laws, giving illustrated lectures to the public, hammering on game protection through the newspapers, raising a fight on predatory animals, and have written a book outlining plans, ways, and means. While making good progress I think the job will last me the rest of my life.⁶

In the midst of this activity, late in 1915, Leopold was asked to accept a detail as editorial assistant in the Washington office of the Forest Service. Not wanting to leave the game protection movement before it was ready to stand on its own, he declined the assignment, only to be officially ordered by the Chief Forester to accept it. He responded with a long letter explaining that because of the uncertainties of his health and his inability ever again to do strenuous field work, he had to watch his opportunities carefully if he did not want to end up in a "dead" job like information work. "To speak plainly," he added in a handwritten note, "I do not know whether I have twenty days or twenty years ahead of me. Whatever time I may have, I wish to accomplish something definite." For him, that something was obviously game protection. As long as he could work on game protection through the Forest Service he preferred that, but now it seemed to be a choice between abandoning either the Service or his chosen work. "To abandon a chance at a life field in favor of a sure job at nothing-at-all,"

he concluded, "would be playing quitter."

The order was changed, and Leopold stayed on with the Service in Albuquerque. His zealous efforts in an unconventional field and the amount of public attention they attracted might well have been disturbing to more traditionally utilitarian foresters. Indeed the Service remained reluctant to commit men and money to the multi-faceted program of game restoration that Leopold envisioned. Yet ranking officers in District 3 seem to have gloried in his organizing feats, perhaps because they viewed his work as strengthening the Forest Service in its nascent struggle with the National Park Service.

Establishment of the Park Service in the Department of Interior in 1916 initiated decades of perennial behind-the-scenes jockeying between Agriculture and Interior for control of recreational lands. Anything the Forest Service could do to demonstrate the potential for recreation compatible with other more economic uses of the forests would help it to maintain control over prime lands coveted by Interior for new national parks. Hunting was one such form of recreation not provided for in the parks. Another was leased sites for summer homes and commercial recreation establishments, authorized in the Agricultural Appropriations Act of March 4, 1915, an act which marked the first significant congressional recognition of recreation as a legitimate use of the forests.

It was Leopold who was charged with planning recreational uses in the Southwestern District. After his initial splurge of activity in game protection, he had to devote his time increasingly during 1916-17 to consulting with local forest officers on recreational working plans, laying out homesites and public campgrounds, developing private and commercial leasing policy, devising adequate sanitation facilities and regulations, and preparing promotional literature. His reluctance to see certain areas subdivided for recreational "improvements" would lead him in a few years to promote yet another substantial innovation in Forest Service recreation policy, establishment of a system of roadless wilderness areas.

But game conservation remained a goal for which he continued to press both within the Service and as an all-absorbing spare time hobby — this is, when he was not down on the Rio Grande with his four-year-old son, Starker, shooting doves and ducks. He published articles on game conservation, forest policy, and ornithological observations; he started a number of personal research projects; and he became involved, through wide-ranging national contacts, in battles for federal legislation dealing with refuges and migratory waterfowl. As secretary of the New Mexico Game Protective Association he

⁶"For the 1908S. Class Record, Yale University," ca. 1916, Aldo Leopold folder, Sheffield Scientific School, Yale University.

⁷AL to A. C. Ringland, 14 February 1916, LP 11 M1, Federal Record Center, St. Louis.

edited its official bulletin, *The Pine Cone*, a quarterly newspaper which he had founded in December 1915 as an oracle of the new movement, and through it spearheaded the drive for a non-political

commission form of state conservation administration. His role in

"the awakening of New Mexico" won him the gold medal of W. T.

Hornaday's Permanent Wildlife Protection Fund in 1917 and a

special commendation from Theodore Roosevelt — not to mention attractive job offers back East, which he declined.

When the stringencies of World War I forced discontinuance of virtually all game work in the Southwestern District, Leopold actually

left the Forest Service in January 1918 to take a position as secretary of the Albuquerque Chamber of Commerce, where he hoped he could more effectively promote the cause of game conservation. Through the chamber he also promoted victory gardens, drainage of the Rio Grande Valley for agriculture, public parks, and a civic center for Albuquerque, with indigenous Spanish architecture.

But commerce was not all conservation and the Forest Service was a compelling institution. In 1919 he was back, as assistant district forester in charge of operations, a position which entailed responsibility for business organization, personnel, finance, roads and trails, and fire control on the twenty million acres of national forests in the Southwest. It was as an administrator, not as a land manager, scientific researcher or conservationist, that he made his mark in the next five years. Yet along with his very real accomplishments in developing more efficient personnel practices, fire control procedures, and forest inspection methods went a deep and active commitment to other less traditional realms of Forest Service concern, such as watersheds, wildlife, and wilderness. He helped stimulate erosion control research and prepared a watershed handbook for the district. As he crisscrossed the forests on inspection trips he made notes on wildlife species and habitat conditions for a book he intended to write with two sportsman-colleagues on southwestern game. Not least important was the groundwork he laid for administrative designation in 1924 of over a half-million acres in the Gila National Forest as wilderness, setting the pattern for the system of roadless wilderness areas which was given force of law in the National Wilderness Preservation Act of 1964.

Aldo Leopold's writings during his years in the Southwest reveal both his enthusiasm for the conservation idea and his evolving awareness of environmental interrelationships. He applied the concepts of wise use and sustained yield to game conservation as well as forestry and in both game and forestry writings sought to develop standards of skill and efficiency in the management of resources. His concern for conservation began to merge with his interest in ecological science as he searched for criteria of environmental quality in southwestern forests, watersheds, and rangelands and probed for a more comprehensive philosophy on the relations of man and environment.

Although Leopold was unquestionably familiar with the concepts of plant ecology emanating from the Universities of Chicago and Nebraska, particularly as they described the distribution and succession of vegetation types, his thinking does not seem to have been dominated by them. Every bit as important as origins for his ideas about the southwestern environment were his habit of keen observation and his historical curiosity, coupled with his voracious reading of the great naturalists and the journals of the early explorers. In fact, Leopold may be said to have been thinking ecologically, in the functional or holistic sense, before ecological science had evolved a conceptual framework capable of supporting such thought.

While leading plant ecologists were still describing normal successional stages as a response to average environmental factors, Leopold through careful observation and inferential reasoning arrived at an essentially functional interpretation of vegetation change and soil erosion on southwestern watersheds — an interpretation which integrated soils, vegetation, topography and climate, geologic and human history, lightning fires and livestock grazing into a single system of interactions. Notably deficient in his early interpretation, on retrospect, was the wildlife component. Although he was among the earliest to appreciate the extent to which wildlife populations were limited by environmental factors, factors which could be manipulated to achieve greater production or control of the game resource, he did not yet view wildlife in its functional interrelations with the total land community. But this detracts hardly at all from the scope of his achievement. Leopold was left with profound respect for the fragile equilibrium of the arid Southwest, in which man's activities in one part of the system were capable of inducing massive, sometimes progressive, usually unanticipated and too often unrecognized changes in other part of the system. It was an environment set, as he termed it, on "hair-trigger." As a conservationist he was concerned with the implications of his interpretation for human action. Action involve changes not only in patterns of land use but also in institutional arrangements affecting land use and, even more fundamentally, in the perception

attitudes, and values of a people. Leopold saw all this at least as early as 1923 and expressed it in a manuscript, "Some Fundamentals of Conservation in the Southwest."

Casting about for philosophical underpinnings for his interpretation of the hair-trigger equilibrium in the Southwest, he hit upon the organicism of the Russian philosopher, P. D. Ouspensky, who regarded the whole earth and the smallest particle thereof as a living being, possessed of soul or consciousness. "Possibly, in our intuitive perceptions, which may be truer than our science and less impeded by words than our philosophies," Leopold wrote, "we realize the indivisibility of the earth — its soil, mountains, rivers, forests, climate, plants, and animals, and respect it collectively not only as a useful servant but as a living being."⁸ In later years as ecological science became more functional and holistic, he would begin to couch his land ethic in ecological concepts rather than in the terminology of the philosophers.

JUST AS HIS ADMINISTRATIVE, scientific, and philosophical concerns were converging in the southwestern environment, Leopold in 1924 was asked to accept a transfer to the U. S. Forest Products Laboratory in Madison, Wisconsin. The Forest Products Laboratory was the principal research arm of the Forest Service at that time, although the nearly 150 chemists, engineers, physicists, mechanics, and foresters on its staff were concerned almost exclusively with research on forest products rather than with the growing of trees. No doubt because of his proven skill as an administrator and his sympathetic understanding of a broad range of research needs, Leopold was offered the position of associate director, with the understanding that there was "more than a possibility" that he would become director within a year. Moreover, he would have the encouragement and support of the Washington office to move laboratory activities into closer correlation with the field units of the Service and the whole forest conservation movement. Having rejected at least five previous offers for promotion which would have entailed leaving the Southwest, he accepted the laboratory position and reluctantly moved his family. But the incumbent director did not resign, and Leopold spent four frustrating years in the number two slot, fighting a mountainous administrative load. He tried to spur interest in utilization of waste wood and inferior species, in genetic and site research for improved tree quality, and in other aspects of laboratory-field cooperation — all to devastatingly little avail. One can imagine that he felt constrained in an institution whose primary concern was with utilization of the tree after it was cut, when everything about him made him interested in the forest as a living community.

He made what shifts he could to function effectively in the laboratory setting, but his principal release during those years must have come from his spare-time hobbies. Primary among these was his book, *Southwestern Game Fields*. The book was to include life histories of southwestern wildlife species and an illustration of the principles of game management as applied to a single species, deer, in a particular area, the Gila Wilderness. He prepared drafts of various chapters for two different versions of the book and circulated them among his colleagues in New Mexico for comments, but an unanticipated irruption of deer on the wolfless Gila coupled with his own distance from the scene forced him in the end to abandon the manuscript. Despite the time he spent writing, Leopold did get out a good deal on weekends into the countryside around Madison. He also managed to pick up a new hobby which infected the whole family — that is, archery, for which he made his own bows and arrows and even his glues. The new avocation justified several return visits to the Southwest to try his luck on the superabundant Gila deer.

Leopold also continued his involvement in conservation politics. No sooner did he arrive in Wisconsin in 1924 than he was swept into the local chapter of the Izaak Walton League, recently organized by an able and spirited group of citizens to promote a stronger state forestry program and a more effective, less political state conservation administration. Having had experience drafting and promoting a proposal for a state game commission in New Mexico, enacted in 1921, he was a key figure in the effort which culminated in Wisconsin's Conservation Act of 1927. The act provided for a conservation department headed by a director responsible to six unpaid commissioners, appointed by the governor for staggered six-year terms. Unlike the New Mexico commission which was concerned only with fish, game, and enforcement, the Wisconsin commission had responsibility for forests as well.

It should be noted that eastern states like Wisconsin had no system of national forests to fall back on, most of the public domain in the East having been taken up by private interests before the era of federal forest reserves. Wisconsin's magnificent white pine forests had been virtually mowed down in the westward march of the timber barons during 1870-1910. The Weeks Law of 1911 provided for federal repurchase of cutover forest lands in the eastern states and acquisition was begun under this law in the early 1930s for two national forests in Wisconsin, the Chequamegon and the Nicolet. But the bulk of public forest acreage in Wisconsin, nearly all of it cutover, tax-reverted land, was acquired by the state or the counties under a cluster of enabling laws passed in the 1920s and administered by the new conservation commission.

⁸"Some Fundamentals of Conservation in the Southwest," ca. 1923. LP 6B16.

With his professional background in forestry and his personal interest in game management, Leopold was the natural candidate for director of the conservation department under the new commission, so he and his Waltonian cohorts thought, and he was prepared to leave his position with the Forest Products Laboratory as soon as the appointment could be secured. But the governor and his appointed commissioners did not oblige, and Leopold was to experience more than a decade of bitter frustration in his repeated attempts to cooperate with the conservation administration he helped create.

By 1928, however, Leopold was determined to leave the laboratory for a position more in line with his consuming interests in wildlife and conservation. Declining more secure opportunities with the Forest Service and various universities, he chose to strike off on his own into a new profession — game management. Under funding from the Sporting Arms and Ammunition Manufacturer's Institute, he began conducting game surveys of the north central states. A game survey, as Leopold envisioned it, was the first step in game management; it involved appraising the environmental factors affecting productivity of game in a particular region and recommending policy measures necessary for game restoration. It was also "an attempt to change the orientation of thought and action on wildlife conservation" — to show, in terms of local conditions and practices, the difference between the old idea of restricting the kill and the new idea of building up the supply through management of habitat. From July 1928 to January 1930 Leopold traveled through Michigan, Iowa, Minnesota, Ohio, Mississippi, Illinois, Indiana, Wisconsin, and Missouri, spending two weeks to two months in each state, visiting a total of over 300 localities and consulting with over 600 state and local officials, scientists and sportsmen. He prepared typewritten reports, charts and maps for each state, and summarized his findings in his *Report on a Game Survey of the North Central States*, published early in 1931. Under institute funding he also set up a series of game research fellowships at five universities and delivered a course of lectures on game management at the University of Wisconsin.

The game survey and related work, coupled with his earlier activities in the Southwest, established Leopold as one of the country's foremost authorities on native game. Shortly after beginning the survey, he became chairman and chief draftsman of a committee charged with formulating an American game policy. Adopted by the Seventeenth American Game Conference in 1930, the game policy signalled a new approach to wildlife conservation in the United States. Up to that point the emphasis had been either on crusading, in the manner of William T. Hornaday, for hunting laws, refuges and other devices to preserve rem-

nants of diminishing species, or on artificial propagation by game breeders, gun club operators, and state game departments. The new policy, like Leopold's game survey, stressed the idea of production in the wild. It advocated encouragement of habitat management by the landholder, whether public or private, forester, farmer, or weekend recreationist, and experimentation in various methods of bringing landowners, sportsmen, and the non-shooting public into productive relationship with each other. Game production was not a matter of witch-doctoring or abstract theorizing. With all its emphasis on experimentation, the policy also stressed the need for solid scientific foundations and the training of men for administration, management, and research. In short, it was necessary to make game a profession.

Aldo Leopold is acknowledged the "father" of the profession of wildlife management in America. One man can hardly establish a profession, but Leopold's stamp has been on the profession so conspicuously from its beginnings around 1930 to the present that the title is perhaps justified. Professionalism in his estimation was a matter not so much of academic degrees as of point of view, technical understanding, standards, and skill. Yet to secure these professional attributes on a broad scale required a variety of institutional arrangements for the conduct and application of research, for the development of specialized vocational, technical, and scientific training, and for the establishment and maintenance of high standards of technical performance and ethical conduct. Others were teaching and working in the wildlife field and even in wildlife management before Leopold, but no one saw more clearly than he the need for sound institutional foundations — in the universities, in government agencies, and in private organizations — nor worked more effectively to create them. In this he was undoubtedly inspired by the example of forestry, which emerged as a area of employment in the earliest years of the century and within decades had developed the institutional structure to support a complete transformation to a professional basis at the field level in the U. S. Forest Service at least. At first, Leopold had called upon his colleagues in the forestry profession to develop a science of game management; but the turning point in his career came in 1928 when he left the Forest Products Laboratory to begin laying the foundations for a distinct new profession.

It takes confidence in one's own abilities and faith in the future to leave the security of an established institution like the U. S. Forest Service and strike out, midway in one's career, into a profession not yet born. But for Leopold, with his compelling desire to *build* something, with his life as well as on the land, it was a characteristic move. As it happened, the stock market crash of October 1929 and the ensuing depression knocked

out, his funding from the arms manufacturers by 1931, leaving him with a wife and five children to support and a letterhead proclaiming his availability as a consulting forester. He did manage to pick up a few months' work, including a second game survey of Iowa and a survey of potential game management areas in Wisconsin. But nothing better illustrates his optimism and commitment than the calm discipline with which he applied himself, unemployed during what for most Americans were bewildering, hopeless years, to writing a textbook for the new field.

Based on the most recent developments in wildlife research and permeated with Leopold's rare esthetic and philosophic sense, *Game Management* (Scribner's, 1933) is still regarded as a basic statement of the science, art, and profession of wildlife management. It has been continuously in print since 1933 and makes fascinating reading for the layman as well as the professional.

In writing *Game Management* Leopold not only utilized his own unpublished manuscript on southwestern game, the findings of the game survey, and his lectures at the University of Wisconsin, but also drew on the work of his predecessors and colleagues in the wildlife field. Unquestionably the most significant early research in game management was that begun in 1924 by Herbert L. Stoddard of the U. S. Biological Survey, investigating quail populations in Georgia in cooperation with the owners of huge private quail preserves. Stoddard had made important findings on the role of fire in maintaining favorable quail habitat and productive timber stands, and on the function of predation in adjusting population levels and promoting vigorous stock; and he produced a classic life history and management study, *The Bobwhite Quail* (1931). Leopold drew also, perhaps more than he realized or acknowledged, on the practical experience of another extraordinarily able wildlife manager, Wallace Byron Grange. Grange had been the first superintendent of game for the Wisconsin



Forest Service

Conservation Department, and would later author yet another wildlife management classic, *The Way to Game Abundance* (1949). Stoddard, Grange, and Leopold worked together after 1928 supervising the Sporting Arms wildlife research fellowships, which supported numerous significant findings on upland game birds. Most notable was the work of Paul Errington at the University of Wisconsin on the relationship of predation to environmental carrying capacity and population density in the northern bobwhite.

Although Leopold relied on the techniques and findings of Stoddard, Grange, Errington, and other field researchers, not to mention his own work, for much of the substance of his book, he cast much of the material in terms of ecological concepts being formulated by still other scientists, including the eminent British ecologist, Charles Elton. Elton, whose first major work, *Animal Ecology* (1927), signalled a gradual shift from a primarily descriptive to a functional approach in ecology, was one of the first to employ the concept of ecological niches, in the sense of the functional status of an organism in its community, and he elaborated the concept of food chains as the basic organizing principle of the community. Leopold had met Elton in 1931 at the Matamek Conference

Aldo Leopold, brother Carl, and their father — going hunting.



Photo courtesy of Mrs. Marie Lord.

on Biological Cycles and the two had struck up an immediate and enduring friendship. That Leopold by 1933 should have integrated the new functional concepts of ecology so well with field observations and research in game management as to produce a book which is still regarded as a classic in the field is unquestionably a remarkable accomplishment. Yet it should be noted that the word "ecology" scarcely appears in the text and there is but one reference in the index to "ecological niche." The compelling idea for Leopold in 1933 was not the idea of ecology so much as the idea of management.

Management, the art of producing sustained yields of wild game, had been the key to his efforts almost since he became involved in game conservation back around 1915. Corollary to this was the idea of control, which he defined in *Game Management* as "the coordination of science and use." "The central thesis of game management," he said in his preface, "is this: game can be restored by the creative use of the same tools which have hereto-

fore destroyed it — axe, plow, cow, fire, and gun." Management was the purposeful and continuing alignment, or control, of these forces. In his emphasis on management, Leopold was simply extending to wildlife, through the medium of rudimentary ecological science, a faith in the possibility of intelligent control which goes back at least to W. G. McGee, Gifford Pinchot, and the origins of the conservation movement in America.

Leopold's faith in the idea of management, conceived as control, extended to the environment of man as well as of game. "I will not belabor the pipedream," he told the Southwestern Association for the Advancement of Science in a major address, "The Conservation Ethic," in May 1933. "It is no prediction, but merely an assertion that the idea of controlled environment contains colors and brushes wherewith society may some day paint a new and possibly a better picture of itself." The economic cards, especially in the depths of a depression, seemed to be stacked against the most important reforms in land use. But permanent though economic laws may be, Leopold pointed out, "their impact reflects what people want, which in turn reflects what they know and what they are." His was a plea for ecological understanding, for the extension of ethics from the realm of human social relations to the whole land community of which man was an interdependent member. But again, as in *Game Management*, the emphasis was not so much on the concepts of ecology as on the use of tools — tools economic, legal and political, as well as scientific and technical — to create a more enduring civilization.⁹

AN OPPORTUNITY TO TRY out some of his ideas about management was not long in coming. In August 1933 a chair of game management was created for Leopold in the Department of Agricultural Economics at the University of Wisconsin. Supported by an unprecedented five-year grant from the Wisconsin Alumni Research Foundation, the chair could be justified in the midst of a depression by its potential contributions in the realm of land utilization — development of a productive game crop — on Wisconsin's cutover, tax-reverted, burned-out and eroded lands; hence the rationale for placing it with agricultural economics. Leopold had been angling for a position at the university for years, and it would hold him for the rest of his life. (A one-man Department of Wildlife Management was established by the university in 1939.) Leopold set up a small graduate-training operation through his chair and established a number of farm demonstration areas near Madison where he and his students could experiment with cooperative farmer-sportsman arrangements, get practical land

⁹"The Conservation Ethic," *Journal of Forestry*, 31:6 (October 1933), pp. 634-643.

management experience, and conduct field research on wildlife. He served also as Research Director of the newly established University of Wisconsin Arboretum, working with professors and students from various disciplines to plan and conduct the restoration of native ecological communities.

Though he may have thought he would be left alone to concentrate on working out ideas in his own little corner of the country, events in Washington drew him abruptly into problems and programs on the national scene and dramatized, almost immediately, both the necessity and the difficulty of what he was trying to do. Establishment of Leopold's chair came just as President Franklin D. Roosevelt's New Deal was shifting into high gear and millions of federal dollars suddenly became available for work relief projects and purchase of submarginal lands under AAA, CCC, FERA, WPA, ECW, SES, and other alphabetical apparitions. Inauguration of all these programs, each with at least a potential wildlife component, generated an extraordinary demand for trained supervisory personnel, a demand which would obviously be met because there was money, but not necessarily met well. Leopold placed a few of his students in technical field positions with federal agencies and himself served as advisor to a number of conservation projects in Wisconsin, stressing in each case the need for cooperative integration of land uses — farming, forestry, wildlife and recreation — and the need to tailor programs to local conditions and to involve individual landholders. But thousands of men were clamoring for jobs, and money was waiting to be spent. The inevitable result was roads, trails, ditches, dams, wherever and as soon as they could be built. The more he saw the more disillusioned he became about the prospects for ever achieving integrated conservation from the fractionated functioning of single track relief agencies.

In early 1934 he served with the cartoonist J. N. (Ding) Darling of Iowa and Thomas Beck of Collier's Publishing Company on the President's Committee on Wildlife Restoration. The three were charged with drafting a proposal for dovetailing Roosevelt's \$25 million program for federal purchase of submarginal farmland with a program of wildlife habitat restoration. Leopold stood alone on the committee in arguing for more research and administrative coordination by the states, which he thought were in a better position than the federal government to deal with local conditions and to foster the practice of game management by private landowners. When he was asked several months later to take over as Chief of the U. S. Biological Survey, the federal agency responsible for implementing the wildlife restoration program, he declined the offer. He was interested more in research and demonstration than in land acquisition, and he thought it might prove just

as important in the long run for him to bring research to actual fruition in Wisconsin as to try his hand at starting it nationwide, especially when there were as yet no federal funds in sight for research. Through his continuing contacts with federal officials and through scientific and professional societies he continued to press for establishment of research programs, especially at the state level. His efforts were rewarded in 1935 with creation of the Cooperative Wildlife Research Unit Program, which provided for research units in nine land-grant colleges across the nation. But to his bitter disappointment his own university, pioneering institution in the field of game management, failed to get one of the units because the Wisconsin Conservation Commission refused to cooperate.

From the start, Leopold had been limping along with a dearth of research funds, less than \$4,000 a year, to support all his students. Yet he resisted the temptation to push students quickly through the mill and out into the burgeoning federal agencies. Rather, he insisted that they attain a solid foundation in a wide array of related disciplines, acquire actual field experience in technical game management, and carry out a well-conceived, publishable research project at the master's as well as the doctoral level. He took only as many students as he had time to work with individually, selecting them for their promise in the new field rather than for their past record. Among his students who are now almost without exception leaders in the fields of wildlife or natural resource management, Leopold was and still is known simply as "the professor," a designation he always cherished.

Many of Leopold's early students have remarked at his youthful, inquiring mind, his openness to new ideas and his willingness to move in new directions. They had ample demonstration of these qualities in the mid-1930s, for it soon became apparent that control of game populations would be more difficult than they had thought. They had started at both ends at once, doing life history research on the various species and putting in food-patches and cover plantings on the demonstration areas in an effort to build up populations. But key species like quail and grouse, on which they had concentrated most of their efforts, failed to increase as expected, oscillating rather in response to some unknown cause. Elsewhere in the country deer herds mushroomed out of control, and game officials were finding it nearly impossible, in the absence of solid research-based fact, to win public support for adequate reduction. Hence Leopold and his students found themselves moving increasingly in the direction of more basic ecological research on animal population mechanisms — "deep-digging" research, Leopold called it — and putting less trust in simple manipulations of habitat.

The move toward more basic ecological research

in the mid-1930s was more than a quest for new facts or relationships. A close analysis of Leopold's writings in these years reveals a subtle though highly significant shift in his whole intellectual orientation, a shift somehow symbolized by three events in his life in the year 1935. In January he joined with Robert Marshall and others to found the Wilderness Society, a national organization to protect and extend the increasingly vulnerable system of wilderness areas which they had been instrumental in creating. For Leopold the new society had philosophical as well as political significance. It was "one of the focal points of a new attitude — an intelligent humility toward man's place in nature." This new attitude involved a commitment to preserve threatened species, especially predatory animals such as wolves and grizzlies, which Leopold now realized were essential to the healthy functioning of ecosystems. The year 1935 marked a reorientation in his thinking from an historical and recreational to a predominantly ecological and ethical justification for wilderness.

In April, Leopold acquired the worn-out, abandoned farm on the Wisconsin River that was to become the setting for most of the nature sketches in *Sand County Almanac*. "The shack," as the Leopold family fondly dubbed the old chicken house they refashioned into essential lodgings, became weekend and vacation headquarters for the soul-satisfying experience of restoring the land to ecological integrity.

In autumn of 1935 he spent three months in Germany on a Carl Schurz travelling fellowship, studying German methods in forestry and wildlife management. It was his first and only trip abroad and an eye-opening experience. His confrontation with the ecological and esthetic costs of the highly artificialized German system of management, particularly with respect to deer and forests, challenged some of his most basic assumptions about the ultimate possibility of environmental control and led him to a re-evaluation of the objectives of wildlife management. No single event can cause a transformation in the intellectual development of so integral a

thinker as Leopold, but surely the impact of the German experience, his redefinition of the wilderness idea, and the convergence of observation, activity and reflection at his sand county shack signal in important ways the beginnings of his mature philosophy.

The mid-1930s were significant years also in the biological sciences, especially in the realms of ecological and evolutionary theory. Ernst Mayr in his monumental *Animal Species and Evolution* (1966) identifies the 1930s as the period when the various discrete lines of specialization in evolutionary biology "almost suddenly fused" into a broad unified theory. And the great AEPPS (Allee, Emerson, Park, Park, and Schmidt, *Principles of Animal Ecology*, 1949) cite these years as a time of acute interest in theoretical ecology and ecological aspects of evolution. Evolution and ecology were coming to be recognized as two windows on the same process. Developments in the biological sciences undoubtedly helped Leopold conceptualize his new approach to wildlife and land management, but one gains the feeling from his writings that his experiences in game management, his trip to Germany, and his activity at the shack were more instrumental in effecting the transformation in his thinking.



Author Susan Flader with Mrs. Aldo Leopold.

Leopold's earliest comprehensive statement of the new ecological viewpoint was his paper, "A Biotic View of Land," read in June 1939 before a joint meeting of the Society of American Foresters and the Ecological Society of America. Here he first presented the image of land as a biotic pyramid — "a fountain of energy flowing through a circuit of soils, plants and animals" — and drew ecological interrelationships into an evolutionary context. The whole trend of evolution, he suggested, was to elaborate and diversify the biota, to add layer upon layer to the pyramid, link after link to the food chains (energy channels) of which it was composed. He asserted, further, that the normal circulation of energy among the various levels of the pyramid — the stability or healthy functioning of the system — depended on the complex structure of the whole, much as the upward flow of sap in a tree depends on its complex cellular organization. Structure, he pointed out, meant the characteristic numbers as well as the characteristic kinds and functions of species. The old approach of economic biology which conceived of the biota as a system of competitions and sought to give a competitive advantage to those species deemed "useful," whether corn or pines or deer, as against those deemed harmful or expendable, would have

Aldo Leopold



to give way to a new ecological approach which conceived of the biota as a single system, the land organism, "so complex, so conditioned by interwoven cooperations and competitions, that no man can say where utility begins or ends." Thus did Leopold express the transition from conservation as a preoccupation with supply and demand to conservation as a state of land health.¹⁰

The key idea in this essay was Leopold's assumption that there was a definite relationship between the complex structure and the smooth functioning of the whole — between the evolution

of ecological diversity and the capacity of the land organism for self-renewal, which he termed stability or land health. As testimony to the crucial role that this apparent relationship between diversity and stability assumed in Leopold's mature thinking, we have a number of unfinished manuscripts and manuscript fragments in which he wrote of "circumstantial evidence," "the tacit evidence of evolution," and even "an act of faith." Indeed, such a relationship is not proven even today, although we can be sure that it is no simple relationship.

The object of conservation in a system thus understood was to preserve the capacity for healthy functioning of the system, rather than primarily to protect individual animals, *a la* Hornaday, or to produce a shootable surplus, as in early game management. Three decades of experience trying to "control" wildlife populations by manipulating selected environmental factors had had a profoundly sobering effect on Leopold. A proper function of management, it now became apparent to him, was to encourage the greatest possible diversity in an attempt to preserve the widest possible realm in which natural processes might seek their own equilibrium.

Along with Leopold's greater consciousness of ecological enigmas and of the necessity for "deep-digging" research came an impatience with the prevailing emphasis on practicality and the insistence on "blood-and-feathers dividends" by wildlife men and government agencies. Although the name of the profession had changed in less than a decade from the rather too economic "game" management to the somewhat broader designation of "wildlife" management, a change reflected in the establishment and naming of the Wildlife Society in 1937, Leopold was already thinking more in terms of wildlife ecology. He looked forward to "an almost romantic expansion in professional responsibilities" in the wildlife field.

Speaking on "The State of the Profession" in his presidential address to the Wildlife Society in 1940, Leopold observed that wildlife men, who had begun with the job of producing something to shoot, might actually be contributing something far more important to the design for living. They might, without knowing it, be helping to write a new definition of what science was for. Most definitions of science dealt almost exclusively with the creation and exercise of power — "the idea of controlled environment," to use his own phrase of several years previous. "But," he was asking now, "what about the creation and exercise of wonder, of respect for workmanship in nature." Shootable game was no longer very important to many "emancipated moderns," he pointed out, and not much game could be produced anyway until the landowner changed his ways of using land. The landowner in turn could not change his ways

¹⁰"A Biotic View of Land," *Journal of Forestry*, 37:9 (September 1939), pp. 727-730.

until his teachers, bankers, customers, editors, governors, and trespassers changed their ideas about what land was for. "To change ideas about what land is for," he mused, "is to change ideas about what anything is for."¹¹

The new approach entailed not only a transmutation of values but also a renewed emphasis on broad public understanding. Deep-digging ecological research could invest wildlife with qualitative rather than merely quantitative value and, by revealing the drama of the land's workings, serve as a unifying force in a liberal education. Leopold's own Wildlife Ecology 118, an undergraduate course which he began offering in 1939, was a highlight in the intellectual development of practically every student who was fortunate enough to stumble upon it. Its objective, as he explained, was "to teach the student to see the land, to understand what he sees, and enjoy what he understands."¹²

This was the period, especially during the early 1940s when World War II drew away nearly all of his graduate students, that Aldo Leopold wrote most of the literary and philosophical essays for which he is best known: "Great Possessions," "Odyssey," "Wildlife in American Culture," "Thinking Like a Mountain." It was a period during which he was involved in recommending new policy directions for something like a hundred different professional societies and committees, conservation organizations, government agencies, research stations, conferences, magazines and journals. And it was also in the 1940s that he reentered the realm of conservation politics, serving as a member of the Wisconsin Conservation Commission from 1943 until his death. The job took a tremendous toll on him, largely as a consequence of the leadership role he assumed in an effort to win public acceptance for a substantial reduction in Wisconsin's deer population. It was his conviction that a man ought to expect to take on such responsibilities once in his lifetime.

Leopold's experiences in the public arena, particularly his efforts to bring about a reorientation in public thinking on the deer question in Wisconsin, reinforced his conviction of the need for an ecologically based ethic. Several times during the decade he struggled to express on paper his conception of an ecological ethic, and he finally succeeded sometime in late 1947 or early 1948. Drawing from his "Conservation Ethic" of 1933 the notion of the cultural evolution of ethics and from his later "Biotic View of Land" the concept of the evolution of ecological diversity, and adding

his strong conviction of individual responsibility for the health of the land, he produced his most important essay, "The Land Ethic." "A thing is right," he concluded, "when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise."¹³

These values, integrity (or co-evolved diversity), stability, and beauty, were fundamental to Leopold's thinking from the beginning. But like his notion of a land ethic, they acquired new meanings and implications throughout his life in response to his changing perception of the environment, so that they meant something quite different in the end from what they had in the beginning. The measure of this difference is in "Thinking Like a Mountain."

On April 21, 1948, Aldo Leopold died of a heart attack while helping his neighbors fight a grass fire that threatened his sand county farm. One week earlier, the book of essays for which he had been seeking a publisher since early 1941 was accepted by Oxford Press via long distance telephone. It was published in 1949 as *A Sand County Almanac* with "The Land Ethic" as its capstone.

Sand County Almanac represents the distillation of a lifetime of observation and reflection on the interrelations of ecology, esthetics, and ethics. Through it Aldo Leopold speaks to the present generation as he will to the future. The essays have a timeless quality, dealing as they do with ecological and evolutionary processes. Yet their strength comes from history, from Leopold's experiences in time, on the land.

Aldo Leopold's thinking was shaped by the land itself, and by his changing perception of it. He considered himself a field man. His thinking was not the product of books read or even of influential friends listened to, except as these made him think more deeply about what he saw in the land. It was his conviction that ecological perception was a matter of careful observation and critical thinking. It proceeded from a view of complexity to a sense of relatedness, concern with causes and consequences. Leopold was not afraid to ask "Why?" — but he did not attempt an answer seated at his desk. When one looks for nodes, critical junctures in his thinking, one finds them as often as not associated with some new field experience. He was extraordinarily willing to look and to see, and to alter the contours of his thinking about a problem if what he saw warranted it. He maintained a wide perspective on means and ends, a perspective which acquired breadth, depth and clarity during the course of his life but was never fundamentally altered. □

¹¹"The State of the Profession," *Journal of Wildlife Management*, 4:3 (July 1940), pp. 343-346.

¹²"The Role of Wildlife in a Liberal Education," *Transactions*, 7th North American Wildlife Conference (1942), p. 486.

¹³Aldo Leopold, *A Sand County Almanac and Sketches Here and There* (New York: Oxford University Press, 1949), pp. 224-225.

File Aldo Leopold

PROPOSED COMMEMORATIVE STAMP

50 YEARS OF WILDERNESS PRESERVATION
GILA WILDERNESS

Submitted By: The Gila National Forest, Southwestern Region,
U.S. Forest Service (Summer of 1973)

Suggested Date of Release: June 3, 1974

Suggested City for First Day of Release: Silver City, New Mexico 88061

Background Information:

In 1909, upon graduation from the Yale School of Forestry, a young forester named Aldo Leopold, (1887-1948), began his career with the Forest Service in the Southwest. His work in timber reconnaissance took him over many thousands of acres of undeveloped, untouched National Forest land. During this work Aldo Leopold saw much of nature as it was created, unspoiled by man. Through his intimate association with this virgin land, he began to sense the need to preserve some of these areas from the encroachment of man. This profound love of wilderness permeated his life and his work.

He attempted, at first unsuccessfully, to persuade others of this need. Convinced he was right, Leopold continued his efforts to secure an enduring resource of wilderness lands.

Promoted through various administrative levels of the Forest Service, he became Assistant District Forester in Albuquerque. His work entailed frequent inspection trips through the National Forests in Arizona and New Mexico. One trip took him to the Gila National Forest in southwestern New Mexico. There in the heart of a vast expanse of land not yet marked by man, Leopold found the area that he felt must be set aside as Wilderness. His inspection report reflected this burning conviction. Finally, his plea fell upon understanding ears.

The Gila Wilderness containing spectacular and remote scenery of the Gila country was designated as the Gila Wilderness on June 3, 1924. This initial unit of protected wilderness contained over 700,000 acres, encompassing the Mogollon, Diablo and Black Mountain Ranges. From that year forward, until their authority was superseded by the Wilderness Act of 1964, the Chief of



*The richest values of wilderness lie not in the days of
Daniel Boone, nor even in the present, but rather in the future.*
— Aldo Leopold (1887-1948)

the Forest Service and the Secretary of Agriculture have set aside many portions of other National Forests for such protection. The dominant theme of the Wilderness Act and the National Wilderness Preservation System of present times is to insure an enduring resource of wilderness for the nation.

Aldo Leopold was one of a new breed of practical romanticists appearing during the first half of the 20th century. He had a practical sense of social need. Leopold believed that the frontier had a beneficial moral and psychological impact on our nation. He once said, "Many of the attributes most distinctive of Americans, are due to the impress of wilderness and the life that accompanied it." Leopold was a man of many accomplishments, and later became one of the foremost conservationists of this country.

Wilderness is part of the American heritage. This nation was spawned in wilderness, and from the beginning of settlement, it has obtained sustenance from the boundless forest on every hand. The American wilderness has been interwoven into the Nation's folklore, history, art and literature. Even today, these wide expanses of forested mountains help shape the character of our youth. The Wilderness that witnessed the birth and early growth of this Nation, no longer spreads from ocean to ocean. But neither has all of it been tamed. Here as wild and as free as ever are over 14 million acres of Wilderness and Primitive area lands for the use, enjoyment and spiritual enrichment of the American people.

It is only fitting that our wilderness heritage, its initially preserved unit, the Gila Wilderness, and its originator, Aldo Leopold, be honored with a commemorative stamp on the 50th anniversary of this historical occasion. It is appropriate that this stamp be released in Silver City, New Mexico. This city is situated approximately 25 miles south of the Gila Wilderness and has long been recognized as the "Gateway to the Gila Wilderness".



The richest values of wilderness lie not in the days of Daniel Boone, nor even in the present, but rather in the future.
— Aldo Leopold (1887-1948)

"A Fierce Green Fire": Remembering Aldo Leopold

by Jack Lewis

Aldo Leopold has found a secure niche in the pantheon of American naturalists. It is not uncommon to see his work ranked with that of such giants as Henry David Thoreau, John Muir, and Rachel Carson. Historian Stephen Fox has called Leopold's *A Sand County Almanac* "easily the most admired, most quoted, most influential book in modern conservation," and Leopold's career "perhaps the most distinguished . . . in twentieth-century conservation."

Yet Aldo Leopold is not as well known as the luminaries now judged to be his peers. Several factors have obscured his brilliance. Leopold the man was gentlemanly and professorial, never a self-promoter. Moreover, he did not live to bask in the praise heaped on his most famous book, *A Sand County Almanac*. Thus, the growth of the Aldo Leopold cult has been slow: one enthusiastic reader of *A Sand County Almanac* recommending it to another, in a word-of-mouth network that now embraces tens of thousands of admirers the world over.

Integral to that cult is the story of Leopold's tragic death. On April 21, 1948, Leopold joined the fight against a grass fire that was threatening his rustic farm in the Sand Country of west central Wisconsin. Only the week before, he had received a long-distance call from the Oxford University Press confirming that *A Sand County Almanac* had been accepted for publication. Ironically, some of the most stirring passages in the *Almanac* were devoted to condemning the scorched earth policy of pioneers who had set fires to clear the same terrain decades before.

Now Leopold was face to face with the fiery enemy. Overcome by smoke, he suffered a fatal heart attack. Leopold was only 61 when death enshrined him for future generations as a martyr to the environmental cause.

Aldo Leopold's life began on January 11, 1887, in the small town of Burlington, IA. He was born to a

prosperous German-American family that had made its fortune manufacturing fine walnut desks. The Iowa of the 1880s and 1890s was still the luxuriant paradise depicted in the paintings of Grant Wood and the novels of Willa Cather. A huge variety of flora and fauna graced Leopold's childhood environment. The spacious frame house where the future forester and naturalist grew up stood on a bluff overlooking the game-rich marshes of the Mississippi River.

Aldo and his brothers, Carl and Frederick, spent countless hours stalking partridges and ducks in these Iowa marshes. Aldo acquired a passion for hunting from his father, Carl, a sportsman who tried to give all his sons

Leopold lived most of his life alienated from the attitudes of his colleagues in "the land of neckties and boiled shirts."

a sense of fairness and self-restraint. To Aldo the boy, self-restraint came to mean sparing the treed partridge and taking aim only at the partridge on the wing. To Aldo the man, self-restraint took the form of substituting bow and arrow for rifle and bullet. But who can doubt that this self-restraint cost a real effort to Leopold, who was capable of writing: "Compared with a treed partridge, the devil and his seven kingdoms was a mild temptation."

There was something almost primordial about the intensity of the young Aldo's bloodlust. Frederick Leopold—Aldo's brother, still hale and hearty at 90—might have been describing Cain himself when he recently recalled: "Father gave Aldo his LeFever, . . . a 16-gauge double. Aldo wore it out. At the rate I was going in my hunting heyday, I could live to be a good many years older than I am now and not have killed near as much game as Aldo did."

Aldo Leopold was, in short, no tree-hugging wimp. He was an avid hunter and outdoorsman with a healthy

Darwinian respect for "nature red in tooth and claw." He regarded the hunting instinct as native to man, just as it is to other animals, and he was never one to sentimentalize the never-ending struggle of species against species. Leopold minced no words in *Sand County Almanac*: "If all are to survive," he asserted, "each must ceaselessly feed and fight, breed and die."

Leopold himself was a child of privilege, insulated from the harder realities of social striving. He left Iowa at an early age to enter exclusive Lawrenceville Prep in New Jersey. After spending several years at Yale's Sheffield Scientific School, he became one of the first students at Yale's new School of Forestry.

It was in these ivied bastions of Eastern privilege that Leopold gained his grounding in the sciences, but it was also at Lawrenceville and Yale that he developed the dandified ways that were to mark him for the rest of his days as, quite definitely, "not one of the boys." Leopold took to sporting hand-made shirts and Brooks Brothers suits, and he was visibly proud of his lean form and patrician profile. "He was always well-dressed in the field," one of Leopold's graduate students later recalled, "and around his neck hung that dog whistle and the Zeiss binoculars. He was a gentleman to the core."

When Leopold graduated from the Yale School of Forestry in 1909, he was one of only a hundred trained foresters in the United States. There was a crying need for Aldo's skills in the U.S. Forest Service, an organization Gifford Pinchot had formed in 1905 with the blessing of Theodore Roosevelt. The lands controlled by the federal government were vast, and so were the responsibilities devolving on the first professional forest rangers. Leopold had been a ranger only one year when he was appointed deputy supervisor of the Carson National Forest in north central New Mexico. The following year he was named supervisor. In 1913, Leopold became assistant district forester for the whole Southwest district of the Forest Service.

That same year, Leopold married Estella Bergere, the daughter of a Spanish land-grant family. Aldo and Stella moved into a house near the forest at Tres Piedras, NM, and began to raise a family of five children. Carl Leopold, Aldo's youngest son, now Professor of Horticulture at Cornell, reports that his father "meticulously avoided" forcing the sciences on his

(Lewis is Assistant Editor of the EPA journal.)



Aldo Leopold examines one of the thousands of trees he and his family planted on their Wisconsin farm.

children. But all five, perhaps acting out of some subconscious desire to delight their father, gravitated toward the sciences.

Starker, the first-born, who died in 1983, became a wildlife ecologist. His scientific interests most closely resembled his father's. Starker's brother Luna is a celebrated hydrologist, now teaching at the University of California at Berkeley. The next-born, Estella, is a palynologist and geomorphologist at the University of Washington. Her sister, Nina, an ecologist married to a geologist, is the only Leopold child who has no formal schooling in the sciences. She lives with her husband on the old Leopold farm in Wisconsin, which—along with a thousand neighboring acres—is now preserved as "The Leopold Memorial Reserve." The youngest Leopold child, Carl, is not only an expert on plant physiology but also an accomplished classical guitarist.

So honored has the Leopold clan become that journalist George Stanley sees no hyperbole in the statement that the "name Leopold is to wildlife conservation what Fonda is to movies and Bach is to music." It surely is remarkable that three of Aldo's offspring—sons Starker and Luna and daughter Estella—are scientists of such distinction that they have gained election to the National Academy of Sciences. Never before or since have so many siblings from a single family been admitted to the Academy. There is ample reason to believe that not just the

genes but the patient tutelage of Aldo Leopold made this feat possible.

Observe the passing of esoteric knowledge from generation to generation. Aldo's brother Frederick speaks of the way their father, Carl—the originating Leopold patriarch—"planted a seed, and it took in all of us. Of course, Aldo developed it further than anyone else. . . . My father remembered seeing the big flights of passenger pigeons. He lived for hunting and the outdoors. He used to tell me his shoes were so bad when he was a boy he had to stuff newspapers in them to keep his feet warm. But he went out nonetheless, in all seasons, and he raised us the same way. He started teaching us to 'read sign' when we were very small. We'd go to a woods or swamp or prairie, and he'd open up a hollow log with an ax and show us the mice and insects living inside. He'd point out where a mink had dug into a muskrat house, looking for a meal. He'd identify the animals that had been around by looking at their scat—"These are a raccoon's droppings," he'd say. 'Look at the wild grape seeds and skins, and the bits of bleached shells from crayfish he's been eating.'"

Aldo's daughter, Estella, a brilliant exemplar of the current generation of Leopolds, recalls: "Whether we were hunting or not, long walks with Dad always involved ecological analyses. There was much stopping and discussing tracks and sign, what the

animal was eating, etc. I don't think he missed seeing much that was going on in the landscape. He knew every species of bird, plant, and mammal, and usually talked about them as individuals. All this made the biotic community very real and exciting."

Later, when Leopold became a professor at the University of Wisconsin, he initiated his students to the mysteries of "reading sign." By the time they completed his series of lectures and field excursions, Leopold expected his students to be able to see patterns hiding in the most disparate evidence. A typical Leopold quiz might present the student with the following particulars: "A road flanked on one side by a subsiding telephone pole, then a pink granitic boulder, bluestem, oat stubble bearing ragweed, some young pine, poorer oat stubble; on the other side a *Silphium*, double-forked sumac, another pink rock, a fence post, and bit of corn stubble. A rabbit lay dead on the road."

Sherlock Holmes himself might have hesitated before answering questions such as these: "How long ago was the last hard winter?" Answer: Two years, a fact that could be deduced from the sumac's double fork. "What sex is the rabbit?" Answer: Male, because females stay close to home in spring. Et cetera.

It was thus through laborious instruction that Aldo Leopold sought to revive the lost arts of the wilderness adventurer. All along, he was well aware of a central irony: namely, that American pioneers schooled in "nature's infinite book of secrecy" could have breezed through the very lessons that dumbfounded their grandchildren and great-grandchildren.

It was in 1924 that Aldo Leopold began his migration from the then-daredevil world of the Civil Service forester to the tamer Groves of Academe. He was 37 years old when he was named associate director of the U.S. Forest Service Products Laboratory in Madison, WI. This lab, located in the same town as the University of Wisconsin, was the major research arm of the Forest Service. Leopold knew of the commercial orientation of most of the research undertaken at the lab, and what he knew made him extremely reluctant to leave the Southwest. He accepted the new position only with the

tacit understanding that he would soon become director of the lab.

Four years later, that ambition still thwarted, Leopold quit the civil service and started work as a private forestry and wildlife consultant. He ran a considerable risk in doing so, what with five children and a wife to support, and no private income. One of Aldo's major projects over the next few years entailed conducting a game survey of the north central states for the Sporting Arms and Manufacturing Institute of America.

The year 1933 proved to the world that Leopold's bold gamble had paid off. Not only were the results of his game survey published, to considerable acclaim, but so was his spectacularly successful book *Game Management*, a comprehensive study that was quickly recognized as the classic text on that subject. Leopold's book was so pioneering and so definitive that a group of University of Wisconsin alumni funded a special chair for him as America's first Professor of Game Management. Capping a remarkable year was Leopold's appointment by Franklin Roosevelt to a special Committee on Wildlife Restoration.

Leopold was convinced that ecology, in and of itself, could not protect nature against man.

The Madison campus of the University of Wisconsin is located a few miles south of the state's "Sand Country." Mesa-like bluffs form steep cliffs throughout the Sand Country, an otherwise flat and sparsely populated region known for its sandy and marshy soil. Seeking a weekend and summer retreat, Aldo Leopold picked out "a cheap farm" in a part of the Sand Country extremely vulnerable to April flooding. Unprepossessing though it was, Leopold came to love this farm with a passion approaching delirium.

A Sand County Almanac records Leopold's observations of life on his farm from January to December of a single year. These observations are all variations on the value of "wildness," and the evil of encroaching civilization. Leopold revelled in the wildness of his isolated and marshy farm. He had nothing but contempt for city dwellers who satisfy themselves with limited glimpses of nature and seek dull security "astride a radiator." Even the



Working for the U.S. Forest Service in 1911, Aldo Leopold was in charge of mapping and reconnaissance of the Apache National Forest in Arizona.

business of education practiced in Madison struck Leopold as suspect: "Is education possibly a process of trading awareness for things of lesser worth? The goose who trades his is soon a pile of feathers."

Leopold attached almost mystical importance to one glimpse of wildness he had caught years before in the Southwest. A mother wolf and her pups suddenly bore down on Leopold's encampment. He sent out a hail of bullets "with more excitement than accuracy," then hurried down to watch the death agonies of the mother wolf:

We reached the old wolf in time to watch a fierce green fire dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes—something known only to her and to the mountain. I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.

Leopold recorded this adventure in one of his Sand County "sketches" called "Thinking Like a Mountain." No one can emerge from a close reading of Aldo Leopold without acquiring some idea, however vague, of what it is like to think like a mountain, a marsh, a crane, a grebe, a jackpine, a burr oak, a meadow mouse, or a hawk. From such exotic excursions into the wild world beyond our overheated doorstep, we emerge more fully aware of what it

means to be living, sentient creatures in a hostile world.

There is something wonderfully evocative about certain phrases in Leopold's prose: "What one remembers is the invisible hermit thrush pouring silver chords from impenetrable shadows"; "Through the open window I heard the heart-stirring whistle of an upland plover; time was when his forebears followed the buffalo as they trudged shoulder-deep through an illimitable garden of forgotten blooms."

Leopold was able to wax poetic without descending to the sentimental excesses of the late Victorian happy hearts. In Round River, a posthumous collection of prose fragments published in 1953, Leopold heaped ridicule on "the era of dickey-bird ornithology, of botany expressed in bad verse, of ejaculatory vapors such as 'Ain't nature grand?'" But he was also careful to distance himself from the desiccated writing of his scientific colleagues in the academic world.

Leopold was, in other words, that rarity in academia, science, and environmentalism: a self-conscious and highly skilled literary artist. Beneath a cultivated and genteel demeanor, he harbored a poetic alter ego, an untamed Adam of the Arcadian marshes, capable of happiness only in some long-lost age when "man and beast, plant and soil lived on and with each other in mutual toleration, to the mutual benefit of all." As a result, Leopold lived most of his life alienated from the attitudes of his colleagues in "the land of neckties and boiled shirts":

There are men charged with the duty of examining the construction of the plants, animals, and soils which are the greatest instruments of the great orchestra. These men are called professors. Each selects one instrument and spends his life taking it apart and describing its strings and sounding boards. This process of dismemberment is called research. The place for dismemberment is called a university.

A professor may pluck the strings of his own instrument, but never that of another, and if he listens for music he must never admit it to his fellows or his students. For all are restrained by an ironbound taboo which decrees that the construction of instruments is the domain of science, while the detection of harmony is the domain of poets.

There is something poignant about that passage, just as there is some suggestion of false modesty in Leopold's reference to himself as "me, a mere

professor." Yet Leopold's students report that he cherished being called "The Professor."

Such contradictions are characteristic of Aldo Leopold. Perhaps his valiant death fighting that grass fire in 1948 was in some sense an escape from the soul-rending conflicts that divided him: scientist versus poet, family man versus wild hermit. Over every line of *A Sand County Almanac*, there hangs a heavy shroud of impending doom. Leopold's land was doomed, and so was the scholar-poet uniquely capable of capturing the aura of its vanishing beauty.

His writings have helped to create an atmosphere conducive to environmental progress.

Soil Conservation Service



Leopold had no doubt that the marshes he loved so much faced swift and total destruction. "The marshlands that once sprawled over the prairie from the Illinois to the Athabasca are shrinking northward. . . . Some day my marsh, dyked and pumped, will lie forgotten under the wheat, just as today and yesterday will lie forgotten under the years."

Like many another man obsessed with the threat of oblivion, Aldo Leopold sought strength in science, but he found his only real consolation in art. Even if his marshes were doomed to die, Leopold hoped that his immortal prose poems would keep those marshes alive on the printed page, if not under the blinding sun and the soothing moon. Gentleman, hunter, artist, scientist, genius, Leopold knew that his "minority" view was vastly superior to the muddled thinking of "the shallow-minded modern."

How to transform mass man into a creature less shallow and less destructive was to Aldo Leopold an unanswerable question. He despaired of any real progress toward "land health" as long as Americans took the attitude that government would pick up the pieces after every outburst of mindless rapacity. The clumsy mistakes of the New Deal had cured Leopold of that delusion once and for all. He believed that the best hope for the future lay with schemes of subtle coercion, designed to exploit man's curiosity and selfishness, and channel these powerful drives toward altruistic ends.

Leopold was convinced that ecology, in and of itself, could not protect nature

against man. "The question is, does the educated citizen know he is only a cog in an ecological mechanism? That if he will work with that mechanism his mental health and his material wealth can expand indefinitely? But that if he refuses to work with it, it will ultimately grind him to dust? If education does not teach us these things, then what is education for?"

"Conservationists have, I fear, adopted the pedagogical method of the prophets: we mutter darkly about impending doom if people don't mend their ways. The doom is impending, all right; no one can be an ecologist, even an amateur one, without seeing it. But do people mend their ways for fear of calamity? I doubt it. They are more likely to do it out of pure curiosity and interest."

In building game management into a profession, Aldo Leopold exploited the bloodlust of hunters fearful of losing their prey, but his objective—then as always—was to "get action from human beings as now constituted." The long-range goal, which Leopold always kept in view, was to use that game consciousness as the leavening core of a wider awareness "capable of expanding in time into that new social concept toward which conservation is groping."

A society sensitive to the demands of animals and plants is today far more a reality than it was in Aldo Leopold's lifetime. His writings have helped to create an atmosphere conducive to environmental progress. Moreover, they have inspired many activists to devote

"Babes do not tremble when they are shown a golf ball, but I should not like to own the boy whose hair does not lift his hat when he sees his first deer." — Aldo Leopold

their lives to protecting America's natural treasures.

Shortly before he died, Leopold wrote a tribute to one of his old Forest Service colleagues, C. K. Cooperrider. It appeared in the July 1948 *Journal of Wildlife Management*, the same issue that carried his own obituary. Aldo Leopold might have been describing himself when he spoke of prophets and prophecies: "A prophet is one who recognizes the birth of an idea in the collective mind, and who defines and changes, with his life, its meaning and its implications."

Generations of future Americans will be drawn to the writings of Aldo Leopold, and to his personal example. Aldo Leopold the prophet, still scarcely known outside environmental circles, will always be there to haunt us and to taunt us when we forget the value of pure wildness. The ghost of Aldo Leopold will beckon to us from the marshes as we sit, discontented, in our overheated parlors in front of our flickering video screens. He will be there always, beckoning to us from within the "fierce green fire" where all the splendor and glory of nature reside. His spirit will never die. □

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IN APPRECIATION OF ALDO LEOPOLD

Paul L. Errington

Professor Aldo Leopold, Chairman of the Department of Wildlife Management of the University of Wisconsin and a Past-President of The Wildlife Society, died of a heart attack near his summer home at Baraboo, Wisconsin, April 21, 1948, after two hours of fighting a bad grass fire on a neighbor's land.

I shall not here write of his personal life except in relation to his career in the professional field of wildlife management.

It is proper that he be singled out for the attention of the profession's members. Without belittling in any way his numerous contemporaries, it may be said that he, more than anyone else, has been responsible for the expansion and refinement of wildlife management as such is known today. As a measure of this, we need only consider the strategic positions that he held, the astounding amount of work that he did on committees, the insight and diligence with which he pioneered in the field, his honesty of purpose, and his inspiring and leading of youngsters and the mature alike. At a conference a couple of years ago, he was introduced as a speaker with the words, "Dean of Deans" of the profession, which might have sounded trite if applied to another, yet for him seemed wholly appropriate.

I met Aldo in the spring of 1929,

when he was conducting a game survey of the north-central United States for the Sporting Arms and Ammunition Manufacturers' Institute. He was likewise the Institute's representative for a series of graduate research fellowships on game birds that it was financing at land-grant universities. I held one of these fellowships for three years, beginning July, 1929, and it happened to be with the University of Wisconsin at Madison—also the city of the Leopold home and office. As Aldo was not appointed to the University of Wisconsin staff until 1933 (a year after I had left the campus), I was never formally his student.

Informally, I moved in on him, his home, and his library for hours at a stretch, talking "shop" or anything else. I wasn't a restful satellite and sometimes argued in an evening until neither of us could sleep long after going to bed, but he was gracious toward me and patient with my ex-trapper's social deficiencies. And he was kindly insistent that, as concerned complex natural phenomena like animal fluctuations, one should first gather an abundance of facts to study rather than put forth opinions based chiefly or solely upon outdoor experience.

He appreciated the ability and scientific outlook of H. L. Stoddard and W. L. McAtee (notably as manifes

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PART 1 - WORK ORDER

by the southeastern researches on bobwhites and associated species), of Charles Elton, the British ecologist, of the late P. S. Lovejoy of Michigan, and of creative thinkers wherever he found them, in person or through their publications. He was one of the first in the field really to see the exceptional virtues and promise of the untalkative young Franklin J. W. Schmidt, who died in a fire just as his work on central Wisconsin prairie chickens was becoming recognized.

Aldo's own alertness and powers of synthesis were very evident from the beginning of my relations with him. Even when beset by great fatigue, he could somehow continue to think effectively. To me, one of his most impressive intellectual performances was during hospitalization for an unrecalled ailment: under stimulus of an impending deadline, he dictated whole chapters of his "Report of a Game Survey of the North Central States," published by the Institute in 1931. Later, he was characteristically dissatisfied with its loose ends, but, irrespective of these, it stands as a remarkable achievement.

In retrospect, I think not only of his personal qualities, as of the time when I knew him best, but also of his virtually undertaking, at middle age, a new profession and making this his distinguished life work after what are commonly a man's most plastic and productive years.

Aldo was born on January 11, 1886, at Burlington, Iowa, and became interested in ornithology and hunting during boyhood and youth along the Mississippi River. He was trained in forestry at Yale, receiving the degree of Master of Forestry in 1909. Thereupon,

he entered the U. S. Forest Service as a Forest Assistant and worked with that organization in southwestern States until 1924, meanwhile advancing through several grades to that of Chief of Operations.

If we look over the first dozen issues (1916-19) in the Leopold bibliography compiled by J. J. Hickey (University of Wisconsin Wildlife Research Newsletter, No. 35, May 3, 1948), we note that his earlier publications were like those of any able young field naturalist might write. They were mostly in *The Condor* and a couple of others on game in the *Journal of Forestry*. One of the latter dealt with the National Forests as the last free hunting grounds of the nation. In the second dozen issues we may see more ornithological notes and articles on game and game reserves, but the future crusader against poaching in conservation and misuse of resources is showing up more clearly.

The listed titles from 1920 to the end of 1925 are predominantly short articles on ornithology, hunting, and game management, forestry, relation to game management, education, control, ecological consequences of fires, and wilderness values. Included is the one that I regard as his first paper: "Wilderness as a form of land use," *Journal of Land and Land-Use Economics*, 1: 398-404, 1925.

The latter was not his first expression of views on wilderness protection. He had published "The wilderness and its place in forest recreational policy," *Journal of Forestry*, 19: 718-721, 1921, and it is plain from other of his previous writings that he was becoming much aware of the priceless value of exploited outdoor areas. The paper

wilderness as a form of land use was more than a statement or plea; it was both solidly informative and a literary contribution. I cannot say how influential it proved to be, of itself; but to it, among the others, surely should be credited some of the prominence Aldo attained as an early protagonist of wilderness areas in National Forests. I read in a University of Wisconsin memorial resolution that the U. S. Forest Service subsequently designated a total of 14,000,000 acres as such areas, which are considered to "represent the most visible evidence of his [Aldo's] influence on the American scene." The Leopold writings on wilderness of around a quarter-century ago are certainly in the historical picture. They still nourish movements for the preservation of wildernesses, not alone in the United States or in North America, but over those parts of the rest of the world where men try to retain irreplaceable natural remnants.

The years, 1924-28, with a transfer to Madison, Wisconsin, to become Associate Director of the U. S. Forest Products Laboratory, comprised something of an interlude. He wrote relatively little for publication in this period, and what he did write usually dealt with forestry techniques and utilization or may be classed as carry-over from his life in the Southwest.

Without knowledge of the details behind the selection of Aldo Leopold by the Sporting Arms and Manufacturers' Institute for its game surveys in 1928, one may perceive how he qualified for the job. He was experienced in administration and public contacts, his interests in game and hunting had long been demonstrated, and he had a record

of constructive accomplishment in what was then known as game management. Considering the stage of development of management as a field, he was singularly informed. Already, he had contributed to the reversal of the trends toward artificial propagation or tightened legal protection as panaceas for conservation ills; he did not seek complete abandonment of either propagation or protection but rather a judicious balance for them in an incomparably more promising system based upon the ecology of the species concerned. He differentiated between passive conservation and active management and identified management with a desirable type of husbandry of the earth and its mineral and biotic resources. He was an ecologist and a specialist in his own branch of ecology.

Despite his background, the transition from his old profession to his new one had its abrupt aspects. During the 20 years that he lived as a full-time practitioner of the new profession (and particularly during the first few years), he changed emphasis in several fairly distinct ways.

The changes did not occur in sudden steps. They reflected his accelerating professional growth and the growth of the new field in applied ecology in which he was a "key" worker, the impacts of the man and of the field, of one upon the other.

His game surveys had left him with friends among game administrators, sportsmen, and conservation workers of differing creeds and purposes over the continent. As a man of reason, he kept building on the factual foundations that he had at hand—constantly trying to uncover pertinent researches that had

been done or were in progress, encouraging further research, and doing what he could by himself. He did a tremendous amount of reading on conservation history and methods, on the long-established systems of game management of the Old World. Always comparing systems, he tried critically to separate the desirable from the objectionable features of each, to dissociate sound fact from traditional assumption, to understand more of the workings of natural mechanisms.

As chairman of a large committee, he did much of the work of preparing the "Report to the American Game Conference on an American Game Policy," Transactions of the American Game Conference, 17: 284-309, 1931, which mentioned the incompatibility of the English and American systems of game management. "Game methods; the American way," American Game, 20: 20, 29-31, 1931, was written "to express a personal view of what the policy means in its references to the European practices." In this, the theorem was advanced that "to supply any given proportion of the population with any given amount of game, Europe must raise a denser stand of game per acre, and hence practice a more intensive form of game management than America." Quoting further: "The recreational value of a head of game is inverse to the artificiality of its origin, and hence in a broad way to the intensiveness of the system of game management which produced it. . . . A game policy should seek . . . between the evident necessity of some management and the aesthetic desideratum of not too much. . . . There is nothing to prevent us from adopting the European technique for

producing a game crop, and at the same time rejecting the European governing the intensity of the hunt and the European system of harvesting and distribution. . . . policy, by and large, proposed. . . ."

He went on in the same challenge "the ruthless suppression of predators which goes with game management in most European countries. W. T. Hudson has voiced his protest over the disappearance of one species after another, and his contempt for the aesthetic hobby of sportsmen and sportsman. American protectionists mortally afraid of the impending (?) American counterpart of this sacrifice. . .

"I am no prophet. I would predict, however, that stringent predator control is usually unnecessary save on the upper scale of intensive game management. . . . we do not need that kind of management. . . . This is not to say that no predator control is needed. It does mean that extensive or low management—enough, let us say, to quintuple our crop—can be achieved by light, local, seasonal, selective handling of the predator factor. . . . Is it too much to hope, that the group-cooperative wildlife enterprise advocated by the game law may ultimately evolve an American attitude toward predators, based on the new biology, and recognizing the hunter-lover and farmer, as well as the sportsman, as joint partners?"

In what could almost be called a companion piece—"Game and wildlife conservation," Condor, 34: 103-105, 1932—he drew other important distinctions that the reader could afford

study. Very significant is that between the "schools" of "hardened sport-men" in this country, exemplified by moderate and extreme factions.

But perhaps nowhere so well as in the concluding paragraphs of the celebrated textbook, "Game Management" (Scribners, 1933), does he clarify his reasoning. From his pages 420-423:

"The game manager manipulates animals and vegetation to produce a game crop. This, however, is only a superficial indication of his social significance. What he really labors for is to bring about a new attitude toward the land.

"The economic determinist regards the land as a food-factory. Though he sings 'America' with patriotic gusto, he concedes any factory the right to be as ugly as need be, provided only that it be efficient.

"There is another faction which regards economic productivity as an unpleasant necessity, to be kept, like a kitchen, out of sight. Any encroachment on the 'parlor' of scenic beauty is quickly resented, sometimes in the name of conservation.

"There is a third, and still smaller, minority with which game management by its very essence, is inevitably aligned. It denies that kitchens or factories need be ugly, or farms lifeless, in order to be efficient.

"That ugliness which the first faction welcomes as the inevitable concomitant of progress, and which the second regretfully accepts as a necessary compromise, the third rejects as the clumsy result of poor technique, bunglingly applied by a human community which is morally and intellectually unequal to the consequences of its own success. . . .

"Herein lies the social significance of game management. It promulgates no doctrine, it simply asks for land and the chance to show that farm, forest, and wild life products can be grown on it, to the mutual advantage of each other, the landowner, and of the public. It proposes a motivation—the love of sport—narrow enough actually to get action from human beings as now constituted, but nevertheless capable of expanding with time into that new social concept toward which conservation is groping.

"In short, twenty centuries of 'progress' have brought the average citizen a vote, a national anthem, a Ford, a bank account, and a high opinion of himself, but not the capacity to live in high density without befouling and denuding his environment, nor a conviction that such capacity, rather than such density, is the true test of whether he is civilized. The practice of game management may be one of the means of developing a culture which will meet this test."

His other writings for this period contain other syntheses of complex subject matter, other pace-setting thought, other excellent composition; and two "heavy" essays, "The conservation ethic," *Journal of Forestry*, 31: 634-643, 1933, and "Conservation economics," *Ibid.*, 32: 537-544, 1934—two of his greatest papers. Among the major changes in professional emphasis to be detected in his publications, 1929-35, is one from the survey to the intensive method of research and another from game management for shooting to far broader versions of management involving native prairie flowers and song-birds as well as game and game habitats. These changes doubtless may be

ascribed partly to changed conditions of employment, notwithstanding which there is plenty of evidence that Aldo's own inclinations led him into them.

In 1935, he studied German game and forest management under a Carl Schurz Travelling Fellowship, publishing his comparisons and conclusions chiefly during the next year: the two-part paper, "Deer and Dauerwald in Germany," *Journal of Forestry*, 34: 366-375, 460-466, and semipopular articles in *Bird-Lore* and *American Wildlife*. This trip, by its contrasts, intensified his concern for threatened outdoor values—see, for example, the introduction to the *Bird-Lore* article, "Naturschutz in Germany," in which he depicted the "nostalgia of the German for wildness, as distinguished from mere forests or mere game. . . . We Americans yearn for more deer and more pines, and we shall probably get them. But do we realize that to get them, as the Germans have, at the expense of their wild environment and their wild enemies, is to get very little indeed?"

We have in 1937 the appearance of superbly written short essays, combining ecology and management and a philosophy of esthetics. "Conservationist in Mexico" and "Marshland elegy," both appearing in *American Forests* (43: 118-120, 146, and 472-474), are, I feel, among the first of the fully mature Leopoldian essays of this type. More came out in subsequent years, such as: "Conservation esthetic," *Bird-Lore*, 40: 101-109, 1938, "A biotic view of land," *Journal of Forestry*, 37: 727-730, 1939, "Escudilla," *American Forests*, 46: 539-540, 1940, "Song of the Gavilan," *Journal of Wildlife Manage-*

ment, 4: 329-331, 1940, "Chover," *The Land*, 1: 310-311, 1941, "The last stand," *Outdoor Life*, 7(7): 8-9, 1942, "The Forest in American Forests," 49: 12-14, 1943, "Wildlife in American culture," *Journal of Wildlife Management*, 7: 1-11, 1943, "The green lagoons," *American Forests*, 51: 376-377, 414, 1945, and "The ecological conscience," *Bulletin of the Garden Club of America*, September-October, 1946-53, 1947. A book of his essays, including his revisions of some of those above, is to be published in 1948 by Oxford University Press, N. Y.

To some degree, his later publications reflect changed emphasis, as when advocating monetary or other incentives for management to lead to inculcating appreciation of natural values. They also indicate a change in emphasis from training specialists to liberal education, which means to management endowments worked for long-term "deep research up to the time of his death." He saw long before then that the problems of sane land use require more attention than the attention of professionals. There had to be better motivations directed, and better sustained participation by the public if wildness in management was to be a living practice.

As scientist or educator, he was not a thing but jealous of professional activities. From "Wildlife in American Culture" (his page 5):

"Wildlife research started as a professional priestcraft. The more or laborious problems must be left to professional hands, but there are a few problems suitable for all game amateurs. . . . Ornithology, r

ogy, and botany, as now known to most amateurs, are but kindergarten games compared with researches in these fields. The real game is decoding the messages written on the face of the land. . . .

"Few people can become enthusiastic about research as a sport because the whole structure of biological education is aimed to perpetuate the professional research monopoly. To the amateur is allotted only make-believe voyages of discovery, the chance to verify what professional authority already knows. This is false; the case of Margaret Nice proves what a really enterprising amateur can do. . . ." (He delighted in the ornithological investigations of Mrs. Nice, which in volume and quality surpassed so much of the work of the professionals.)

Long ago, he had likened the titles of academic courses to labels on bottles having highly variable contents; and, coming from him as a teacher of academic coursework, his paper, "The role of wildlife in a liberal education" (Transactions of the North American Wildlife Conference, 7: 485-489, 1942) has quotable paragraphs:

"Liberal education in wildlife is not merely a dilute dosage of technical education. It calls for somewhat different teaching materials and sometimes even different teachers. The objective is to teach the student to see the land, to understand what he sees, and enjoy what he understands. I say land rather than wildlife, because wildlife cannot be understood without understanding the landscape as a whole. Such teaching could well be called land ecology rather than wildlife, and could serve very broad educational purposes.

"Perhaps the most important of these purposes is to teach the student how to put the sciences together in order to use them. All the sciences and arts are taught as if they were separate. They are separate only in the classroom. Step out on the campus and they are immediately fused. Land ecology is putting the sciences and arts together for the purpose of understanding our environment. . . .

"There is no need to persuade the student of land ecology that machines to dominate the land are useful only while there is a healthy land to use them on, and that land-health is possibly dependent upon land-membership, that is that a flora and fauna too severely simplified or modified might not tick as well as the original. He can see for himself that there is no such thing as good or bad species; a species may get out of hand, but to terminate its membership in the land by human fiat is the last word in anthropomorphic arrogance."

From the paper, "Wildlife in American culture": "Ecology is now teaching us to search in animal populations for analogies to our own problems. The ability to perceive these, and to appraise them critically, is the woodcraft of the future."

Aldo's personal contacts with students were quite evidently similar to what they had been with me during his game survey years. I learned from "grapevine" that he exhorted them to write carefully, to revise their manuscripts over and over until organized and smooth, to strive for the maximum simplicity consistent with the subjects written upon. The summer after leaving Wisconsin, I brought back to him a

medium-length manuscript on the different versions of which I had labored for four months and which I considered ready for the editor; we worked for two days at high pressure, and it took six weeks more of revision to incorporate his suggestions—and that wasn't any too long!

His students, too, could hardly have missed his fairness and what Elton (letter of May 4, 1948) called a "special sort of integrity." My data were always mine, and I have no doubt that his students were assured that their data were theirs and that they could as a matter of course expect a reasonable amount of professorial guidance in handling the same—actually, he was generous with his time to the extent that it frequently meant hardship to him. Nor do I doubt that at least his more mature students respected his intellectual humility.

I remember other things about him from the earlier years. I remember him as a man in the personal crisis of being without income for months during 1932 and 1933 in the worst of the Depression. He took this punishment most creditably, kept up the standard of living of his family as well as circumstances allowed, worked on the manuscript of "Game Management," and made plans with courage and realism. He was offered desirable positions, including a professorship at a prominent state college, but these would have entailed moving his home from Madison, which he was reluctant to do. Then, the University of Wisconsin established its first Chair of Game Management, later becoming the Department of Wildlife Management.

In appraising Aldo's accomplish-

ments, I would rate the li as the greatest. They reflected thoughts, what McAtee (13, 1948 to R. A. McCabe) "his lucid and stimulating in the conservation field growing power as a writer. own field of excellence, I that anyone else may be co him.

His scientific best is, I trated by his papers on fore land use. These have appear scattered journals, but the Forestry drew the larger pro

His personal inspiration hard to do justice to, wheth in routine dealings with s public, or in strategic comm As regards his committee v one must consider not only of committees of scientific sc conservation organizations t was appointed but also those dinary prestige and importa as his chairmanship of the on wildlife studies of the Na search Council. Shortly before he had been asked by Se State Marshall to be a discuss man at the Inter-American C on Conservation of Renewab Resources and by Secretary terior Krug to serve on the Committee on American Pa at the United Nations Scien ference on Conservation an tion of Resources.

* * *

In order to write this mem flectively as I could, I waiter vacation to do it, to do the w simple log dwelling house n National Forests.

A porcupine-girdled pine top may be seen through the front windows, and just out of sight hang the remaining sticks of a goshawk nest that had young in it twelve summers ago. Three species of grouse live along the creek that comes down out of the canyon. If one looks, one may easily find deer and bear "sign" and, in the hours of darkness, coyotes howl. The air smells richly of pine and sage.

The property on which the log house is situated contributes to the livelihood of people. Along with the "sign" of native animals is some of horses and cattle. Some land is tilled and some yields hay. Yet, the tract surrounding the house is wild and it is intentionally kept so. We are getting rid of the old stumps and other axe-marked wood; our two boys bring it in to burn in the box stove. A large yellow pine with weakened base that we once had to take down to protect the house is an exception: its trunk will be left where it fell, axe and saw cuts and all, ungrudgingly. For a ruffed grouse has accepted it as a drumming log, and, in the twilight of evening or early morning, if careful, the family may watch and hear the muffled beating of wings—that "numenon" of northern woodlands. This, I am sure, Aldo would have approved as husbandry.

To the west, the National Forest begins. Less than ten miles away is timberline and, below that, are still-occupied retreats of those much reduced prize fur-bearers, the martens. In the canyons farther below, glacial waters pour over and between boulders, and there are bobcat or lynx tracks in the mud where a game trail leads around a beaver pond. Deep in the forest are said

to be a few grizzly bears and even cougars.

The thought of Aldo in connection with this mountain wilderness seems appropriate, though I doubt that he had ever seen it. The love he felt for the out-of-doors and the things that belonged in it was not a matter of geographical boundaries, nor confined to particular settings. In his essay, "Conservation esthetic," he wrote: "To those devoid of imagination, a blank space on the map is a useless waste; to others, the most valuable part. (Is my share in Alaska worthless to me because I shall never go there? Do I need a road to show me the Arctic prairies, the goose pastures of the Yukon, the Kodiak bear, the sheep meadows behind McKinley?)"

* * *

Very probably one so distinguished will be honored posthumously in many ways. There is talk of a memorial fellowship and there may be other movements to perpetuate his name and ideals. Assuredly, these should be encouraged and supported to the extent that they are well-conceived. We must not mock honesty with gestures. I can imagine his gentle scorn at the thought of anything like elaborate statuary in his memory while despoliation and wastage of the land and its biota continue as usual.

For, his greatness, as I regard it, lay in the fact that he loved and worked and fought for something greater than himself or any other man. He knew of the peace that outdoor values may give to receptive minds and he wanted those values safeguarded and increased for others as well as for himself. However else it may be designated, his concept of what is worth living in human life

has a certain agelessness to it, a solidarity beyond the creative power of any one man. His sense of responsibility and decency is likewise much more than the byproduct of any one man's thinking.

Let no one do him the disservice of fostering Leopoldian legends or Leopoldian dogmas. Knowing him as I have, I can say that he would not wish them to arise from his having lived. He would not wish to have imputed to him any qualities or abilities that he did not possess. He was only a mortal man, but

a highly civilized and intelligent, withal, literate and—most—articulate in those ways that convert intentions into lead.

In some respects, we might have wild beauty, as such, whether in a yard or in remote places, a memorial to him and to his kind. To his professional colleagues, let us acknowledge our obligations to a philosophy that has goodness in it beyond its objectives; and, moreover, let us honor him according to the way we ourselves, live and lead.

MARSH-BLASTING AS A WILDLIFE MANAGEMENT TECHNIQUE

Maurice W. Provost¹

Iowa State College, Ames, Iowa

INTRODUCTION

It is now commonly agreed that wildlife values in marshes are largely dependent upon a favorable balance of cover and open water. This has been called the interspersion factor (Low, Scott and Dever, 1941). Although avian responses to varying degrees of interspersion have not been actually measured, much circumstantial evidence supporting the relationship is available. Except in the case of diving ducks, where Low (1945) described the use of open water areas as bases for nesting operations and as take-off and alighting

areas, the nature of this interspersion requirement remains little understood. Probably there is more involved than mere "edge effect," even though it may be interpreted in terms of distribution of food production. On the basis of territorial behavior in ducks described by Hochbaum (1944), the potential of a marsh should be proportional to the ratio of cover-water to cover area, an obvious inverse of interspersion. Other species of interspersion to various marsh wildlife may eventually be demonstrated. Nevertheless, there is involved an environmental complexity in which water depth, cover type, cover density, as well as interspersion are only different aspects; and they are nearly always conditioned by time (Provost, in press). In some cases, therefore, interspersion may be the result of interaction of o-

¹ Research Fellow, Proj. No. 496, directed by Dr. Geo. O. Hendrickson and Dr. Thos. G. Scott. Iowa Agricultural Experiment Station. Journal Paper No. J1545. Fish and Wildlife Service (U. S. Dept. of the Interior), Iowa State College, Iowa State Conservation Commission, and the Wildlife Management Institute cooperating.

sirable factors, in which case it would be more an indicator than an actual requisite of adequacy in the environment. Until its exact nature has been demonstrated, interspersions hypothetically can be considered an ecological factor in the marsh environment. Studied in this light, it may be used as a base upon which to orient many phrases of the intricate relationship between animal and habitat in the marsh.

Natural interspersions are ordinarily created, modified, or maintained through the agency of several influences, foremost among which are water levels and muskrat activity. Where neither water level manipulation nor muskrat activity can be relied upon to open up dense covers, it may be desirable to resort to artificial means of improving cover-water interspersions. This thought led Scott and Dever (1940) in 1939 to attempt blasting as a means to this end. Later, an intensive investigation of the techniques was undertaken in Iowa. This report will concern itself primarily with the physical aspects of dynamiting in marshes, the ultimate objective being the formulation of the most adaptable and most efficient methods for creating the desired interspersions by blasting.

EXPERIMENTAL AREAS

In reporting the pioneer work done at Little Wall Lake in Hamilton County, Iowa, Scott and Dever (1940) described the area as a 230-acre marsh near Jewell, Iowa, grown up to a dense *Scirpus-Typha* (bulrush-cat-tail) community. In 1941, when follow-up studies were made, the marsh was essentially unchanged. Since then, water levels have risen five feet or more to com-

pletely fill the basin, inundate the experimental excavation, and reduce the solid cover to a thin stand of bulrushes on approximately 40 per cent of the lake's area. The lake bottom is deep peat, underlain by a shallow clay hardpan only about the periphery. The blasting was done partly over this clay and partly over deep peat (Figure 1).

In the spring of 1940 and in the fall of 1941, blasting was done in a state-owned tract of marsh adjoining Mud Lake in Palo Alto County, Iowa. This Oppedahl Tract (Figures 2 and 3) has changed little since 1940. It is a sedge marsh, dominated by lake sedge (*Carex lacustris*). Half of the marsh has a sizable intermixture of broad-leaved cat-tail (*Typha latifolia*) and river grass (*Fluminea festucacea*), and several small patches of hard-stemmed bulrush (*Scirpus acutus*) and great bur-reed (*Spartanium eurycarpum*). Except for a channel crossing the tract in the northwest sector and a small natural opening along the mid-southern boundary, it is virtually solid marsh cover. In an average year, water stands up to 12 inches over the marsh in the spring and recedes to several inches below the ground level by late summer. The soil is mainly peat to a depth of over six feet. Areas marginal to upland are underlain by a blue clay sloping from two feet underground at the edge to six feet down approximately 100 yards from shore.

In the fall of 1941, experimental blasting was carried on also in the ponds of Dewey's Pasture (Figure 4), a 403-acre, state-owned tract of prairie dominated by bluegrass, dotted with over 50 kettle-holes ranging in size up to 13 acres. This area is north of Mud

Aldo Leopold



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30 May 1973

Frank Harmon
History Office
U.S. Forest Service
Washington, D.C. 20250

Dear Mr. Harmon:

I have your letter of 11 May 1973 requesting a copy of my thesis on Aldo Leopold. The thesis is in excess of 350 pages and I do not have extra copies for distribution.

Enclosed is a reprint of the revised first chapter which appeared in the April 1973 Forest History. The fully revised thesis will be published as a book by University of Wisconsin Press, probably in early 1974. I also have an extended essay on Leopold in a book to be published by Sierra Club this fall, titled THE SAND COUNTRY OF ALDO LEOPOLD.

Thank you for your interest.

Sincerely,

Susan Flader

Susan Flader



Recycled

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ARTICLES

**THE NATIONAL FORESTS AND THE
CAMPAIGN FOR WILDERNESS LEGISLATION**

by Dennis Roth, page 112

contains info on Leopold

PLACE-NAMES: RELICS OF THE GREAT LAKES LUMBER ERA

by Randall E. Rohe, page 126

KENYA FORESTRY UNDER BRITISH COLONIAL ADMINISTRATION, 1895-1963

by Thomas P. Ofcansky, page 136

FOREST HISTORY IN THE MAKING

FORESTLAND INVESTMENT AND OWNERSHIP: CHANGING TIMES

by Perry R. Hagenstein, page 144

BOOK REVIEWS

Encyclopedia of American Forest and Conservation History, edited by Richard C. Davis, reviewed by Ivan Doig, page 148

Common Landscape of America, 1580 to 1845, by John R. Stilgoe, reviewed by Richard G. Lillard, page 149

Changes in the Land: Indians, Colonists, and the Ecology of New England, by William Cronon, reviewed by Robert deV. Brunkow, page 150

Public Lands Politics: Interest Group Influence on the Forest Service and the Bureau of Land Management, by Paul J. Culhane, reviewed by Norman I. Wengert and Carole Gildea Garvey, page 151

The Amazon Rubber Boom, 1850-1920, by Barbara Weinstein, reviewed by Beverley Bowen Moeller, page 152

Soviet Forest Industries, by Peter Blandon, reviewed by Paul E. Lydolph, page 153

REGULAR FEATURES

NEWS
page 154

BIBLIOSCOPE
page 155

OUR AUTHORS
page 159

COVERS

Wilderness proponents have argued that unaltered natural environments can be a source for sustaining frontier values. The rustic craft employed by the two attentive anglers in our front cover photo confirms the continuation of frontier ingenuity in outdoor recreation, at least in this instance. The U. S. Forest Service photo was taken in 1919 by F. E. Colburn on the White River National Forest, Colorado. Our lead article, written by Forest Service Chief Historian Dennis Roth, commemorates the twentieth anniversary of the signing of the Wilderness Act.

Our back cover photo, taken on Wisconsin's turbulent Wolf River, represents the skill and daring that marked the big pine era of Lake States logging. Scenes like this are a thing of the past, but perusing present-day Lake States maps is likely to reveal numerous geographical features named after bateaux, splash dams, memorable logjams, or other aspects of north woods logging history. In this issue Randall E. Rohe points out that place-name identification can be a key to the past. Photo courtesy of Malcolm Rosholt.

The Wilderness Ideal

Paul Brooks

We need the tonic of wildness—to wade sometimes in marshes where the bittern and the meadow-hen lurk, and hear the booming of the snipe; to smell the whispering sedge where only some wilder and more solitary fowl builds her nest, and the mink crawls with its belly close to the ground.

—Henry David Thoreau
Walden

WHEN WE TALK about “wilderness,” what exactly do we mean? Not, certainly, what our forebears meant. The history of words is the history of ideas, and the traditional idea of wilderness is a far cry from that of the Sierra Club or The Wilderness Society. The word itself derives from Old English “wildeor,” wild beast. In ancient times it was a place hostile to man. The Bible equates it with “desert,” the last refuge for outcasts, into which one drove the scapegoat laden with the sins of mankind. The Puritan settlers brought this concept with them across the Atlantic. To them, everything beyond the cleared area of the settlements was

A waste and howling wilderness
Where none inhabited
But hellish fiends, and brutish men
That Devils worshipped.

In Europe this attitude took a sudden turn in the late 18th century, beginning with philosophers like Jean Jacques Rousseau and culminating in the Romantic Movement, with Wordsworth as its English prophet. The American pioneer, however, had no time for daffodils dancing in the breeze. Now at last limitless land was within his grasp. In taming the wilderness, in making it work for him, he was doing God's work as well. As Jehovah said unto Noah after the Flood: “The fear of you and the dread of you shall be upon every beast of the earth and upon every bird of the air and upon everything that creeps on the ground and all the fish in the sea. Unto you they are delivered.”

In this subjugation of the wilderness the heroes were the destroyers: Daniel Boone and Kit Carson and Davy Crockett, the buffalo hunters and the Indian fighters, wielders of the long rifle and the axe. Towering above

them stood the legendary lumberman Paul Bunyan, who laid low the forests from coast to coast.

Yet from the early 19th century onwards the American wilderness had an increasing impact on our culture, both in literature and in art. James Fenimore Cooper found in it the inspiration for his romances.* Washington Irving, though still writing in the European tradition, waxed eloquent over the American scene: “her mighty lakes, like oceans of liquid silver; her mountains, with their bright aerial tints, her valleys, teeming with wild fertility . . . her trackless forests, where vegetation puts forth all its magnificence. . . .” William Cullen Bryant, for all his worship of Wordsworth, preferred American scenery to anything he saw abroad. So with the artists: Thomas Cole and the Hudson River School; George Catlin, the first painter of the American West and one of the first to advocate national parks; Charles Bodmer, who traveled up the Yellowstone in 1833, one year after Catlin, in company with the German naturalist, Prince Maximilian; Alfred Miller, whose watercolors are our freshest on-the-spot record of the frontier; John James Audubon, whose work has become a part of our cultural tradition. Artists and writers together—Audubon was both—had by mid-century established a new attitude toward wild nature.

Before the end of the century the so-called “frontier” had reached the Pacific, and been officially proclaimed dead. On its westward sweep, however, the course of empire had left many unspoiled areas in its wake, saved by their inaccessibility, islands in the sea of Progress. They are no longer inaccessible. But fortunately our

*Cooper described the view across the Mohawk Valley as “completely an American scene, embracing all that admixture of civilization and of the forest, of the works of man and of the reign of nature.” Today, unfortunately, we have two extreme and needlessly hostile groups: those who speak scornfully of the “wilderness cult” and consider wilderness values a witless return to primitivism, and those who talk about “escaping to the wilderness” as if all man-made landscapes were false and ugly. The world is full of examples of how man has improved his environment, esthetically as well as practically. The fact that we no longer consider wilderness ugly and hostile to man does not mean that we must therefore consider civilization ugly and hostile to nature.

*How Aldo Leopold and Robert Marshall
Articulated the Need for Preservation*

Viewpoint

FOR OVER two years many Americans have been waiting in suspense to see how the United States Senate finally would come down on the Alaska land challenge. The Senate's influential Energy Committee has tended strongly to put oil and other developmental concerns ahead of less tangible values represented by wilderness and wildlife protection, and no one has known how heavily this fact and the negative posture of Alaska's two senators would weigh with the rest of the Senate.

Now we know that the persistence and enthusiasm of those who have been fighting the good Alaska conservation fight within and beyond Congress have been eminently worthwhile. The succession of lopsided votes which torpedoed the Energy Committee's own sorry bill beginning in late July proved that the Senate was much less isolated from public sentiment and from the environmental conscience of the times than many had feared. That only 14 senators, at the last, felt constrained to oppose the Tsongas-Roth-Jackson-Hatfield compromise is greatly to the sponsors' and the Senate's credit.

This is not to label the result an acceptable bill. As highlighted in our new *Wilderness Watch* section which begins on page 38, in a number of its features what emerged on August 19 from the Senate chamber is seriously flawed. The Senate is still being too solicitous of the special interests of the oil, timber and mining industries, hunting guides and development-minded Alaskan politicians.

To this solicitude can be attributed such unfortunate intentions as denying wilderness protection to the Porcupine caribou herd's calving grounds along the Beaufort Sea, as well as to strategic additions to the Douglas Arctic Refuge and to key acreage in the Misty Fjords, on Admiralty Island and on West Chichagof Island in the Tongass National Forest; handing over to the state areas that should be part of the Douglas and Yukon Flats Refuges; giving less-protective "preserve" status to important habitat in Wrangell-St. Elias and Denali (McKinley) Parks; mandating a transportation corridor through the "boot" of the Gates of the Arctic wilderness park; and omitting a wildlife refuge/wilderness unit in the Copper River Delta.

One conspicuous statistic in the Senate's bill should be of concern to everyone wanting to see a suitable portion of the Alaskan national parks and other federal lands given the special protection that comes with being part of the National Wilderness Preservation System. The Senate wilderness total is 11 million acres less than the 67.5 million approved by the House. Even in Alaskan terms this is no trifling differential.

Congressmen Morris Udall and John Seiberling and the other sponsors of the sounder House bill have the challenge of upholding the House position to the maximum possible. We should all be rooting for them.

Senator John Melcher of Montana has tucked a little-

noticed 19-line rider into the Senate-passed Alaska bill which poses a serious threat to federal wilderness areas and wilderness study areas, and indeed to many other federal lands all across the nation.

The language of the rider, Section 1323, mandates the granting of access across federal lands to any owners of non-federal land within the national forest system and within the lands managed by the Department of the Interior's Bureau of Land Management. Without saying so, it would nullify a part of Section 5(a) of the 1964 Wilderness Act which provides an alternative to granting access to non-federal holdings within wilderness areas—namely, offering to trade federal land of approximately equal value in the same state. It would also undercut the government's option of buying private inholdings.

The Melcher rider could have devastating impacts on many public wildlands. One would certainly expect any such proposal to be subjected to thorough public hearings and legislative debate. But strangely enough, Section 1323 has had the benefit of neither. It was introduced casually and in only tentative form to the Senate Energy Committee at the last of the Alaska bill markup sessions last October 30, apparently has never had any serious discussion within the committee, was not debated on the Senate floor and has had almost no publicity outside Montana.

Under the circumstances, it is fortunate that House members pivotally concerned with the Alaska legislation are raising pointed questions about the proposal. We trust they will firmly oppose its acceptance by the House, where the provision has had no deliberative attention whatsoever. Public land laws are too complex, and the Wilderness Act is entirely too sensitive, to be tampered with carelessly and without meaningful public involvement. The Melcher rider fails on both counts.

Some Montanans think the Melcher rider was designed to aid a major Montana inholder, Burlington Northern, Inc., in a current battle over the integrity of a Montana candidate wilderness.

Over the protest of The Wilderness Society and Montana wilderness groups, Burlington Northern last year obtained a special-use permit from the U.S. Forest Service to build two timber-access roads into BN lands in the Gallatin National Forest. The roads would bisect the 290,000-acre Taylor-Hilgard Wilderness Study Area, a beautiful stretch of wild country that conservationists hope to see become part of a proposed half-million-acre Lee Metcalf Wilderness honoring Montana's late senator and wilderness champion.

The Society, the Montana Wilderness Association and others sued to block the BN permit. A federal judge granted a temporary restraining order, and the case was hanging fire when Senator Melcher proposed his rider. Recently the court denied a preliminary injunction against the access permit, but the decision is being appealed. But if the Melcher rider were to become law, the case automatically would become moot and citizens would be left without recourse.

The memory of Lee Metcalf deserves better. So does the nation's candidate wilderness.

—J.G.D.



Aldo Leopold visiting a storage building on an abandoned mining claim in the Apache National Forest, Arizona, in 1911. He was then a 25-year-old forest assistant with the Forest Service.

sense of values was changing while the conquest was going on, at first among the few and later—thanks to the growing literature of nature—among the many. The idea of preservation, as in the national parks, and of conservation, as in the national forests, became generally accepted. Most of wild America was gone; what remained had a scarcity value. Yet the significance of true wilderness as we know it today was little understood, in terms of either its contribution to science or its spiritual value to man. It is indeed a subtle concept, intuitively known years ago to Thoreau and Muir and a few others, first given official standing in the saving of Yosemite Valley, latent in the philosophy behind the national parks movement, yet recognized as a vital aspect of conservation only in the 1920s. And not for another three decades would it become a major political issue, to be embodied at last in federal law.

A long process, in terms of a single lifetime, but in historical perspective a remarkably sudden turnabout. "Thinking as a biologist," writes A. Starker Leopold of the University of California (a son of Aldo Leopold), "I see this emergence of a new idea as comparable to a macromutation in organic evolution—one of those sweeping shifts of evolutionary direction that come suddenly, and without forewarning." In preserving an undisturbed natural area, Leopold points out, we are

"showing a respect for nature as it existed in the first place. It is the emergence of this element of *respect* that deserves special attention, for it marks a turning point in man's view of the earth." (Clearly he is referring to *Western* man.) In short, it is a moral issue. Not, however, in the sense that Emerson proclaimed moral law to lie at the center of nature, which itself was meaningful only in its relation to man. Here was the other side of the coin: man's moral obligation to save natural areas for their own sake, to recognize their right to exist.

Henry Thoreau had recognized this right, long before the last of our wilderness was threatened. In *Walden* Thoreau had expressed for all time the need we feel for a world not of our own making. "At the same time that we are earnest to explore and learn all things, we require that all things be mysterious and unexplorable, that land and sea be infinitely wild, unsurveyed and unfathomed by us because unfathomable. . . . We need to witness our own limits transgressed, and some life pasturing freely where we never wander."

A wilderness philosophy is thus nothing new, though hitherto confined to a few prophetic individuals like Thoreau and Muir. The concept of the "wilderness area," however, is comparatively modern. Fortunately, it is supported by practical arguments more easily grasped by government administrators than are Thoreau's mysti-

cal insights. Largely responsible for the idea and its realization are two outstanding writers, both of whom were members of the U.S. Forest Service: Aldo Leopold and Robert Marshall.

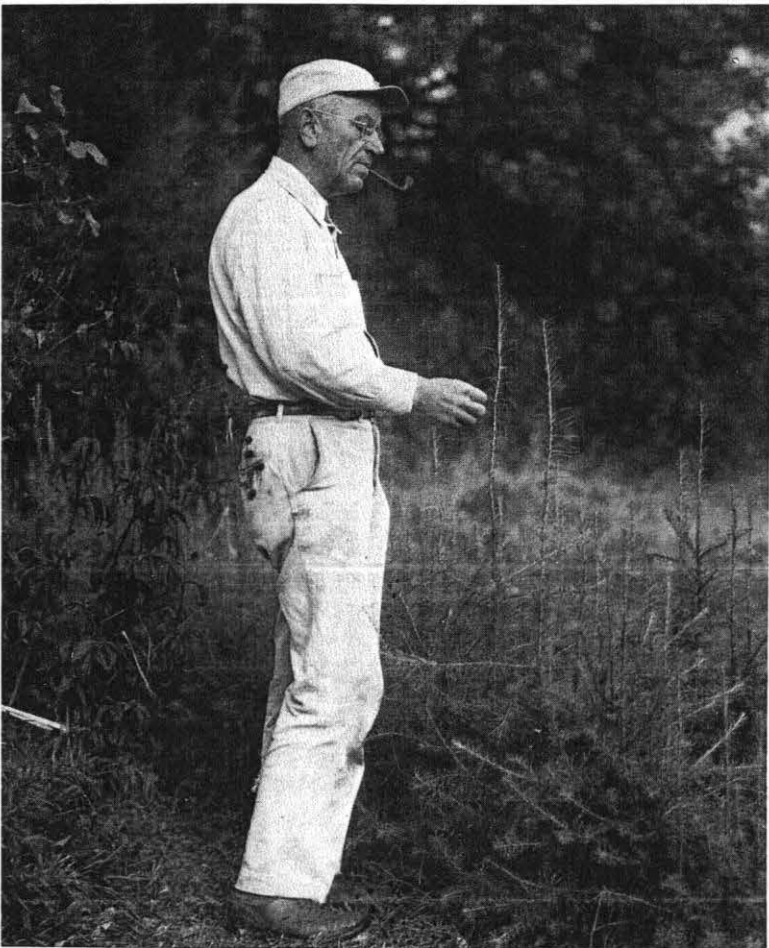
Aldo Leopold will always be associated with two regions of America: the Southwest, where he began his career as a professional forester and game manager, and central Wisconsin, the scene of his classic *A Sand County Almanac*. Born in Burlington, Iowa, in 1887, a 1909 graduate of Yale's School of Forestry, he came on the stage at the end of the Roosevelt era. In 1909 the Forest Service, headed by Gifford Pinchot, was only four years old, as was the National Association of Audubon Societies. William T. Hornaday, that fiery convert from hunter and collector to conservationist, was at work on his trumpet-call to action, *Our Vanishing Wildlife*. Leopold's first assignment in the Forest Service, to the Arizona and New Mexico territories, was a revelation and a challenge. Though settlement had come late to this rugged mountain country, a decline in the numbers of big game animals was already evident. To Leopold, a country without wildlife was a spiritual vacuum. In contrast to Hornaday, Leopold did not consider sport hunting to be incompatible with conservation. But the goals of the

two men were the same. A visit from Hornaday encouraged young Leopold in his campaign among local ranchers and businessmen to establish game refuges—a concept still alien to the frontier mentality. “While making good progress,” he wrote for his Yale class record, “I think the job will last me the rest of my life.” A prophetic remark, since Aldo Leopold was to become the principal founder of the science of game management.*

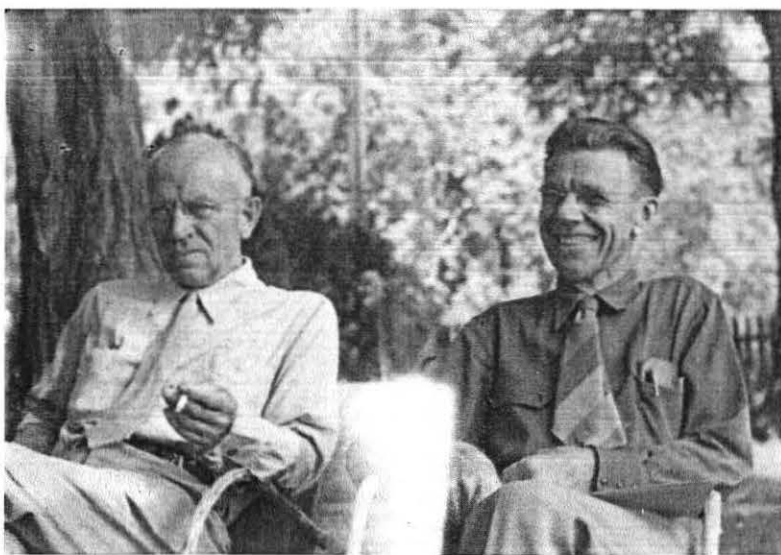
Like Hornaday and most of his contemporaries, Leopold at first saw all predators as varmints to be exterminated; the principal enemies of the “game” were the mountain lion and the wolf. In the light of his future philosophy, one reads with a sense of shock a statement that he made in 1920: “It is going to take patience and money to catch the last wolf or lion in New Mexico, but the last one must be caught before the job can be called fully successful.” But Leopold was entering on his career at a time when the importance of the predator to the balance of nature was at last being recognized, and when the deeper meaning of wildness to civilized man was becoming generally accepted. Long before *A Sand County Almanac* was published, his views about wolves and other predators had swung around 180 degrees. Their importance in keeping the deer herds under control had been tragically demonstrated in the Kaibab National Forest on the north rim of the Grand Canyon (to take the most notorious example). To protect the native deer, and the sheep and cattle introduced into the forest, all large predators—wolves, coyotes, mountain lions, bobcats and golden eagles—had been systematically exterminated. The deer population exploded; the range was destroyed by overgrazing; and finally the deer themselves died of starvation and disease. Although ecologists have since questioned whether the population explosion was caused by the destruction of predators, Leopold and others then so interpreted it.

Appalled by what he saw in the Kaibab and elsewhere, Leopold abandoned his previous position. “A deer herd deprived of wolves and lions,” he concluded, “is more dangerous to wilderness areas than the most piratical senator or the go-gettingest Chamber of Commerce.” And his change of heart went deeper than simple considerations of game management. By the time he began writing *A Sand County Almanac*, he realized that the wolf embodied the very essence of the wilderness. “A deep chesty bawl echoes from rimrock to rimrock, rolls down the mountain, and fades into the far blackness of the night. . . . Those unable to decipher the hidden meaning know nevertheless that it is there, for it is felt in all wolf country, and distinguishes that country from all other land. It tingles in the spine of all who hear wolves by night, or who scan their tracks by day. Even without

*The title of Aldo Leopold's classic textbook, *Game Management* (as contrasted with “wildlife management,” the more familiar term today), is characteristic of a period when the principal purpose of saving wildlife was for sport. His early journals in particular emphasize his own delight in hunting. Later, in reference to the bird-watcher or plant collector, he remarks: “Because his kind of hunting seldom calls for theft or pillage, he disdains the killer. Yet, like as not, in his youth he was one.” And it is also true that one's sources of pleasure often change with maturity.



Aldo Leopold at his Wisconsin “sand county” retreat about 1946. He is inspecting young tamaracks planted in a low-lying spot where he hoped to establish a bog ecosystem.



Aldo Leopold and staff director Olaus J. Murie at the 1946 Wilderness Society council meeting at Old Rag Mountain, Virginia. Leopold was elected vice president.

sight or sound of wolf, it is implicit in a hundred small events: the midnight whinny of a pack horse, the rattle of rolling rocks, the bound of a fleeing deer, the way shadows lie under the spruces. Only the ineducable tyro can fail to sense the presence or absence of wolves. . . ."

Leopold had an almost mystical sense of the place of the wolf in the scheme of nature, which he dates from the time he shot a splendid old female, the leader of a pack of gamboling pups, and saw her die. "I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters' paradise. . . . Since then I have lived to see state after state extirpate its wolves. I have watched the face of many a newly wolfless mountain, and seen the south-facing slopes wrinkle with a maze of new deer trails. . . . I have seen every edible tree defoliated to the height of a saddlehorn. Such a mountain looks as if someone had given God a new pruning shears, and forbidden Him all other exercise. In the end the starved bones of the hoped-for deer herd, dead of its own too-much, bleach with the bones of the dead sage, or molder under the high-lined junipers."

TO THE PRACTICAL JOB of saving the native fauna of the Southwest from ultimate annihilation, Aldo Leopold brought both the skills of a professional forester and the insights of an ecologist. Obviously the first step in protecting any form of wildlife is to assure the integrity of its habitat. Thus it was that Leopold, a founder of New Mexico's game protective associations, conceived the idea of setting aside certain wild areas in the national forests which would be permanently off limits to logging and road building—an idea which had been implemented 30 years earlier on the state level when New York established the Adirondack Forest Preserve and adopted a constitutional amendment that it "shall be forever kept as wild forest lands." Leopold was still thinking as a member of the Forest Service, which adhered to Gifford Pinchot's doctrine of "highest use." The process of development, he wrote in 1921, "must of course continue indefinitely." But at the same time he questioned "whether the princi-

ple of highest use does not itself demand that representative portions of some forests be preserved as wilderness." Two years before, he had met in Denver a fellow employee of the Forest Service who shared this conviction. Arthur Carhart was a landscape architect employed by the Service to develop homesites on a choice spot in the high Rockies; instead, he had persuaded his superiors to keep the area free of all roads and houses. Shortly thereafter, he had done the same thing in the unique canoe country of northern Minnesota, helping to lay the groundwork for what would become our first official "Roadless Area." Although his contribution to wilderness preservation does not rank with Leopold's, the two were seeking the same goal.

The area Leopold chose for his initial effort was the mountainous Gila National Forest in the southwest corner of New Mexico, near the Arizona border: a country well known to local sportsmen, with which he himself had long been familiar. He visualized its future as "a continuous stretch of country preserved in its natural state, open to lawful hunting and fishing, big enough to absorb a two weeks' pack trip, and kept devoid of roads, artificial trails, cottages, or other works of man."

In 1924 over half a million acres of the Gila National Forest was officially designated as wilderness, thus setting the pattern for 192 such areas within the national parks, forests and wildlife refuges and on the lands under the Bureau of Land Management. To achieve official protection under act of Congress, however, would require 40 years of intensive work, and the efforts of countless talented writers in awakening the public to what was at stake. For in the final showdown, it is the votes that count.

Shortly before the Gila Wilderness was established, Leopold was transferred by the Forest Service to Madison, Wisconsin. It was a promotion, but it meant leaving a land which he had grown to love. After a few more years with the service, and private practice as a consulting forester, he was appointed the first professor of wildlife management at the University of Wisconsin—where, back in 1860, a farmer's son named John Muir first found support for ideas much like Leopold's about man's place in the universe. In 1933 Leopold published his classic *Game Management*—a work whose literary and philosophic overtones have extended its influence beyond the confines of the profession, while it remains a standard text to this day. Two years later he bought a derelict farm on the Wisconsin River, in the heart of cutover land where Daniel Muir had all but worked his children to death; and where Frederick Jackson Turner, growing up in a newly "tamed" wilderness, conceived his famous frontier thesis. The only usable structure on Leopold's 80 acres of river bottom land was a cow barn which, remodeled as a hunting camp, came to be known as "the shack."

"For Leopold and his family," writes Susan Flader in *The Sand Country of Aldo Leopold*, "the shack years were an experience in the slow sensitizing of people to land, the evolution of a sense of country. The shack originally acquired as a hunting camp soon became a 'weekend refuge from too much modernity,' a place to hike and

swim and savor the outdoors, to build with their own hands, to split oak and make sourdoughs in the dutch oven at an open fire, to play guitars and sing and talk and laugh together. It was also a place where one could experience a feeling of isolation in nature. . . . And it offered rich country for the growth of perception. The more woodcock nests they discovered, the more trees and shrubs, grasses and flowers they planted, the more chickadees and nuthatches they got to know—in short the more familiar they became with the place—the more they found to anticipate, to ponder, and to marvel at. . . . *Sand County Almanac* is eloquent testimony to the meaning and value of the experience.”

It is all of that, and more. Here it was that Leopold's rare talents as a writer and philosopher of wilderness came to fruition; here he developed a “land ethic” which has profound social—and even religious—implications for our time. Probably not since Thoreau and Muir has there been a more thoughtful, and more quotable, piece of writing on the meaning of nature to man. The first part of the book, the “almanac,” is a month-by-month record of outdoor observations based on the author's journal; like Thoreau's journal, it continually breaks through the surface to speculate on deeper meanings, as much in the realm of poetry as of science. Sawing through a huge lightning-killed oak on a February morning, Leopold recreates history in reverse as the blade bites through one growth-ring after another, deeper and deeper into the past: back through the years when “the largest pine rafts in history shipped down the Wisconsin River in full view of my oak” to the day when the acorn sprouted “perhaps on the wheel tracks of the covered wagons that once rumbled through this valley with settlers for the Great Northwest. . . . At last there is a tremor in the great trunk . . . my oak leans, groans, and crashes with earth-shaking thunder, to lie prostrate across the emigrant road that gave it birth.”

At misty daybreak in September, Leopold listens for the brief hesitant bird calls, so different from the swelling chorus of early spring. The silence is suddenly broken by a covey of quail, hidden from sight. “There is a peculiar virtue,” he writes, “in the music of elusive birds. Songsters that sing from top-most boughs are easily seen and as easily forgotten; they have the mediocrity of the obvious. What one remembers is the invisible hermit thrush pouring silver chords from impenetrable shadows; the soaring crane trumpeting from behind a cloud; the prairie chicken booming from the mists of nowhere; the quail's Ave Maria in the hush of dawn. No naturalist has even seen the choral act, for the covey is still on its invisible roost in the grass, and any attempt to approach automatically induces silence.”

Leopold lived too late to know the huge flocks of passenger pigeons that were a treasured memory for Burroughs and Grinnell and scores of other naturalists of an earlier generation. Sadly he reflects on the irony of a monument erected in a Wisconsin state park “to commemorate the funeral of a species. . . . This monument, perched like a duckhawk on this cliff, will scan this wide valley, watching through the days and years. For many a March it will watch the geese go by, telling the river

about clearer, colder, lonelier waters on the tundra. For many an April it will see the redbuds come and go, and for many a May the flush of oak-blossoms on a thousand hills. Questing wood ducks will search these basswoods for hollow limbs; golden prothonotaries will shake golden pollen from the river willows. Egrets will pose on these sloughs in August; plovers will whistle from September skies. Hickory nuts will plop into October leaves, and hail will rattle in November woods. But no pigeons will pass, for there are no pigeons, save only this flightless one, graven in bronze on this rock. Tourists will read this inscription, but their thoughts will not take wing.”

Leopold's concern was not only with wildlife but with the very land itself. “Conservation is getting nowhere,” he complained in the introduction to the *Almanac*, “because it is incompatible with our Abrahamic concept of land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.” For him, our relation to the land was as much a matter of ethics as is our relation to our fellow man.

In mid-April of 1948, Aldo Leopold received a telephone call from New York. At last, after years of being turned down, *A Sand County Almanac* had been accepted for publication. A week later, full of happiness at the prospect, he was at work at the shack when he spotted smoke drifting east across the marsh. Rushing to the scene, he joined a handful of neighbors fighting a fire that was already out of control. His heart could not stand the strain, and so he died. His book, it is safe to say, will outlive us all. In the words of Roderick Nash, an authority on the American wilderness, “it became, in many ways, the bible of the surging environmental movement of the 1960s and early 1970s.” It remains so today. The reason is clear; Leopold had framed in eloquent terms “an entirely new way of defining conservation.”*

LONG BEFORE Leopold died, this radically new definition had been officially recognized by the Forest Service. Within the decade following the establishment of the Gila Wilderness in New Mexico in 1924, two significant events had taken place. In 1929 the Chief of the Forest Service issued a regulation creating “a series of areas to be known as primitive areas, within which . . . will be maintained primitive conditions of environment. . . .” And five years later, almost by accident, a group of dedicated outdoorsmen who shared Leopold's philosophy met in the heart of the Great Smoky Mountains and conceived the idea for a nationwide organization devoted solely to wilderness preservation. The initial spark had been struck by a brilliant article in *The Scientific Monthly* entitled “The Problem of the Wilderness,” from the pen of a young member of the Forest Service named Robert Marshall.

Though Bob Marshall was only 33 years old at the time of that historic meeting in the Great Smokies, he

*A second volume, *Round River*, was later edited from Leopold's early journals and unfinished manuscripts, but it is for *A Sand County Almanac* that he will be chiefly remembered.



Bob Marshall checking new seedlings in a reproduction study in the Kaniksu National Forest in 1927 while he was assigned to the Forest Service's Priest River Experiment Station, Idaho.

already had more wilderness experience behind him than most of us enjoy in a lifetime. Born in 1901 in a brownstone house in New York City, he was the second son of Louis Marshall, a wealthy lawyer, Jewish leader, humanitarian and conservationist. Louis Marshall had been a delegate to the famous New York State constitutional convention of 1894 which provided that the Adirondack Forest Preserve be "kept forever as wild forest lands." While they were still in their teens and early 20s, Bob and his younger brother George—today one of America's leading conservationists—climbed every high peak in the Adirondacks. "When he was 15," writes George, "Bob decided to become a forester so that he might spend the greater part of his life in the woods he loved." After graduation from the New York State College of Forestry, he spent a summer working for the Forest Service in the Pacific Northwest, and the following year, with a master's degree from Harvard, he joined the staff of the service's Northern Rocky Mountain Forest Experiment Station in Missoula, Montana and Priest River, Idaho. (Later he earned a Ph.D. at Johns Hopkins.)

But devoted though he was to the Forest Service, it could not provide all the romance of his youthful dreams. When he chose this career, he later recalled, "I

didn't have the remotest idea what forestry was, but had vague notions of thrilling adventures with bad men, of lassoing infuriated grizzlies, and of riding down unknown canyons in Alaska. When I actually became a forester, I found life much more filled with keeping the meat at the fire camp from becoming flyblown, discussing the merits of various volume tables, measuring to a tenth of an inch the diameter of pine trees. . . ." By ordinary standards, his job with the Forest Service offered plenty of wilderness adventure, but he had his heart set on something beyond that, something rapidly disappearing from the face of the earth: wild country no man had ever seen. One huge area, he found, remained a virtual blank on the map: the stretch of arctic wilderness north of Alaska's Yukon River. Here he would go. During three prolonged leaves of absence from the service, he made his dream come true.

Bob had too much sense of humor to pretend that his flings at real exploration had any particular scientific or social justification, such as more solemn explorers like to attribute to their expeditions. His justification, if one was needed, was "that most glorious of all pastimes, setting foot where no human being has ever trod before." In "The Problem of the Wilderness," written just before

the first of these trips, he had remarked: "Adventure, whether physical or mental, implies breaking into unpenetrated ground, venturing beyond the boundary of normal aptitude, extending oneself to the limit of capacity, courageously facing peril. Life without the chance for such exertions would be for many persons a dreary game, scarcely bearable in its horrible banality."

His own successful escape from banality is embodied in two books: *Arctic Village*, published in 1933, and *Arctic Wilderness*, edited posthumously from his journals and letters by George Marshall in 1956.* Despite his disclaimer, there was a scientific purpose behind these explorations, notably the mapping of wholly unknown territory and the study of tree growth at northern timber line. But in his own words his "far most important though not advertised objective was gaining the absolutely unassessable thrill of just looking at superb natural beauty."

Bob's base of operations was the village of Wiseman on the Koyukuk River, a tributary of the Yukon flowing southward from its headwaters in the Brooks Range. The largest "town" in this whole vast wilderness, it consisted in 1933 of 42 occupied houses. The whole 15,000-square-mile Koyukuk region boasted 127 people, whites, Eskimos and a few Indians. From Wiseman, accompanied by one or two companions—miners, fur trappers, sourdoughs—Bob traveled on foot for days and weeks at a time into unmapped country. It was an explorer's heaven. "Often, as when visiting Yosemite or Glacier Park or the Grand Canyon or Avalanche Lake or some other natural scenery of surpassing beauty, I had wished selfishly enough that I might have had the joy of being the first person to discover it. . . . And now I found myself here, at the very headwaters of one of the mightiest rivers of the north, with dozens of never-visited valleys and hundreds of unscaled summits still as virgin as during their Paleozoic creation."

In page after page of *Arctic Wilderness* one recognizes the same sense of exaltation that Muir and Clarence King felt in the High Sierra, Olmsted in Yosemite Valley, Powell and Dutton in the depths of the Grand Canyon. Here we feel the impact of wild scenery, heightened by a sense of isolation, sharpened by knowledge of ever-present danger: "I spent more than three bright hours up there on top of the continent, looking in every direction over miles of wilderness in which, aside from Lew and Al, I knew there was not another human being. This knowledge, this sense of independence which it gave, was second only to the sense of perfect beauty instilled by the scenery on all sides. My time on the summit was spent by first giving myself to an enjoyment such as another person might experience listening to Beethoven's Fifth Symphony played by some dreamed-of super-Philadelphia Orchestra; I then took pictures and made sketch maps of the topography in every direction. I had to be careful on top because though the side from which I had climbed Limestack was gentle enough, the opposite side fell off vertically for about 1,500 feet."

Despite such almost transcendental experiences, Bob

Marshall never took either himself or his hair-raising adventures too seriously. A few days after this inspiring climb he was working his way precariously up a narrow valley beside a rushing torrent. "There was a stretch of about 40 yards which totally absorbed my attention as to how to place my feet. When I looked up, my heart stood still, as the books say. About 150 feet ahead were three grizzlies. This may seem like a long distance to a catcher trying to throw a man out stealing second, but not to a man faced by three bears, 11 miles from the closest gun, 106 from the first potential stretcher bearer, and 300 from the nearest hospital. As in Goldilocks, the first bear was small, probably a two-year-old, the second was of medium size, the third appeared like two elephants plus a rhinoceros. They reared up, one after the other, from little to gigantic, just like so many chorus girls going through some sprout in sequence. They stood for a moment and then got down on their four legs and disappeared into willows. I continued upstream."

BACK IN WISEMAN between journeys, Bob found time to write letters home which were duplicated for a small circle of his friends. These included Supreme Court Justice Benjamin N. Cardozo, whose warm acknowledgement goes straight to the core of the nature writer's art: "I suspect that being close to nature, as you have been during these many years, has an influence, in the end, even on one's choice of words. One no longer has any patience for thoughts or for phrases that are not genuine and honest. And how deftly you blend the concrete and the abstract. 'Every mountain was covered with snow, every peak showed a clear white edge set against a pure blue background. Almost everything in life seems to be at least somewhat blurred and misty around the edges and so little is ever absolute that there was a genuine satisfaction in seeing the flawless white of those summits and the flawless blue of the sky and the razor edge sharpness with which the two came together.' I call that fine."

Perhaps the most significant discovery that Bob Marshall made in northern Alaska was the relation of wilderness life to human happiness. He returned from his first trip with the impression that the few white and Eskimo people who were scattered through this remote region were the happiest folk he had ever encountered. He knew, however, how mistaken first impressions can be. "And so," he writes, "I decided to return for at least a year in order to make a detailed study of this civilization of the North." The result was a unique book, *Arctic Village*, published in 1933 and an immediate best seller. His account of the people of the Koyukuk should bury once for all the simplistic notion that to love nature more is to love people less.

This is patently untrue of most of our best nature writers—never more so than in the case of Bob Marshall, whose love for the sourdoughs and Eskimos of Wiseman, with whom he lived so intimately through a long arctic winter, is matched only by their evident love for him. Seldom has a sociological study—for *Arctic Village* is nothing less—been characterized by such warmth and

**Arctic Wilderness* was reissued in 1970 under the title *Alaska Wilderness: Exploring the Central Brooks Range*.

joie de vivre. At the same time it is utterly frank, uninhibited, unsentimental. As Justice Cardozo perceived, "in the wilderness one no longer has patience for thoughts or for phrases that are not genuine and honest."

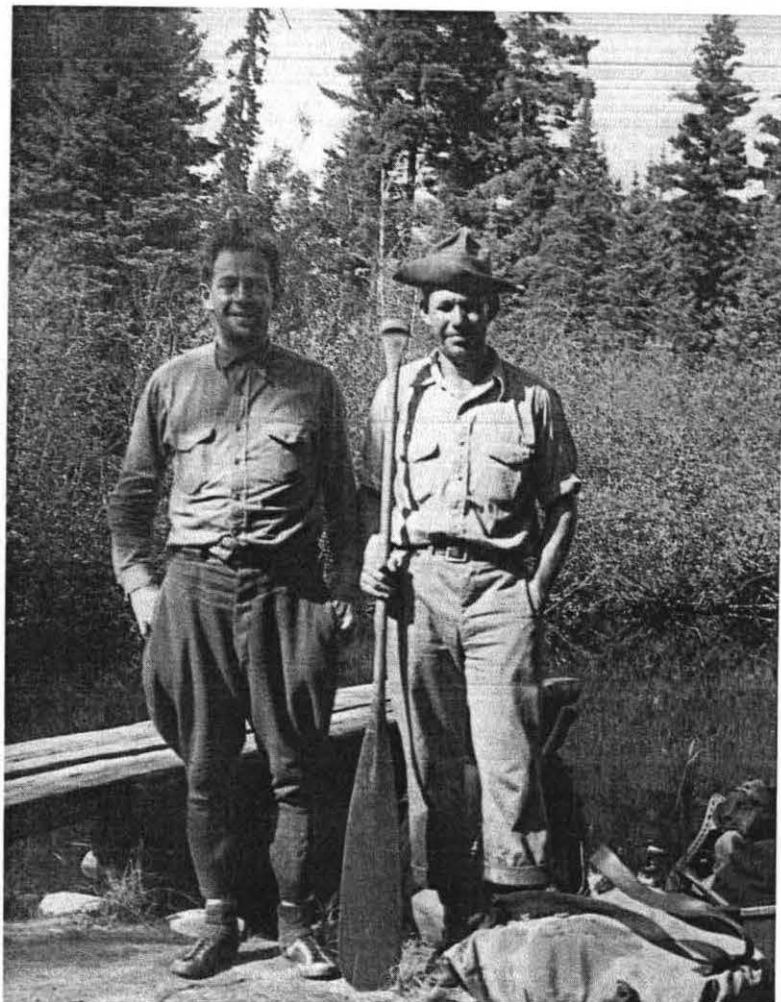
In the summer of 1934—the year after publication of *Arctic Village*—Bob Marshall was back at work, this time as Director of Forestry for the Office of Indian Affairs. By happy coincidence, his official duties took him to Great Smoky Mountains National Park at the precise moment when a group of conservationists who had read his article, "The Problem of the Wilderness," were seeking a way to save the Smokies and other stretches of the Appalachians from the encroachment of proposed skyline drives. One of them was Benton MacKaye, a one-time forester under Pinchot who in 1921 had proposed the idea of creating the Appalachian Trail and who recently had moved to Knoxville to work as a regional planner for the TVA. Another was Harvey Broome, Knoxville lawyer and Smoky Mountains Hiking Club leader, whom MacKaye had first met the year before.

Marshall was to look at possible routes for a Shenan-

doah-to-Smokies "skyway" and had wired MacKaye an invitation to meet him. A day-long motor trip through the park and a hike to the summit of Clingmans Dome offered an opportunity for thorough discussion not only of the immediate threat, but of the broader and deeper principles involved. Here in these ancient mist-clad mountains, surrounded by the greatest virgin hardwood forest left in North America, the three men conceived a plan for uniting (in Marshall's words) "all friends of the wilderness ideal." By fall they were joined by Aldo Leopold and four other like minds: Bernard Frank, a TVA forester; Harold C. Anderson, an organizer of the Potomac Appalachian Trail Club; Minnesotan Ernest C. Oberholtzer, leader of the wilderness movement in the Quetico-Superior country; and a talented writer named Robert Sterling Yard, former editor of *Century Magazine*—the same publication which, so many years before, had encouraged John Muir in his struggle to save Yosemite. So The Wilderness Society was born. "There is just one hope," Bob Marshall had written, "of repulsing the tyrannical ambition of civili-

Bob Marshall and three of his Koyukuk country hiking friends in Wiseman just before a 29-day 1938 Brooks Range trip.





Bob Marshall and Sigurd Olson on a 1937 canoe trip in the Minnesota-Ontario Quetico-Superior country.

zation to conquer every niche on the whole earth. That hope is the organization of spirited people who will fight for the freedom of the wilderness."

Marshall himself was a fighter, but a persuader rather than a preacher, whose personal magnetism was doubtless more effective than the messianic solemnity which marks some conservation leaders. In September, 1939, working once again for the Forest Service in a job especially created for him—Director of the Division of Recreation and Lands—he instigated adoption of regulations for reclassifying national forest primitive areas as wilderness or wild areas and managing them as protected wilderness. This was a giant step toward what in 1964 became the National Wilderness Preservation System. Still in process of expansion, the system now embraces more than 21 million acres of our federal lands.

The 1939 regulations were Bob Marshall's crowning achievement. Two months later he was dead (like Aldo Leopold, of a heart attack). The vast, rugged Bob Marshall Wilderness of Montana is named in his honor. But today one thinks of him first of all as the man who knew, as few white men have, the greatest wilderness of them all, northern Alaska.

Marshall lived just long enough to see his commitment to wilderness accepted as Forest Service policy. Execution of this policy, however, was still a matter of administrative decision, always subject to change. Another quarter-century would pass before Congress could be persuaded to give wilderness areas permanent protec-

tion through federal law. During these years the conservationists' problem was primarily one of public education. Here the nature writers played a key role. Beginning in 1949, a series of biennial wilderness conferences sponsored by the Sierra Club gave them a public forum. As Daniel B. Beard of the National Park Service said at one of these meetings, "a distinct wild land or wilderness literature is required to bring into positive focus the values of such areas and such conditions to modern society." By 1961 Sigurd F. Olson, famous for his books on the Quetico-Superior canoe country, was feeling optimistic: "It seems like a monumental task to try to get our story across to the people, but when you look at the books that have been written recently on wilderness, the articles that have been written . . . the fact that Congress is piling up millions of words in testimony for and against wilderness—these things to me are encouraging. Ten years ago this would have been impossible."

More and more Americans were becoming sensitive to their natural surroundings as they took a fresh look at the world through the eyes of our literary naturalists. More and more of them visited the national parks; and thanks to the Park Service's interpretive nature programs, fewer of them inquired with disappointment, "but what do we do here?" With knowledge came greater enjoyment. The value of wilderness areas to science—their importance as "outdoor laboratories"—was now recognized. The principles of ecology (a word that has since been degraded by misuse) were generally understood for the first time, as plants and animals were seen not simply as individuals but as part of a balanced, interdependent community. Along with this went a growing appreciation of the esthetic and spiritual values to be found in wild nature unmanipulated by man.

This was all very well, but in practical terms the problem was to translate these broad principles into votes on Capitol Hill. In 1956, a wilderness bill was introduced in Congress, drafted by one of the country's most articulate, experienced and effective conservationists, Howard Zahniser of The Wilderness Society. Year after year it bogged down in committee, as the opposition, spurred on by the logging, mining, oil and grazing lobbies, used every parliamentary trick to keep it from coming to a vote. But the public pressure was too strong to be resisted forever. On September 3, 1964, the bill became law. As Michael Frome has written in *Battle for the Wilderness*, "Virtually every happening associated with wilderness, both before and after the passage of the [Wilderness] Act, demonstrates that only the enthusiasm of people can make it work. An enlightened and involved public stands as the hope between the remaining parcels of wilderness and oblivion."

Paul Brooks, who for many years was editor in chief at Houghton Mifflin Company, wrote "The Pursuit of Wilderness" and "Roadless Area," which won a John Burroughs Medal. This article is drawn from "Speaking for Nature: How the Literary Naturalists from Henry Thoreau to Rachel Carson Have Shaped America," to be published by Houghton Mifflin in October. (Copyright © 1980 by Paul Brooks.)

They proved their willingness to swap land for peace in the Camp David accords. And they have demonstrated on numerous occasions that they are willing to sit down at the peace table with their other neighbors.

Finally, the people of Israel are perhaps our closest friends and allies. Our two people share in common a commitment to liberal democratic values, an ethical system rooted in the Old Testament, and a pioneering spirit born of religious persecution and forged in a fight for independence.

Mr. President, I hope my colleagues will join me in sending congratulations and best wishes to the people of Israel on the occasion of their independence celebration.

HEALTH CARE

● Mr. SIMON. Mr. President, a great deal has been said lately about the quality of health care in the United States. And fingers of blame and criticism have been pointed in many directions.

One of the health provider groups that seems to get hit from all sides is our Nation's physicians. With increasing medical malpractice costs, accusations of unnecessary services and excessive charges and with proposals to bring physicians in under the DRG's, doctors have found themselves increasingly practicing defensive medicine. And we have all heard about the profitability of private practice.

Not all of the charges and allegations appear to be without some degree of merit, but likewise, such generalizations are hardly universally true.

It is difficult to find good news in health care these days. It is difficult for all of us to graciously accept our shares of the burden, be they financial or moral. One does not need to be a physician to appreciate the difficulty in maintaining a fair and balanced perspective of public service.

And so I was delighted to find, in the May 8 American Medical News, an opinion editorial by Dr. Forrest P. White of Norfolk, VA. He wrote of his own personal experiences in medicine, his reasons for entering the profession—complete with its ups and downs. It is pertinent, I think, not just for physicians, but for all of us who, from time to time question the rewards of public service. It is provoking and I recommend it for the enjoyment of my colleagues.

I ask that the following article be printed in the RECORD.

The article follows:

"DOUBLE JOY" STILL EXISTS IN MEDICAL PRACTICE

(By Forrest P. White, MD)

As I join my colleagues in deploring the changes in medicine, I realize that economically I'm heading back toward where I started—indeed, toward where I expected to be near the end of my medical career. Those of us contemplating medical careers in the '30s and '40s expected to live a pretty hard life. We were motivated by the twin joys of

learning and of helping people. Sure, we didn't expect to be actually poor, but very few looked on medicine as a way of getting rich. We followed our inclinations and our role models into various specialties with little thought of which would be more lucrative. Even if I had known that my switch from radiology to pediatrics would result in about 30 percent less lifetime income, I would have said, "So what?"

Now that forces beyond our control are changing the way we practice medicine, I keep reminding myself that the double joy is still there: I'm learning fascinating things every day, and every day I can help people in some way. As long as they don't take that away, they can't make me sorry I'm a physician.

Sure, I detest the constraints being put on the practice of medicine. But there have always been constraints. When I started practice in 1950 we all took care of a certain number of no-pay and poor-pay patients, and attended clinics with no thought of remuneration. It was very frustrating to be able to do so little for patients who often needed so much. I attended clinics run by the Norfolk City Clinic of the King's Daughters, who looked after the poorest of the poor. When we saw a child with an infection of any kind, the best we could usually do was to write a prescription for sulfadiazine, which could be obtained from the health department in tablet form, to be crushed and gotten into the sick child the best way the mother could. There were a few beds in the clinic building where very sick children could be kept overnight to receive penicillin shots and hypodermoclysis.

King's Daughters never turned a child away, but what we could do for them was severely limited. Of course, things were much worse only 20 years earlier. William Carlos Williams, the pediatrician poet, expressed it with controlled pathos when he told of the feeling of guilt at saving a bright-eyed little girl from a serious disease, knowing she would go back to a founding home where death was almost inevitable. Now that's talking constraints!

Physicians of my generation saw Medicare and Medicaid come in. We were glad that the elderly and the poor young would be given care, though we knew full well that no system of unlimited medical services could survive indefinitely. The widespread development of private medical insurance expanded our economic base, as well as our ability to offer our private patients maximum care. These third-party payers allowed our hospitals to develop in an unbelievable manner. King's Daughters still turns no child away, but now the typical problem is how to get another million out of the state legislature for the Children's Hospital's state-of-the-art intensive care units.

It seems to me that the beginning of the end of the physician's merry economic ride came with the nearly universal adoption of the "usual, customary, and reasonable" (UCR) concept. Each physician would be paid for each visit or procedure the rate that 90 percent of his colleagues were charging. The trouble was, as soon as that level became known, it instantly became the minimum fee, and everybody kept pushing ever higher until a new UCR was reached, which again became the minimum, and on and on. Thanks to insurance, we physicians no longer had to worry much about our patients' ability to pay. Third parties had allowed us to take our services out of the marketplace and charge essentially what we wanted. No matter how conscientious we were, escalation became inevitable.

The surprise is that our comeuppance appeared not from the liberal left but from the conservative right—from businessmen

who found that health care costs were severely limiting their ability to compete with imported products. They had to wield the cost-cutting ax, and couldn't worry too much on whom it might fall.

Now we're faced with a whole new set of constraints, and many think we're going back to a two-tiered system of health care. I regret this as much as the next physician. I chafe at government and third party intervention. But I realize that things are not as bad as they used to be. Our ability to look after our patients is still far ahead of what it has ever been, and our financial status is still far advanced in comparison with physicians in other countries, and with the economic mean in our own.

Perhaps we need to face the fact that our services are not worth quite as much as we thought they were. This is especially true for procedures versus cognitive medicine. Looking at the whole fabric of American life, perhaps it doesn't make sense for so many Jaguars and mansions and offshore bank accounts to belong to physicians. Of course, I'm glad to have been around when even we pediatricians, along with the general practitioners and family practitioners at the bottom of medicine's ladder, were doing pretty well. I feel sorry for the young men and women who mortgaged their future to the hilt to get through med school, in the full expectation that the payoff would come soon. They may be analogous to the farmers who thought that the price of an acre of fertile land could only go up.

Maybe my attitude is analogous to that of the optimist who, after falling off the top of the Empire State Building, called out to a window washer on the 27th floor, "OK so faaaaar." Still, I urge my colleagues to keep a sense of perspective as they read the doom and gloom editorials in every medical society publication. Yes, we've lost some freedom and, yes, there are many battles still to fight. But let us not forget that we're practicing a fascinating and noble profession in a wonderful country. Whatever the forces arrayed against us, let's not allow them to take away that job.

100TH ANNIVERSARY OF BIRTH OF ALDO LEOPOLD

● Mr. KASTEN. Mr. President, this year marks the 100th anniversary of the birth of one of America's foremost conservation leaders. Aldo Leopold was both a leading practitioner of wildlife management principles and shaper of national policy on environmental conservation.

I ask that a copy of a recent article from Wisconsin Natural Resources describing some of the achievements of Mr. Leopold be printed in the RECORD.

In addition, I ask to have printed in the RECORD a list of additional cosponsors of Senate Joint Resolution 40.

The material follows:

Aldo LEOPOLD

(The year 1987 marks the 100th anniversary of the birth of Aldo Leopold. World renowned for enunciating the land ethic and founding the science of wildlife management, Leopold had a special connection with this magazine. Several chapters of his most famous book, Sand County Almanac, were first published in the old Wisconsin Conservation Bulletin. The Bulletin changed its name and became the publication you're now reading, Wisconsin Natural Resources in 1976.

While commemorative events are planned in Leopold's honor nationwide this year, they have a deeper meaning in Wisconsin where his ideas were nurtured and turned into action. Leopold served as head of the US Forest Products Laboratory in Madison, as a professor and department chairman at the University of Wisconsin and as a member of the Wisconsin Conservation Commission before it became the Natural Resources Board.

As part of the 100th anniversary, DNR has designated 1987 as the "Year of Leopold" and scheduled a variety of activities in his honor. Numerous other Wisconsin institutions will also commemorate him during the next 12 months. To make sure details of these events get to the public, DNR will inform the media and other interested parties as schedules are received from various organizations.

This magazine's celebration of the Year of Leopold begins here with the story by Clay Schoenfeld, a student and colleague of Leopold's. During the rest of 1987, Wisconsin Natural Resources will reprint Leopold essays first published in the old Bulletin between 1943 and 1946. While some were included in a Sand County Almanac, others were not, but are charming examples of the Leopold philosophy and style.

Wednesday, April 21, 1948 was one of the first real days of spring in the valley of the Wisconsin. The sun glinted brightly on the swollen river. Frogs croaked incessantly in the sloughs. And in the air was the piquant smell of grasssmoke as the farmers along the Baraboo hills went about their spring burning.

Down by Plummer's Marsh, in Sand County, Jim Reagan's grass fire began to get out of hand. A neighbor, planting young Norway pines nearby, saw the danger and ran over a help. He filled a bucket of water at the farm well and disappeared in the billowing smoke. He never came back.

Yet in a larger sense Aldo Leopold is not gone. Today his figure towers like a veteran oak over a forest of seedling environmentalists seeking that "ecological conscience" Leopold bespoke.

Oddly enough, eight years earlier to a day I had tramped with Aldo Leopold that same Plummer's Marsh where he was to die of a heart attack at the untimely age of 62.

"It is a revelation to walk in the open with the Professor," my field journal reads for April 21, 1940. "Every grass blade is a challenge, every bird a question. High points of the day: a pair of mallards feeding in the shack 'front yard,' a big hen woodcock flushing near an inky-black pothole, grouse droppings three inches deep under a grape tangle, two deer bounding across the road, Estell's pet squirrel, and Mrs. Leopold's stew."

After a similar inspring hike with the Leopolds at their sand county acres the next fall, I reported in my column as editor of the University of Wisconsin student *Daily Cardinal* that "Aldo Leopold is undoubtedly one of the great figures in American conservation."

At the time such a statement could stem only from a personal acquaintanceship. While it was true that Leopold was widely recognized then in professional circles, even later, at the time of his death, he was virtually unknown to the public at large. Many of what were to become his most famous essays had already appeared in such journals as *Bird Lore*, the predecessor of *Audubon Magazine*, but a frustrating number of publishers had rejected his *Sand County Almanac* concept.

This is a sentimental visit to the Aldo Leopold I saw for 14 years, to the tints and shadows of a very human being. As H.

Albert Hochbaum, one of his perceptive students, once wrote to him: "It is only by accepting ourselves for what we are, the best of us and the worst of us, that we can hold any hope for the future." In partial response Leopold was to compose "Thinking Like a Mountain," the single essay that best traces the evolution in his own thinking, up blind alleys and down bright paths. "The important thing," Leopold said, "is to strive." The opportunity to share in his striving is the Aldo Leopold legacy.

The general outlines of the Leopold career are well documented. From a boyhood in Burlington, Iowa, he had gone on to acquire a professional degree from Yale's School of Forestry, only recently endowed by the parents of Gifford Pinchot. He then immediately joined the burgeoning U.S. Forest Service in the Southwest in 1909. Leopold instinctively grasped an as-yet-unnamed "ecological" approach to forest management. His concern ranged far beyond cellulose production to include watershed protection, grazing, fish and wildlife conservation, outdoor recreation, and, particularly, the idea of designated wilderness areas preserved inviolate. The Forest Service may not have known quite what to do with a man of such eclectic interests. Despite a severe bout with nephritis Leopold rose steadily up the field ranks, but when he was offered a Washington assignment he declined. In 1924 the Forest Service sent him to a post as associate director of the U.S. Forest Products Laboratory at Madison, Wisconsin. As a capable administrator Leopold plunged into his new assignment with his usual gusto. But his heart was really not in the technical problems of converting sawdust into wall board, and he returned to his commitment to game management by helping sportsmen in a reorganization of the Wisconsin Conservation Commission. His Isaac Walton League friends thought he should be appointed Department Director. When that did not materialize, Leopold resigned from the Forest Service in 1929 to undertake a monumental game survey of the North Central states under the sponsorship of sporting arms and ammunition manufacturers. Meanwhile, his prolific pen was bringing him to the attention of readers of varied conservation periodicals. Then in 1933 he brought out his classic treatise on *Game Management*, and was called to be professor of game management at the University of Wisconsin, a new chair funded by a special grant from the Wisconsin Alumni Research Foundation. The rest is history I can try to interpret from memory. Aldo Leopold was a multifaceted person. All I know is what I saw and admired. Others may have varying perceptions.

I first met Aldo Leopold in the early spring of 1934. He came to the small-town Wisconsin high school where I was a sophomore to organize a "Youth Conservation Club." The activity was typical of the man. Unlike the impression you might draw from *Sand County Almanac*, Leopold was no philosopher-writer operating in an attic, nor a latter-day Thoreau musing beside some Walden pond. He was invariably out on the hustings organizing people. The number of leagues, associations, and societies he fomented, founded, or fostered exceeds a score.

The program he proposed for our conservation club was also vintage Leopold. We weren't supposed to make wildflower scrapbooks or bird life lists; we were going to help build up huntable populations of ringneck pheasants and Hungarian partridge on nearby farmland. Leopold had just signed on a group of farmers and sportsmen at crossroad Faville Grove in a wildlife research and development project, and we

high school students were to be the privates in a holy war—planting shelter belts, stocking hens, counting nests, marking pullets, warning poachers, collecting gizzards, filling feeding stations, recording weather data—all around the calendar.

The whole arrangement was pure Leopold. Federal alphabet agencies were already abroad in the land, but Leopold has a profound disrespect for bureaucracy, and little confidence in Washington sticks and carrots. Ours was to be a local, voluntary cooperative. The farmers were to loan land in exchange for trespass control. We pupils were to invest muscle and sweat in exchange for free ice cream. Leopold put in managerial time for access to an outdoor laboratory. This Jeffersonian faith in grassroots action as opposed to big government was a Leopold tenet throughout his life. While the National Environmental Policy Act indeed became in a sense the institutionalization of Leopold's own dictum that "a thing when it tends to preserve the integrity, stability, and beauty of the biotic community," what Leopold personally would have thought of the EPA apparatus in problematic, although he certainly would have applauded the NEPA insistence on public involvement in land use planning.

A goodly number of us Lake Mills sophomores volunteered with alacrity for duty with Leopold. The mission was exciting, but it was more than that. Leopold was a born leader in a very physical sense. The studio portraits most people associate with him suggest a sort of benign countenance befitting a halo. In person Leopold didn't come on like that to me at all. Remember the opening scene in the recent movie, *Fallon*, in which George C. Scott strides out to dominate an otherwise-empty stage? That was somewhat the Leopold I knew. He had what the army calls "command presence," exuding a certain tall-in-the-saddle air. Even this street attire often had a field-campaign flair. Students in his classes were always alerted to his approach down the corridor by the lively "click-click" of the steel plates he wore on the heels of his shoes. Put another way, the Professor could be like a dynamic chamber of commerce secretary, which indeed he actually was for a time in Albuquerque, New Mexico. Or say he had "a courtly quality which simply wowed the ladies," as a contemporary recalls. Unquestionably, in Susan Flader's assessment, he was no introvert; he was "extraordinarily persuasive in personal contact—a master at appealing to diverse interest groups."

Each of us who knew Aldo may recall his personality in different ways, but all of us would agree with Frederick and Frances Hammerstrom that he had a compelling "magnetism." Yet it was no put-on. We would likewise agree with Professor Robert McCabe that here at heart was the epitome of the "kind, sincere, gentleman."

Another basic side of Aldo Leopold came through very quickly to us conservation clubbers. We weren't simply to be field hands; we were to observe, to ask questions, to try to put things together; in short, to "perceive," as he later called it. We were to begin to practice "deep digging" for facts, yet we were not to be blind to natural beauty.

On one of our first spring excursions with The Professor, as we all called him, we "drove down to the prairie to get a count on the upland plover, which had just arrived back from South America." My field journal for the day tells how we began to apply Leopold's ornithology lessons:

"We watched one bird beat up high in the sky, its eerie twitter coming down the wind. Then it plummeted to earth, elevating its

wings after alighting and then carefully folding them on its back. The birds seemed to be paired already, and were sneaking about in the grass as if investigating nesting sites, as well as feeding on insects. A bird of one pair had a distinct yellow bill, the other a drab brown one. I thought this might be a sex characteristic. But The Professor said it was a sign of each bird's age."

Leopold was later to immortalize the upland plover in his *Almanac* vignette called "Back from the Argentine."

Our exposure to Aldo Leopold at an early age made a lasting impression on at least three of us sophomores. Unable to encompass the whole Leopold, one of us is now a research geologist, I purport to be a professor-writer, and another of us is an evangelical preacher.

With Faville Grove well off the ground, Professor Leopold bowed out as sole director in 1935 to move on to new fronts: taking an eye-opening sabbatical in Germany, forming a pioneer department of game management at the University of Wisconsin, and buying his sand county acres. The latter, incidentally, was not to be just a retreat; it was to be a family laboratory where there was peace, happiness, and creativity as the Leopolds sought "to take a tract of wornout land and bring it back to its original state of harmony," as his oldest daughter Nina recalls.

In Leopold's stead at Faville Grove, we conservation clubbers were ably tutored by two of Leopold's first graduate students, Arthur S. Hawkins and Irvn O. Buss, both of whom went on to distinguished careers in wildlife biology. In the process, Art met and married an ardent club member, Elizabeth Tillotson, whose grandfather was the Faville of Faville Grove.

I next heard from Aldo Leopold in the spring of 1937. After high school I had gotten a job as combination reporter-editor-printer's devil in my hometown weekly, the *Lake Mills Leader*, where I proceeded to give front page news coverage to a favorite topic—the Faville Grove Wildlife Area. "Predators Insignificant When Compared to Farmer's Mower," one headline read—a story about field research into why we weren't getting an upswing in natural pheasant reproduction because ringneck nesting habits conflicted with land use patterns. The Professor liked the report, and took time to pen me a hand-written note of encouragement.

What Leopold wrote was in effect what he later told the Wildlife Society in his 1940 presidential address, that there was a real need for wildlife people with a writing bent, or vice versa. "These intergrades in human taxonomy," he was to say, "are perhaps more important than those which so perplex the mammalogists and ornithologists. Their skulls are not yet available to the museums, but even a layman can see that their brains are distinctive."

It wasn't going to be easy, Leopold told me. He knew from practice. Although his felicitous style may seem to have distilled on his paragraphs like dew, the Professor worked diligently at diction. I was later to see in his office the sheets of yellow ruled copy paper that gave clear evidence of considerable carpentering. His offhand field notes in Round River bear little resemblance to the polish cadences of his much-recast "Land Ethic."

Many of the Professor's essays were initiated as convention speeches or poems. The necessary absence of the convoluted sentence helps account for his high marks on modern readability scales; that, and his nice feeling for metaphor, simile, and the alliterative phrase. While in their original form Leopold's writings were often highly topical,

their sentiments invariably looked far down the road to the future. The man's sense of vision was positively uncanny. Although "The Land Ethic" did not enter the ken of the general public until the publication of a paperback Sand County in 1966, that seminal essay had actually appeared in truncated form as early as 1933 in *The Journal of Forestry*. Today's environmentalists may find it hard to reconcile the thrust of the essay with the official publication of the Society of American Foresters, unless they remember that Leopold was a card-carrying member and contributing editor. Otherwise it is quite likely his unconventional message would not have found acceptance. He must have thoroughly enjoyed pricking the conscience of his colleagues. Indeed, a sophisticated sense of humor was a Leopold trademark, exceeded only by his rare ability to make manifest in compelling words the intrinsic beauty and insidious degradation of "the organism called America," words as pulsing and provocative today as in the years they were honed and sharpened.

To become a specialist in conservation reporting: that was challenging advice for a junior journalist, and I took it to heart, enrolling that fall as a freshman at Madison. By chance, my laboratory partner in Botany 1a was Carl Leopold, youngest of the three Leopold boys, now Dean of the Graduate School at the University of Nebraska. Through our friendship then I gained occasional entrée to the Leopold family circle. It was a close, happy family, marked by music and quiet laughter. Yet its collective style was patrician. For example, the Leopold table was well-set. You didn't eat with the Leopolds; you dined, at least so it seemed in the eyes of a country preacher's son. The Leopolds were a family of some substance. If your desk is made of hardwood, inside the center drawer you may find a little plaque bearing the Leopold family crest. Leopold had been educated at private Eastern schools. Mrs. Leopold was of old Southwest Spanish landgrant sheep rancher lineage. Their relative security gave Leopold the perspective to tell the US Forest Service off on at least two occasions. At ease with business and businessmen, the Professor never proposed that the laws of ecology should repeal all the laws of economics. A close family friend was a prominent manufacturer and "boss" of the Wisconsin Republican Party. Leopold himself was no party man, but he accepted politics as the grease that made the gears of government go. I'm sure he would have welcomed the environmental movement as a long-overdue revolt against the fat-cat complacency of our culture, but I don't think he would have gone as far as some environmentalists in rejecting "the system." As he said in the foreword to *Sand County Almanac*, "one must make shift with things as they are."

All the Leopolds had a nice feeling for the fitness of things. They did not carry the trappings of a good life into the out-of-doors. Their Sand County shack was literally that, a slightly-remodeled ex-chickenshed, with only a fireplace for cooking and warmth, and no indoor plumbing. For them, the horse was the only proper mode of transportation in western wildlands, and the hand-made bow and arrow the proper weapon for stalking deer. It was a Leopoldian sense of fitness that could conceive our system of national wilderness preservation areas so early as 1919 when the rest of the country was not yet ready to accept a blank space on the map.

The young eco-activists in my university classes today tend to reject the idea of an "establishment" Leopold, and it can be overdrawn, of course, but any image of Leopold as a Muir-like "trampo" is equally errone-

ous. I do not remind my air-pollution-conscious students that the Leopold they revere was a smoker. It is really irrelevant. The expensive commissioned oil painting of him, towering down in the new Wildlife Ecology Department reference room on the UW-Madison campus today, and otherwise not-too-likelike portrait, does indeed display Leopold with cigarette in hand, and the Rierson Studio photograph he once selected shows him nonchalantly puffing a pipe. Yet he tried to keep his smoking down to a minimum, and often would leave his cigarettes behind when he was heading for the Shack for a weekend. If he had lived to read a surgeon general's report, he would probably have sworn off for good.

Another aspect of Leopold my students try to reject as a momentary aberration is Leopold's role as a hunter. But it can't really be done. By his own admission, as a growing man he had "congenital hunting fever." It is no accident that his *Almanac* includes a sketch called "Red Legs Kicking," the account of the dignified death of the boy Aldo's first black duck. Only a committed hunter would preserve such a moment.

Yet a Leopold ruffed grouse hunt was no search-and-destroy expedition; it was a ceremony, complete with ritual and incantation, as we played the role of substitute for fox or hawk. And the stage setting was an essential part of the drama—a staunch dog, invariably called Flick, forging through "smoky gold" tamaracks or coming on point in a tangle of blackberry "red lanterns." With profound respect we matched the quarry against only light double barrels, and reverently dissected any harvest in a continuing study of food habits, disease, and population dynamics.

Leopold abhorred the conduct of "goon" hunters, and inveighed against them, but he would have surrendered to no one his own right to gather game in a sportsmanlike manner. If he were here, he would undoubtedly participate in today's debate against anti-hunting sentimentality. Yet I doubt he would have joined the self-righteous uproar that followed the showing of *Guns of Autumn*. He would more likely have pointed his own verbal guns at the hunting abuses the TV camera may have exaggerated but did not invent. In his later years he spent as much time studying bird songs as he did hunting, and what is perhaps his most scientific paper is on that subject. It was his personal "voyage of discovery" onto a high sea of perception, a rejection of the "factory-made gadgets," "where-to-go" management mentality, and abominable ethics that could destroy for Leopold the personal and cultural values in sport hunting.

Leopold certainly wouldn't have much empathy, either, with some current "environmental education" doctrines: the proposition, for example, that environmental education is some mysterious, existential, affective "process," divorced from tough ecological cognitive content. I know from sharp experience. As a student in his then-unique Wildlife Ecology 118 course at the University in 1940-41, I had a number of papers rejected because my answers to his weekly questions were more platitudinous than precise.

The first class day, my notes record, Professor Leopold lectured on Ecological Principles, and wrote on the boards his "criteria of conservative land use: (1) maintain soil fertility, (2) preserve the stability of the water system, (3) yield useful products, and (4) preserve the integrity of fauna and flora to a reasonable degree." As he told us, "There is something more than esthetic grounds for writing Number 4 into this list of criteria; in the long run the stability of

soil and water systems will be maintained only with the protection of flora and fauna." Thus "the most important question in history becomes, how and to what extent can biotas adapt themselves to violence?" Leopold then went on to ask us who could be counted on to cherish which criterion in the above list. His answer: the agricultural college, 1, 2, and 3; the sportsman, only 3; the forester, 2 and 3; the erosion engineer, 1, 2, and 3; and only the nature lover, 4. Conservation, we gathered, was not simply preservation; it was wise use. But "use" in the Leopold lexicon was defined to encompass an ecological imperative at once utilitarian and universal—an ethic of community life; and his community included "the soil, waters, fauna, and flora, as well as people." His inclusion of people was not accidental; it was they who could bring to hear a conscience that would cease being intimidated out of hand by the argument that an action is impossible if it does not yield quick profits, or that an action is necessarily to be condoned because it seems to pay: "That philosophy is dead in human relations, and its funeral in land relations is long overdue."

Here was Leopold in essence, a forecast of the *Sand County Almanac* to come.

Any hunch that a Leopold course was simply a series of nature essays would be erroneous. There were 99 tomes on his list of required readings, and a weekly quiz that tested our acquisition of what those readings contained. The core of the course was a series of practical field trips on which we were expected to demonstrate clear competence in reading the landscape through ecological glasses.

Our final exam in 118 took place on a back 40 west of the campus. After a morning of field observation we were to describe in detail the existing biota and interpret thereby the history of the land use on that particular plot. There was no way you could "mix" that test without a good working knowledge of botany, zoology, soils, climate, and farm practices. A mood essay wouldn't cut it at all. I got a "B-," which did nothing for my ego but a great deal for my determination to "perceive."

Yet I do not mean to picture Leopold as a classroom czar; quite the contrary, he was as patient as he was demanding. Art Hawkins vividly recalls how he and the Professor struggled together over a thesis: "On the days I went to his office, he always cleared his desk of personal business, closed the door, and listened to me attentively. Nothing in the world was so important as my manuscript, or so he made me feel. It went through about 13 drafts. In this way he built confidence in his students. No other teacher I've ever had could compare with him in abilities of this kind." This was the Socratic Leopold who, as Charles Bradley recalls, "never tired of asking the questions that ended by blowing my mind, revealing me to me, and me to him."

That Leopold was a stickler for facts, a generation of his students can attest. But he never assumed that a learned degree necessarily signified knowledge, nor that knowledge could be discovered only in fancy laboratories. He was a great believer in what the amateur could learn on a corner lot, given the eyes to see. He had a profound admiration for an Ohio woman who made major contributions to the science of ornithology by studying song sparrows in her neighborhood.

His own lack of a PhD never bothered Aldo Leopold, but it did seem to bother some of his faculty colleagues; that and the paucity of so-called "solid" research papers in his existence bibliography. Not knowing quite what to do in 1933 with one of the

country's first professors of game management, the University put Leopold initially in the department of agricultural economics in the College of Agriculture. E.B. Fred, distinguished bacteriologist, dean of the Graduate School, and later a great president of the University, always harbored certain doubts about Leopold as a bona fide scholar. When I was President Fred's special assistant and confidant after World War II, he once told me he knew Leopold "had something" but he wasn't sure exactly what. The feeling was shared by some other orthodox UW scientists, but not by Leopold's close compatriots or students. We knew him, as Susan Flader has written, for "his youthful, inquiring mind, his openness to new ideas, his willingness to move in new directions," the intellectual drive he demanded and the lifting language he inspired.

The Professor liked to go to bat for the students in whom he saw promise. When Dean Fred wouldn't admit Al Hochbaum to the Graduate School because of an undergraduate "gentleman's C average," Leopold had a long talk with the Dean—and got Hochbaum accepted on a year's probation. Al went on to make profound contributions to waterfowl management.

It is one of life's little ironies that an Aldo Leopold type without a doctorate could not now get appointed as an assistant professor in the department he founded, much less get promoted to tenure. I can almost hear the Professor sputter and stomp about that. If Leopold had lived to see the E-Day era, of course, he would have acquired a drawer-full of honorary degrees—which he might or might not have cherished as much as the revolver and watch grateful New Mexico sportsmen once gave him.

I did get an "A on one Wildlife Ecology 118 paper. Like any professor, Leopold was not immune to the charm of a student giving back to the professor what the student heard in class:

When it comes to conservation, we sportsmen remind me of my dog. If my dog runs into another dog too big for him, instead of dealing with the other dog, he deals with a tree bearing his trademark. That way he saves his ego without exposing himself to danger. Just so we sportsmen often deal with bureaus and laws and programs, which are the symbols of our conservation problem, instead of dealing with the land and its products and ourselves, which are the problem.

That can be recognized as a sort of plebian version of Leopold's own "ecological conscience." In a slightly different form it was later to appear over my bi-line in a *Sports Afield* article called "Conservation Needs Reconversion."

In the late spring of 1941 I joined the Leopold crew for the annual wildlife census on the University Arboretum. It was the last time I was to see him for five years. Along with most of his students, I trooped off to war that June. It was while we were gone that he had time to begin to put together *Sand County Almanac*, and to plunge into state biopolitics as a Conservation Commissioner. I kept in touch only through reports from Robert A. McCabe, the Faville Grove manager at the time, who very kindly often visited with my father. Bob now chairs the department of wildlife ecology at UW-Madison. He still refers to Leopold eloquently as "the Boss."

Art Hawkins and I did make a sentimental journey back to Faville Grove in the fall of '41, hitchhiking from army posts in the West. We hunted mallards together on the marsh, but the Professor couldn't join us. We've always regretted that. While he was in service, Art left Gus, his German shorthair, with the Professor. Gus' last hunt is recorded in *Round River*. His first hunt was

not so noble. As Art and the Professor launched out of pheasants from the Faville Grove barnyard, Gus came immediately on point. When the gunners closed in, Gus broke point and retrieved a squealing piglet. As Art says: "This was my most embarrassing moment, ever." Under the Professor's training, Gus became a polished performer. With dog or horse Leopold was the soul of himself: "softly strict, certain of obedience, yet indulgent of some dalliance." A hunting dog was simply a part of the Leopold family. When you dined at the Leopolds you were always aware of a "Flick" flopped down nearby.

During the war, Leopold got up to his neck in a knock-down and drag-out fight over Wisconsin's whitetail deer management policy. The Wisconsin deer herd had irrupted, steadily eating itself out of house and home, leaving ruined range, starved fawns, and stunted bucks. It was the Kalbab Plateau problem all over again, and Aldo knew the only answer was a substantial reduction in the deer population, via the gun in the absence of natural predators. But Wisconsin's deer hunters, brought up on the sanctity of short seasons and bucks-only laws, couldn't see the light, and they controlled the regulatory process through the Wisconsin Conservation Congress. What was needed was a massive adult education program.

I had no sooner returned to the campus in mid-1946 to pursue graduate work than I got a call from Professor Leopold. He had read my "Conservation Needs Reconversion" piece, and he thought I was just the guy to put some life in the Wisconsin Conservation Department's public information shop. I was flattered, but I said, "No." I was too committed to getting my master's degree under the GI Bill, and was not about to exchange one uniform for another so quickly. I was never confident the Professor really appreciated why I backed away from the campaign in which he was so totally immersed. But he didn't let any feelings make me less than welcome in the weekly seminar he began to run again. I did at least freelance several Field and Stream articles about the problems of "too many deer," one of which the Professor caused to be reprinted in the Wisconsin Conservation Bulletin.

Those were heady days. Bright, young minds were back from worldwide battlefronts, wartime laboratories had released a whole new kit of research tools, what has been the art of game management was about to become the science of wildlife ecology, and the public was more willing to listen to university experts of the type that had fabricated the bombs and chemicals and people who had won the war.

We all met in the slightly-refurbished attic of the old house on Farm Place that passed for an office building and lab. After you climbed the creaking stairs you had to duck your head to clear the rafters. The chairs were army surplus, the slide screen a bedsheet. But the ideas that churned up out of that evening seminar were mint fresh. Many a principle of wildlife management in practice today was born or refined in that Leopold think-tank. Nor have there ever been taller tales exchanged about hunting and fishing exploits or about rare plants or birds identified in unlikely places. The red Wealthy apples the Professor always provided helped prolong our discussions far into the night.

Then with a suddenness that left us stunned, it was over. All who knew Aldo Leopold wallowed even then fully cognizant of the depth of the country's loss.

In one of his last essays, Leopold's news peg was the dedication of a plaque to the

passenger pigeon in a Wisconsin state park. What he wrote I chose as the theme of the official University epitaph I wrote in May 1948 as editor of the Wisconsin Alumni Magazine:

The pigeon lived by his desire for clustered grape and bursting beechnut, and by his contempt of miles and seasons. Things that Wisconsin did not offer him today he sought and found tomorrow in Michigan, or Labrador, or Tennessee; to find them required only the free sky, and the will to ply his wings, but there are fruits in this land unknown to pigeons, and as yet to most men. Perhaps we too can live by our desires to find them, and by a contempt for miles and seasons, a love of free sky, and a will to ply our wings.

Aldo Leopold knew of such fruits, the obligatory read. He was unrestrained by the iron-bound taboo that decrees the construction of instruments in the domain of science, while the detection of harmony is the domain of poets. He conceived of the good life as being at once efficient and esthetic.

Aldo Leopold had a contempt for miles and seasons. He was as familiar with the grouse of Scotland, the spruce of Silesia, the pike of Canada, and the mule deer of Mexico as he was with the Wisconsin cottontail. He was as alert and open-minded the day he died in 1948 as the morning he "commenced" at Yale in 1909.

Aldo Leopold had a will to ply his wings. He knew more about land ecology than any person of his time. He had developed a deep understanding of the interactions of biotic forces and the mechanisms of their integrated expression in the life and landscape of America. It is no uncommon thing for a specialist to sound a record depth of knowledge in a singly limited field, but Leopold acquired the knack of putting together a mental clock made of parts from the whole gamut of the earth sciences, and then listening to it tick.

Those sentiments were written on the spot, as it were, many years ago. Time has only strengthened the assessment.

To America's wildlife lovers, he left a body of conservation principles that can improve habitat quality and species quantity a hundred years hence.

To America's resource managers, he left a philosophy of perception and a code of conduct that can protect and even enhance the intrinsic value of every landscape.

To America's scholars, he left a pattern of putting the sciences and the arts together for the purpose of understanding our environment.

To the American public, he left a continent better for his having lived on it, and a natural heritage safer for his having limned it.

There was no pompous church funeral for Aldo Leopold, no painful memorial service, only a simple commitment to the family plot in Iowa. That is the way he would have wanted it. He was more conscious than most men that death is merely one of the inevitable processes of nature. He had watched giants of the forest topple to become rich humus on the sodland floor. He had seen the antlers of ancient bucks contributing their nutrients to meadow soil, and spent trout turning belly-up on the shallows while their roe milked the waters.

And so it is with Aldo Leopold. Spring will come to the valley of the Wisconsin again, and he will surely be there, in all the manifold inheritors of his spirit—listening to the "peenting" of the woodcock, casting for walleyes at the head of the island, mulching a stand of young pine, recording insights, and watching Jim Reagan's son as he burns his marsh grass

ADDITIONAL COSPONSORS

Senators Kassebaum, Pryor, Lautenberg, Bradley, and Nunn.

BRENT DeLAND

● Mr. DIXON. Mr. President, for 10 years, the Illinois Association of Community Action Agencies has had the outstanding direction of my dear friend, Brent DeLand.

Not only has the agency benefited from his experience, but the State of Illinois has gained more than a decade of devotion.

Brent has worked toward the goal of antipoverty for 21 years. On June 6, he began his 10th year at the association as CEO. Throughout the years, he has expanded membership services and programs of the organization by 350 percent.

His job far surpasses IACAA. Brent was appointed chairperson for the Governor's Consumer Coordinating Council, and holds positions on the Mid-America Community Action Association, the Governor's Task Force on the Homeless, the Domestic Affairs Council, and the Emergency Food and Shelter Board. Before Brent joined the association, he has served the Governor's Committee on the Handicapped. Those are only a few of the organizations Brent has added to.

Brent's success goes beyond his work. In 1974, he completed his master of arts degree in social planning from Sangamon State University with high honors. Before SSU, he was a Franciscan brother and served as a missionary in Brazil. His first academic training was as a radiologic technologist at Northwestern University Medical School in Chicago.

I would like to recognize Brent's commitment to improving the quality of life in Illinois and everywhere. With great pride, I join the IACAA in honoring Brent. ●

JUST SAY NO TO DRUGS WEEK

● Mr. SHELBY. Mr. President, today I rise to acknowledge "just say no to drugs" week. Like many of my colleagues, I am an original cosponsor of this resolution that so designates this week of the 17th through the 23d. I would like to share with my colleagues my attempt to participate in commemorating this week. I have sent a letter to the principals of Alabama's schools in the hopes that my message would be passed on to each and every student across the State. Simply, I have told the students of my concern about their well being and my hopes for their future. It is my sincere hope that this letter, which will be read in Alabama classrooms throughout this week, will, on some level, reach these students.

I commend my colleagues for their efforts in the past and I know this 100th Congress will continue with dedication on behalf of America's youth. Mr. President, I ask that my

letter to the students of Alabama be printed in the RECORD.

The letter follows:

U.S. SENATE,

Washington, DC, May 13, 1987.

DEAR STUDENTS: Today I have set aside time from my Senate duties to write you a letter about something that's on my mind. In my new job as a United States Senator, I work on many important issues every day. But to me, you are every bit as important as balancing the budget, protecting our environment and defending the nation. I have started to write this letter many times today. Each time, I have paused and tried to put myself in your shoes. I have thought about what I would like to hear and more importantly, what would have the most impact on me. The problem is, it is very difficult for me to try to understand what you are all going through. When I was in school things were not as complicated as they are for you today. Drugs were only found in the neighborhood drug store not in the neighborhood school yard. I think it is very hard for any adult to understand what you have to deal with every day.

That's what we adults—mothers and fathers, teachers and doctors, politicians and preachers—ask you to just say no to drugs. What else can we say?

From my office here in Washington, I promise you that I will do my part—I will work for programs to teach young people the danger of drugs. I will work for programs to help young people who have fallen into the trap of drugs. And I will work to stop drugs from sneaking into our country and finding their way into your schools.

But the bottom line is that your future rests with you. Please promise me that you will do your part. Only you can make the decision to stay away from drugs—only you can say "No." I can't say it for you—your parents can't say it for you—your friends can't say it for you.

If it is hard for me to put myself in your shoes, maybe for a moment, you could put yourself in mine. As a United States Senator, I am in a special position to fight drugs. But I can't do it alone. I am calling on you—America's future—to write to me and suggest how I can help Alabama win the war against drugs. I believe that with your help, Alabama can lead the nation as a state made up of drug-free, healthy and happy students.

Finally, I know the "Just Say No" theme has become a bit over used, but don't let that stop you.

Please, don't use drugs.

Sincerely,

RICHARD SHELBY,
U.S. Senator. ●

NOTICE OF DETERMINATION BY THE SELECT COMMITTEE ON ETHICS

● Mr. HOFFLIN. Mr. President, it is required by paragraph 4 of rule 35 that I place in the CONGRESSIONAL RECORD notices of Senate employees who participate in programs, the principal objectives of which is educational, sponsored by a foreign government or a foreign educational or charitable organization involving travel to a foreign country paid for by that foreign government or organization.

The select committee has received a request for a determination under rule 35 for Senator ROBERT W. KASTEN, Jr., and Mr. Alexander Echols, a member

July, 1940

THE LIVING WILDERNESS

7

(Magazine of The Wilderness Society)

Origin and Ideals of Wilderness Areas

BY ALDO LEOPOLD

(A) Chronology

I WILL here attempt to cover the history of the wilderness movement in the southwest prior to 1926. I suppose the subsequent events are too well known to require comment.

The earliest action I can find in my files is a letter dated September 21, 1922, notifying the District Forester that two local Game Protective Associations had endorsed the establishment of a wilderness area on the head of the Gila River, in the Gila National Forest. I suppose one may assume a prior "incubation period" of a year or two. I take it, then, that the movement in the Southwest must have started about 1920.

This assumption is further corroborated by the publication, in 1921, of my paper, "The Wilderness and Its Place in Forest Recreational Policy" (Jour. Forestry, Vol. 19, No. 7, November, 1921). In 1922 G. A. Pearson published in Ecology (Vol. 3, No. 4) a paper proposing the need for small wild reservations for ecological study. This later grew into "A Naturalist's Guide to the Americas."

In 1924 the action stage was reached. I have a map dated March 31 showing the Gila area boundaries as originally proposed by me and as approved by District Forester F. C. W. Pooler. I do not know when Washington finally added its approval.

How widely had the idea spread by 1924? I offer in evidence the resolutions passed by the National Conference on Outdoor Recreation (Jour. Forestry, October, 1924) which contain no mention of wilderness.

The publication of my paper, "The Last Stand of the Wilderness," was in 1925, in *American Forests* (October).

By 1925 I had left the Southwest, but I continued to write on the western problem. *Sunset Magazine* published my "Conserving the Covered Wagon" (March issue). The "Service Bulletin" of the Forest Service for June 8, 1925, contains a skit of mine (which I would not mind signing today) entitled, "The Pig in the Parlor." The *Journal of Public Utility Economics* for October, 1925, contains my "Wilderness as a Form of Land Use."

By 1926 the high-ups were beginning to wrestle with wilderness. (See W. B. Greeley, Service Bulletin, U. S. Forest Service, October 18, 1926.) I can appreciate their predicament now better than I could then. It was no light job to offer the first official resistance after a century of unresisted boosterism.

(B) Perspective

In 1909, when I began work in the Southwest, there were six immense roadless areas in the Southwestern forests, each larger than half a million acres. New Mexico had the Jemez and the Datil-Gila area; Arizona had the White Mountains, the Blue Range, the Tonto Rim, the Kaibab. All are now gone

except the Gila. The Gila has been split down the middle and pared at the edges, but it is officially set aside. Part of the lost areas were justifiable sacrifices to timber values; part, I think, were the victims of poor brakes on the good roads movement. They are too rough ever to pay out on a timber transport system.

Outside the National Forests, there were large wild areas in many odd corners. They are all, by now, more or less broken up. The dismemberment of small bits of wilderness is, I fear, still going on.

I know of no serious attempts as yet, to enlarge and consolidate wild spots for the benefit of particular threatened species in the Southwest. Thus the grizzly bear in 1909 persisted in five of the six wilderness areas already mentioned. Today this species is said to be gone from all but one spot in the National Forests. The large facilities for land exchange which have recently been available have not yet been used to create even a single grizzly range.

It would appear, in general, that in the Southwest the wilderness movement has come too late to save much of what my generation called wilderness.

(C) The Future

There are four jobs for the future now in sight.

The first is to make the system of wild areas mean something in terms of particular rare plants and animals (like the grizzly).

The second is to guard against the disruption of the areas still wild. Disruption may come from unexpected quarters. A deer herd deprived of wolves and lions is more dangerous to wilderness areas than the most piratical senator or the go-gettingest Chamber of Commerce.

The third is to secure the recognition, as wilderness areas, of the low-altitude desert tracts heretofore regarded as without value for "recreation" because they offer no pines, lakes, or other conventional scenery.

The fourth is to induce Mexico to save some samples of what we no longer have on our side of the border. Great scientific as well as recreational values are here at stake. It will some day be of the utmost importance to be able to study, just across the line, samples of unspoiled mountain country, to compare them with samples on our own side which have been subjected to the classical exploitation-conservation process. We have, in Arizona and New Mexico, hardly a stream still in normal condition; in the Mexican mountains such streams are still found. We have no faunas or floras which have not been abused, modified, or "improved"; in the Mexican mountains the whole biota is intact with the single exception of the Apache Indian, who is, I fear, extinct.

beginning
of
national
areas



This map was drawn from information furnished by the U. S. Forest Service.

PROTECTED WILDERNESS AREAS UNDER DEVELOPMENT IN NATIONAL FORESTS

100,000 ACRES OR MORE

NAME	STATE	ACREAGE
<i>Region 1</i>		
Anaconda-Pintlar	Montana	145,000
Beartooth	Montana	230,000
Pentagon	Montana	125,900
Selway-Bitterroot	Idaho-Montana	1,870,000
South Fork	Montana	625,000
Sun River	Montana	240,000
<i>Region 2</i>		
Flat Tops	Colorado	117,800
Glacier	Wyoming	177,000
North Absaroka	Wyoming	379,460
San Juan	Colorado	240,000
South Absaroka	Wyoming	614,216
Stratified	Wyoming	147,000
<i>Region 3</i>		
Black Range	New Mexico	169,984
Blue Range	Arizona	218,164
Gila	New Mexico	572,204
Mazatzal	Arizona	213,760
Pecos Division	New Mexico	137,820
Superstition	Arizona	131,820
<i>Region 4</i>		
Bridger	Wyoming	383,000
High Uintas	Utah	243,957
Idaho	Idaho	1,232,744
Sawtooth	Idaho	200,942
Teton	Wyoming	565,291
<i>Region 5</i>		
High Sierra	California	826,601
Marble Mountain	California	237,527
Middle Eel-Yolla Bolla	California	143,426
Salmon Trinity Alps	California	280,260
<i>Region 6</i>		
Eagle Cap	Oregon	222,360
North Cascade	Washington	801,000
Three Sisters	Oregon	246,726

Less Than 100,000 Acres

<i>Region 1</i>		
Absaroka	Montana	64,000
Cabinet Mountains	Montana	90,000
Mission Mountains	Montana	75,500
Spanish Peaks	Montana	50,000
<i>Region 2</i>		
Cloud Peak	Wyoming	94,000
Gore Range-Eagle Nest	Colorado	79,700

NAME	STATE	ACREAGE
La Garita-Sheep Mountain	Colorado	38,030
Maroon-Snowmass	Colorado	64,600
Mt. Shavano	Colorado	32,100
Mt. Zirkel-Dome Peak	Colorado	43,120
Popo Agie	Wyoming	70,000
Rowah	Colorado	25,720
Uncompahgre	Colorado	69,253
Upper Rio Grande	Colorado	56,600
West Elk	Colorado	52,000
Wilson Mountains	Colorado	27,347
<i>Region 3</i>		
Chiricahua	Arizona	17,280
Galiuro	Arizona	50,200
Mount Baldy	Arizona	7,400
Pine Mountain	Arizona	17,500
San Pedro Parks	New Mexico	45,000
Sierra Ancha	Arizona	29,900
Sycamore Canyon	Arizona	47,230
White Mountain	New Mexico	24,000

Region 4 None.

<i>Region 5</i>		
Agua Tibia	California	35,116
Caribou Peak	California	16,443
Cucamonga	California	5,000
Desolation Valley	California	41,380
Devil Canyon-Bear Canyon	California	36,200
Emigrant Basin	California	98,043
Hoover	California	20,540
Mt. Dana-Minarets	California	82,376
San Geronio	California	20,000
San Jacinto	California	33,291
San Rafael	California	74,990
South Warner	California	70,682
Thousand Lake Valley	California	16,335
Ventana	California	55,884

<i>Region 6</i>		
Goat Rocks	Washington	72,440
Mt. Hood	Oregon	14,800
Mt. Jefferson	Oregon	86,700
Mount. Lakes-Rogue River	Oregon	13,445

ROADLESS AREAS

<i>Region 9</i>		
Little Indian Sioux	Minnesota	109,392
Superior	Minnesota	927,158