Writings: Round River ; Almanac 1966 ed., Proofs.

ROUND RIVER

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From the Journals of Aldo Leopold

Edited by Luna B. Leopold

Illustrated by Charles W. Schwartz

New York · OXFORD UNIVERSITY PRESS · 1953

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hear, so much the better." The melody is there, faint but perceptible, as it is in Richard E. Byrd's antarctic introspection "Alone," and it has the sound of literature.

ROUND RIVER, by Aldo Leopold, edited by Luna B. Leopold (Oxford). A posthumous miscellany, largely composed of journal accounts of hunting and fishing rambles in Lower California, New Mexico, Canada, and elsewhere, which antedate the author's incomparable "A Sand County Almanac." While it would be too much to say that these early writings do anything more than approach the force and the felicity that Mr. Leopold achieved in that finished work, we can be grateful for the opportunity they give us to spend another pleasant and profitable hour in the company of a man who was perhaps the most provocative student of land and wildlife conservation that our country has produced. Drawings by Charles W. Schwartz.

NOTE: Two collections of drawings by William Steig have been published—"Dreams of Glory" (Knopf) and "The Steig Album" (Duell, Sloan & Pearce). A considerable part of the contents of each first appeared in this magazine.

Aldo Leopold wrote *A Sand County Almanac and Sketches Here and There* in

1948 (Oxford University Press, 1949). That year he died, fighting a marsh fire near his cabin. In 1953, *Round River* was edited from his journals by his son, the geologist Luna Leopold (Oxford University Press, 1953).

Read what F. Fraser Darling, the British naturalist, has to say in his *Pelican in the Wilderness* (Random House, 1956) of Aldo Leopold, then judge for yourself whether you have missed anything by not reading these beautiful little books.

"Aldo Leopold was the man above all others in America who reduced an immense body of sentiment and goodwill for conservation to reasoned, documented, scientific reality. . . . Equally philosopher and visionary . . . he set down . . . facts . . . conclusions, and . . . dreams in most felicitous English. . . . His influence is all about."

PAUL B. SEARS

Our Thoreau: Aldo Leopold

"Round River." By Aldo Leopold. Oxford.

I wish that my prose when I write about nature could approach that of the late Aldo Leopold of the University of Wisconsin whose final book "Round River" (Oxford), selected from his unpublished journals and essays, makes one realize that here was a Thoreau who lived in our time.

Disciples of his balanced ecology, which proposes a certain harmony between the flora and fauna, can scarcely look happily upon the aggressive rate of human reproduction.

Leopold quotes Ariosto as saying, "How miserable are the idle hours of the ignorant man." Those who love nature and books are seldom idle and never miserable or bored for reasons of ignorance. They are likely, on the contrary, to be eager to explore both the printed page and the world.

Life in the Country—

'Personality' of the Land Explained by Writer; What to Do When Cream Won't Make Butter?

By James Birchfield

There is a difference between land and country. I have known this always but never fully understood it until I read recently Aldo Leopold's "Round River."

"There is much confusion between land and country," Mr. Leopold wrote. "Land is the place where corn, gullies and mortgages grow. Country is the personality of land, the collective harmony of its soil, life and weather. Country knows no mortgages, no alphabetical agencies, no tobacco road; it is calmly aloof to these petty exigencies of its alleged owners."

I believe any one intimate with the country knows, or has felt, this difference. To the bird shooter or the deer stalker, the character of country is quite evident.

Some of our farmers — the clean-row boys—may have overlooked this difference. To them a covey of quail may mean an overgrown fence row or a bit of cover that might otherwise provide an hour's grazing for a cow.

* * * *

We have a lot of land and a lot of country around The 40 Acres. The big buck that shed his antlers last summer on the farm next door, which came back this fall to browse in our pine thicket out back, is a part of our country.

And the fox that got one of our geese the other night also is a part of the country. The fox and the buck don't fit into land. You don't think of Ladino clover when you think of the buck, and you don't think of clean fields when you think of the fox. They both belong to country.

That Mr. Leopold died in 1948, at the very peak of his productivity, is a loss to conservation. His was the broader view—not confined to contoured fields and grassed waterways—but rather including the entire field called ecology.

"Round River" is a selection of his journals and essays, edited by his son Luna, a hydraulic engineer with the Water Resources Division of the Geological Survey. It follows "A Sand County Almanac," and should be read by all who like the touch of the out-of-doors. It is published by the Oxford University Press.

* * * *

Our Jersey, Susy, has gotten out of adjustment. Her milk is still as rich as ever, and the cream rises into a thick crust on the milk pans in the refrigerator.

It is the kind of cream that used to be called "rat cream." The idea being that in the old spring houses, the rats could run across the cream without breaking through.

Trouble is, the cream won't go into butter. We churned one batch for five hours and got nothing more than whipped cream.

The experts know this sometimes happens, but they don't know why.

Sometimes, they say, toward the end of the lactation period, there is a delicate change that affects the cream. No harm, they say, and it won't last long.

But meanwhile, we have to eat that unmentionable stuff that only looks like butter.

More Potatoes in '53

An estimated 300 million bushels of potatoes will be harvested this year in the 29 late pot producing states — 7 per above last year's ample crop.

Books of Today

[Edited by AUGUST DERLETH]

ALDO LEOPOLD'S JOURNALS

ROUND RIVER: FROM THE JOURNALS of Aldo Leopold, Edited by Luna B. Leopold. Oxford University Press, New York. 173 pp., $3.00.

Published recently, another book from the pen of Aldo Leopold will delight all those who took so much pleasure in his fine first book, A SAND COUNTRY ALMANAC. Though this second book is not up to the first, it has in it nevertheless enough good nature and conservation lore to make it, too, well worth owning.

Derleth

Put together from papers and jottings in a journal — many of them clearly not meant or not ready for such publication at Aldo Leopold's untimely death—this second volume is primarily the work—one of love, surely —of his son, Luan, who assembled the material, including some few pages by other hands taking part in the same trips Aldo Leopold chronicles. The book consists of a few essays, of a piece with those to be found in its excellent predecessor, A SAND COUNTRY ALMANAC, some random pieces, and journals of hunting, fishing, and exploring trips made into Mexico, Canada, Illinois and New Mexico.

Perhaps the journal excerpts are least effective, compared to the essays, since these paragraphs were clearly meant only as rough material for something to be finished later—alas! their author was gone before he could turn his hand to them again. But even these have a certain charm which is inescapable, and one need not be an angler or a nimrod to appreciate the flavor of these notes, which do indeed have about them the reflective delights of the campfire and the woods.

It is in the essays that Aldo Leopold shows up once again at his best—and at his best, the late Aldo Leopold is very good indeed. Small wonder to those who knew him and his work, that Nature Magazine in its October issue, listing the ten greatest men in "Conservation's Hall of Fame" should have chosen Aldo Leopold to be among them!

Nature Magazine said of him, as it said of Jay N. Darling, Ira N. Gabrielson, John Muir, Theodore and Franklin D. Roosevelt, T. Gilbert Pearson, Gifford Pinchot, Stephen T. Mather, and Hugh H. Bennett, that he was a "typical example of the best in American democracy. These men, though representative of different walks of life, and stemming from various regions of the nation, reveal in the diversity of their interests and personality one common trait—an aggressive belief in the cause for which they worked, or still work."

From the Bookshelf

For the Enjoyment of Wild Life . . . . . By T. Morris Longstreth

Our Wildlife Legacy, by Durward L. Allen. (New York: Funk & Wagnalls Company. 422 pp. $5.)

Round River, from the Journals of Aldo Leopold. Edited by Luna B. Leopold. Illustrated by Charles W. Schwartz. (New York: Oxford University Press. 173 pp. $3.)

Last year a nearby woodlot that deer frequented was built on and we see no more deer. Recently, a neighboring thicket was razed and its citizen woodchucks, rabbits, foxes, and pheasants were rendered roofless. It is just such encroachment by man on the wildlife in all parts of our country that has impelled Durward Allen to write this comprehensive and valuable book.

His title is eloquent, for a legacy puts unearned wealth into our hands with the understanding that it will be well used. Not one of us can avoid the responsibility of this national legacy of wildlife. For "the enjoyment of wildlife is a part of our standard of living," as Mr. Allen remarks. An America devoid of wild animals would be calamity—but a calamity not so far away, if the situation is not understood and acted upon in time. So Mr. Allen addresses his findings not only to sportsmen but to everyone who enjoys looking at birds, or fishing in clean waters, or initiating his children in the live wilderness.

* * *

The author's position in the Fish and Wildlife Service of the Department of the Interior gives him an over-all view of the disasters closing in upon the threatened forests. His chapters fall into three sorts. First we have "Numbers at Work" in which the decimation now going on is compared with "the unimagined fruitfulness" possible under planned conservation. Part Two shows "Paths and By-Paths towards a more intelligent use of our legacy." Part Three enlarges on "The Method and the Outlook." These pages are not technical. They thrill one with the tale of our current resources in wolves and wildcats, and the reader who can finish the book without a wholesome reaction to its warnings and its invitation is stony-hearted indeed.

"The way to have wildlife in abundance is to provide its life necessities on the land and in the water." Mr. Allen is long on common sense. For him conservation means "wise use," since a legacy loses value in the hands of a miser. He finds that a balance between game and its predators, including "the world's most successful biped," must be maintained. Stocking a habitat that does not justify it is useless; nature redresses the balance every time.

* * *

"Our Wildlife Legacy" is handsomely illustrated. The 40 pages of Reference Notes enlarge on the philosophy of resource management. The Bibliography runs to 501 titles. Here is a sound and much needed exposition of the way to preserve a great national asset.

The late Aldo Leopold is often quoted by Mr. Allen, for he was one of this country's foremost authorities on what to do for our wildlife. "A Sand County Almanac" persuaded its readers to regard nature as a friend rather than a source of booty. "Round River" gives further excerpts from the Leopold journals, and Mr. Schwartz's drawings add lively touches.

Much of the book is given over to hunting, fishing, camping, and outdoor cookery. But the several chapters on conservation could serve as a literary capstone of Mr. Allen's book. Leopold makes two major points; that the discovery of the complexity of the land organism is the most helpful discovery of our times; and that the emphasis of the conservation concept should shift from the economic to the ethical.

Leopold's prose is from the shoulder, as is usually the case when a writer is earnest in intent and can also write. His ear for outdoor sounds and eye for outdoor sights helped to make his words sharp and winged. Wit and humor go along with shrewd analysis and common sense. He is everywhere quotable. "The man who cannot enjoy his leisure is ignorant, though his degrees exhaust the alphabet." "Country is the personality of land." His shove was always in the right direction, and the things he set in motion are important to us.

Hunter's Diary Exudes Zest for All Outdoors

11/29/5
Grand Post

Reviewed by Irston R. Barnes

President, Audubon Society of the District of Columbia

ROUND RIVER. From the Journals of Aldo Leopold. Edited by Luna B. Leopold. Drawings by Charles W. Schwartz. Oxford University Press. 173 pp. $3.

HIS ZEST for the outdoors, his keen interest in all manifestations of nature, light every page of Aldo Leopold's journals. The present accounts tell of family hunting, fishing and camping trips between 1922 and 1937 from Canada's Quetico wilderness to Mexico's delta of the Colorado. A pioneer in wildlife management and an ardent conservationist, Aldo Leopold reveled in wilderness trips and in the hunts that brought meat to the camp table.

"The common denominator of all hunters is the realization that there is always something to hunt. The world teems with creatures, processes and events that are trying to elude you; there is always a deer, and always a swath down which he can be seen. Every ground is a hunting ground, whether it lies between you and the curbstone, or in those illimitable woods where rolls the Oregon. The final test of the hunter is whether he is keen to go hunting in a vacant lot."

And in living this philosophy, Aldo Leopold hunted with gun and trap and bow-and-arrow. The deer and the wildcat, the turkey, the quail, the goose and the mallard, the pike, the trout and the bass, all were pursued with high enthusiasm and notable success. And every hunt was eminently worthwhile, whether the hunters returned empty-handed or to a camper's banquet.

The Leopolds also hunted with binoculars and notebooks and with an unquenchable questioning of every landscape and natural process they observed. Every trip brought its adventures, and these will excite hunters and nonhunters alike. The book is spiced with the hard-won wisdom of the voyageur who joyously accepts every challenge of the trail, and campers will note these clues to better wilderness living.

But each day's record offers new insights to enrich the lives of all who respond to the beauty and mystery of nature. It is this last feature which makes all of Leopold's writings classics in their field, leading his followers to read and reread his observations with increasing understanding.

Such are the pleasures of a first reading of "Round River." A second reading savors more fully the wisdom and philosophy of one of our great leaders in the crusade to truly preserve all of our native wildlife and all of their essential habitats, to conserve our land in all its fertility and rich diversity. The more contemplative essays distill some of the essential truths discovered by a great conservationist, while the day-by-day field notes illustrate the same verities in the life of a true naturalist.

The journals have been edited with imagination and insight by Aldo Leopold's second son, a member of the wilderness parties and now a hydraulic engineer with the Geological Survey. The crisp, sensitive line drawings of Charles W. Schwartz add greatly to the esthetic enjoyment of the book.

NY Times Book Review Oct 4, 1953 p. 6

For the Love of Land

ROUND RIVER: From the Journals of Aldo Leopold. Edited by Luna B. Leopold. Illustrated by Charles W. Schwartz. 173 pp. New York: Oxford University Press. $3.

By HAYDN S. PEARSON

DURING the first half of this century a few men accurately envisioned the enormous complexity of the nation's conservation problems. Aldo Leopold was one of this group. After his varied and rich experiences in forestry and wildlife management, the University of Wisconsin, in 1933, created a Chair of Game Management for Mr. Leopold — a position he held until he met his tragic death five years ago while fighting a forest fire.

Aldo Leopold realized that conservation was infinitely more than planting trees, plowing on the contour or storing water in a mountain valley. Round River, however, is not a technical treatise on conservation; it is a well chosen and balanced collection of enjoyable essays and informative entries from his journals, edited by his son, Luna. To the country-minded persons who cherish his "A Sand County Almanac" this collection will be especially rewarding. Journal entries include comments on two long canoe trips in Canada and a trip into Mexico. The journal comments are descriptive, entertaining and informative, but to this reviewer the richness of the book is in the brief, pithy essays.

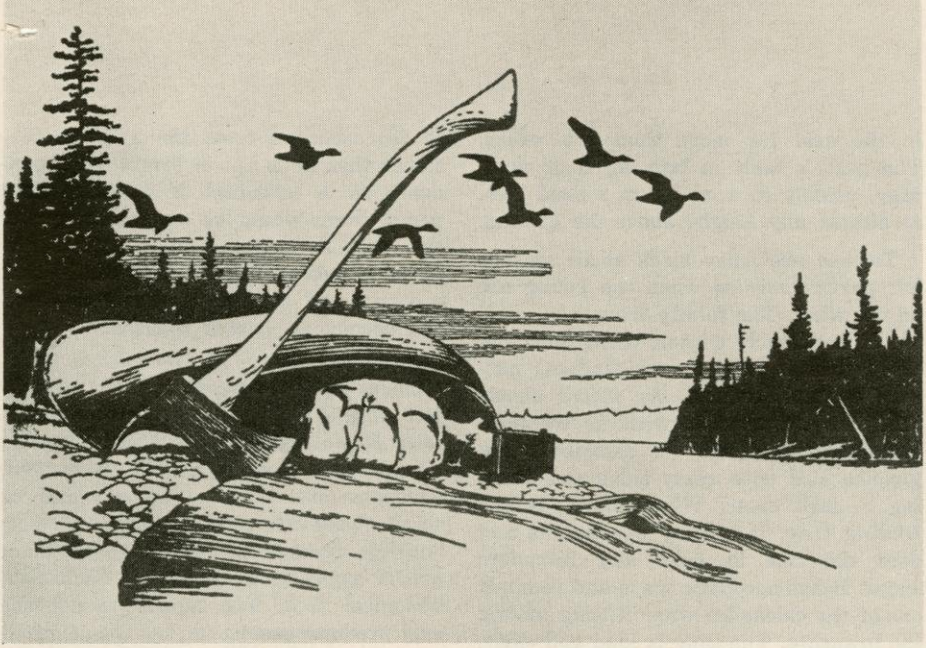
Aldo Leopold always wielded a pen with power and precision. He was blunt in puncturing pretense, swung hard to tamp home pivotal points and had a puckish delight in dissecting human foibles. In the provocative essay, "A Man's Leisure Time," he wrote: "Becoming serious is a grievous fault in hobbyists." In the essay "Country" he said: "Land is the place where corn gullies and mortgages grow. Country is the personality of land, the collective harmony of its soil, life and weather. * * * In country, as in people, a plain exterior often conceals hidden riches."

One wishes every educational leader in the nation could be required to read and ponder the essay "Natural History." In the essay "Conservation" he stated: "The outstanding scientific discovery of the twentieth century is not television or radio, but rather the complexity of the land organism."

"Round River" does not pretend to be a treatise on conservation. It is the discerning and tolerant philosophy of a conservationist, hunter and fisherman. In both the essays and the journal entries there are pungent observations that give spice and zest to the book. The charming pen-and-ink illustrations by Charles W. Schwartz happily complement the text. Not often is there a combination of short essays and journal entries that has both a top and a bottom crust well baked, but Luna Leopold has brought it about in this well chosen collection.

From an illustration by C. W. Schwartz for "Round River."

Mr. Pearson is the author of "Countryman's Year."



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The appearance of *Round River*, another collection of the writings of Aldo Leopold can only be greeted with superlatives. The question of how it compares with *A Sand County Almanac* to which it is a sequel will inevitably arise. However, it is not strictly fair to compare the two. Unlike the earlier book which was a collection of finished later writings, *Round River* endeavors to trace his intellectual and literary development in the field of conservation with unpublished writings from various stages of his life. Edited by his son Luna, it is a fine contribution to conservation literature in its own right. It is liberally illustrated by the perceptively beautiful ink sketches of Charles W. Schwartz.

Part One is an essay entitled "A Man's Leisure Time", and extolls Leopold's philosophy on hobbies. Trained as a forester he became interested in wildlife as a hunter, later developed his principles of wildlife management and conservation as a hobby, finally to become outstanding in the profession.

Part Two, "Country", is a group of excerpts from his journals written while on hunting and camping trips in Mexico, Canada, the Southwest, and the Midwest. The journal entries in "Country" cover the early period as a hunter in which were rooted the beginnings of his perception of the biotic drama. The development of this perception is the theme of the book. The interspersion among the early journal entries of several short philosophical essays taken from his later writings are frequent reminders of the heights later attained by this development: "There is much confusion between land and country. Land is the place where corn, gullies, and mortgages grow. Country is the personality of land, the collective harmony of its soil, life, and weather. Country knows no mortgages, no alphabetical agencies, no tobacco road; it is calmly aloof to these petty exigencies of its alleged owner . . . Poor land may be rich country, and vice versa. Only economists mistake physical opulence for riches. Country may be rich despite a conspicuous poverty of physical endowment and its quality may not be apparent at first glance, nor at all times."

Wis Conservation Bulletin Dec 1953
Vol 18. No. 12

The thought of Aldo Leopold indiscriminately shooting duck hawks, coyotes, and foxes in his earlier days need not disturb those familiar with his views of conservation. This only serves to make more outstanding by contrast the degree of development of his aesthetic and ethical philosophies on conservation covered in the third part of the book, "The Round River": "Conservation is a state of harmony between man and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the ranges; you cannot build the forest and mine the farm. The land is one organism. Its parts, like our own parts, compete with each other and co-operate with each other. The competitions are as much a part of the inmate workings as the co-operations. You can regulate them—cautiously—but not abolish them . . . The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism. Only those who know the most about it can appreciate how little we know about it . . . If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering . . . One of the marvels of early Wisconsin was the Round River . . . The current is the stream of energy which flows out of the soil into plants, thence into animals, thence back into the soil in a never-ending circuit of life . . . Ecology is destined to become the lore of Round River, a belated attempt to convert our collective knowledge of biotic materials into a collective wisdom of biotic navigation. This in the last analysis, is conservation."

Leopold's philosophies constitute one of the greatest creative achievements in the field of conservation. Fortunately, he was gifted with a pen which poured forth writings fully as eloquent and artistic as his ideas. Luna Leopold, in making available another collection of these, has done a great service to conservation, to what undoubtedly will be an appreciative reading public, and to his father.

—Fred H. Wagner
P–R Pheasant Research

Mammals of Minnesota

***The Mammals of Minnesota*, by Harvey L. Gunderson and James R. Beer. The University of Minnesota Press, Minneapolis, 1953. $3.50 cloth, and $2.00 paper bound.**

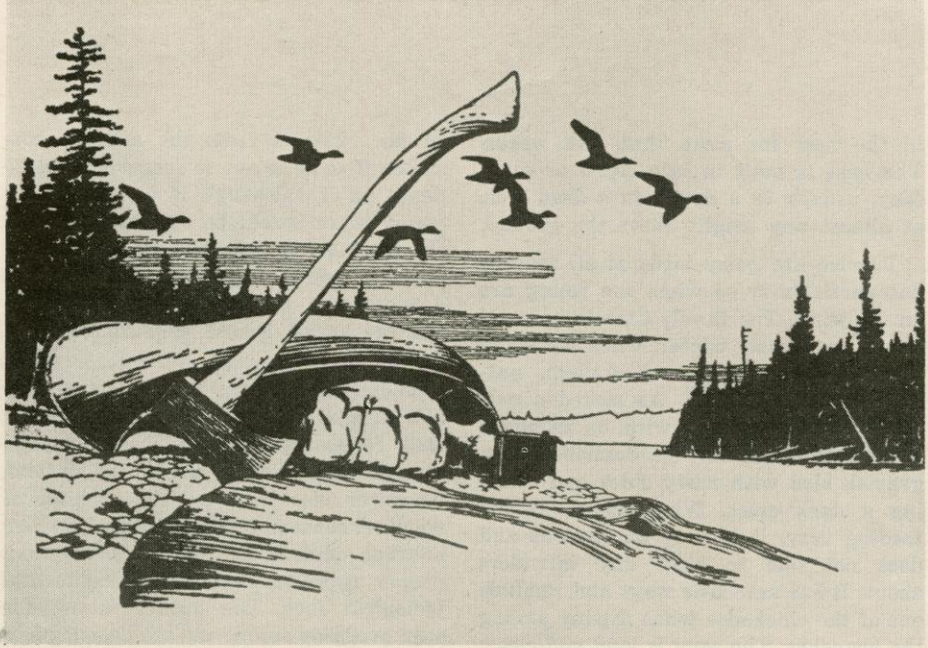
This book treads the middle ground between such ones as Burt's "Mammals of Michigan" and "A Field Guide to the Mammals" by Burt and Grossenheider. It is printed on high-grade, glossy paper, and the numerous photographs are, in general, excellently reproduced. There is a short section on the collection, preparation, and study of mammals, and another on the geography of Minnesota. These are greatly abridged but valuable additions. On page 29 is a key to the orders of Minnesota mammals which refers one to the page where the species of the appropriate order are keyed out. These keys seem quite usable.

Perhaps the most important contribution of this book is made through the Minnesota range maps given for each species known to be present there nowadays. Wisconsin readers should realize that the obvious gaps in the knowledge of Minnesota mammals so vividly shown by these maps are no greater than those in our knowledge of Wisconsin mammals.

Unfortunately, there are several errors in the book, most of them probably due to poor proofreading.

Wisconsin school libraries should find this book a usable addition, since practically all, if not all, of our mammals are included.

—A. S. Mossman
University of Wisconsin



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University of Wisconsin

New Group for Lovers of Nature

Los Angeles Times Oct. 25, 1953.

Nature lovers have good shelves of books to choose from this fall.

The first volume is not, however, a nature book but a metaphysical adventure in the past by a nature writer. Leonard Dubkin has found subjects in the stone canyons of Chicago before, notably "The White Lady," but even from Dubkin WOLF POINT (Putnam: $3.50) might seem farfetched.

Wolf Point is a tiny plot of land where the Chicago River forks, its only vegetation a few weeds, its surroundings huge buildings, railroads, auto parks and boulevards.

Tales of Early Days

Dubkin discovered the remnant of original Chicago land, sat there to meditate and came out with four stories of early days when trees and bushes, flowers and animals, birds and Indians, and later the Ft. Dearborn pioneers lived and grew before concrete and asphalt, steel and glass covered the marshy land.

From the journals of a forester and wildlife management expert, Aldo Leopold of Wisconsin, comes an observant, poetic volume, ROUND RIVER (Oxford: $3), edited by the late naturalist's geologist son, Luna Leopold. These notes drift beyond Wisconsin's Round River to the Southwest, Colorado, Canada, the Sierra Madre and other parts of North America.

Animal Motion Caught

With photos, diagrams and action drawings, HOW ANIMALS MOVE, by James Gray (Cambridge: $3), describes the magical ways walking, running, flying, crawling and swimming creatures use to get about.

FLOWERS OF THE SOUTH, by Wilhelmina Greene and Hugo Blomquist (Chapel Hill: $5), is not for Southerners alone, since many of the blooms are found in the West and North. A beautiful book, magnificently illustrated.

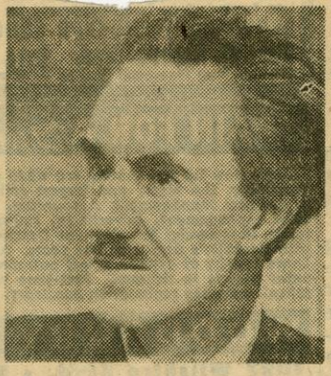
To show the horror and waste of fire, a story for children has been done by Robert Masters and Fred Reinfeld in BLAZER THE BEAR (Sterling: $2), illustrated by Howard Simon.

New Mexico Described

Adventures in the Pecos high country by the author of "When the Dogs Bark" and "Treed" make up the new book from Elliott S. Barker, BEATTY'S CABIN (New Mexico: $4.50). Animals, mountain climbing, outlaws, poachers fill the lively pages, praised by J. Frank Dobie.

California's official lion hunter in an earlier time, Jay C. Bruce, writes of game trails in COUGAR KILLER (Comet: $3).

Coming out of the wilds into the home, we have PLANTS IN POTS by William H. Clark (Little, Brown: $2.95), a pocket-size volume for the gardener limited to clay pots. Clark wrote the popular "Gardening the Small Place."



Hans Cloos
Tells story of Earth

sees them moving. Our Sierras are rising all the time, imperceptibly most of the time, but as much as six feet during the earthquakes of 1872.

All Is Change

And the very nature of the "eternal" rocks themselves is changing—chemical changes as masses of rock are transformed from liquid to solid and back again: as rocks are weathered by wind and rain.

As Cloos describes his journeys from continent to island, from desert to mountain, we see that he regards the earth as a living thing rather than a mere nest for living things, and he does speak to the earth, though nowhere as much as the earth used to speak to him of its secrets.

And that is why even a lay reader follows this brilliant scientist on his field trips around the world. One does not always understand the theories he expounds, though his language is at all times simple enough and his thought clearly expressed. But one feels in him the poet along with the scientist. Hans Cloos never lost his sense of wonder.

Chicago Daily News

LEOPOLD'S NOTES AND ESSAYS

Book Sings Out Poetic Plea To Save Our Game and Soil

BY VAN ALLEN BRADLEY
Literary Editor of the Daily News

"The outstanding scientific discovery of the 20th century is not television or radio, but rather the complexity of the land organism," writes the late Aldo Leopold, author of "A Sand County Almanac," in "Round River,"* a new selection, just published, of notes and essays from his journals.

Mr. Leopold was the Iowa-born pioneer conservationist for whom the University of Wisconsin created a special chair of game management in 1933.

One of the creators of the government's National Forest Policy, he became known through a lifetime of nature study as a leader in the fight to preserve our natural resources and as nature writer of high talent.

* * *

"LOOK AT OUR own back yard: At the prairies of Iowa and southern Wisconsin," he lectures us. "What is the most valuable part of the prairie? The fat, black soil, the chernozem.

"Who built the chernozem. The black prairie was built by the prairie plants, a hundred distinctive species of grasses, herbs and shrubs; by the prairie fungi, insects and bacteria; by the prairie mammals and birds, all interlocked in one humming community of co-operations and competitions, one biota.

"This biota, through 10,000 years of living and dying, burning and growing, preying and fleeing, freezing and thawing, built that dark and bloody ground we call prairie."

* * *

MR. LEOPOLD is concerned, among other things, with the sweeping back and the gradual death of the prairie flora at the hands of the engineers with their bulldozers, graders and mowers.

He cites "the clear dictum of history that a species must be saved *in many places* if it is to be saved at all."

Often a witness to straw-stacks burning on the Canadian prairies, to gullies climbing a thousand hills, to precious mud flowing to the sea, he despairs of teaching the private landowner to protect the land.

* * *

HE FINDS "the root of the problem" in this fact: "There is as yet no social stigma in the possession of a gullied farm, a wrecked forest, or a polluted stream, provided the dividends suffice to send the youngsters to college."

His conclusion: "What conservation education must build is an ethical underpinning for land economics and a universal curiosity to understand the land mechanism. Conservation will follow."

"Round River" is not all conservation stuff. It is mostly, in fact, a charming and informative series of daily entries concerning his hunting, fishing and exploring trips.

* * *

THE FLAVOR of the writing is compressed into this final paragraph from the book, which also helps to explain his zeal as a conservationist:

"To conclude: I have congenital hunting fever and three sons. As little tots, they spent their time playing with my decoys and scouring vacant lots with wooden guns. I hope to leave them good health, an education, and possibly even a competence.

"But what are they going to do with these things if there be no more deer in the hills, and no more quail in the coverts?

"No more snipe whistling in the meadow, no more piping of widgeons and chattering of teal as darkness covers the marshes; no more whistling of swift wings when the morning star palse in the east!

"And when the dawn-wind stirs through the ancient cottonwoods and the gray light steals down from the hills over the old river sliding softly past its wide brown sandbars—what if there be no more goose music?"

*ROUND RIVER: From the Journals of Aldo Leopold, edited by Luna Leopold (Oxford University press, $3).

Pacific Discovery Vol VI, No. 6 Nov-Dec 1953 p. 23

of books on nature in all its phases. What is actually going on, perhaps, is that never has everyone's natural interest in everything natural been so abundantly fostered and stimulated by a great variety and quantity of graphic media.

Round River: *From the Journals of Aldo Leopold.* Edited by Luna B. Leopold. Illustrated by Charles W. Schwartz. Oxford University Press, New York. 1953. xiii + 173 pp., line drawings. $3.00.

The fact that a gratifyingly large number of copies were sold of Aldo Leopold's *A Sand County Almanac* (Oxford, 1949), with several printings, indicates two things to us: a gratifyingly large number of people are responding to the best in contemporary literature of nature (nature writing is too thin an expression for any of that which may be called "the best"); and Aldo Leopold speaks directly to many appreciative readers besides this one.

Round River is "more of the same," in part, – Parts I and III, – with a difference in Part II, which is largely from the author's hunting journals. "A Man's Leisure Time" (Part I) is a gem among essays; and "The Round River" (Part III) is deepest insight into the ultimate meaning of conservation. It could not be too widely read for the lasting benefit of all of us, whatever our own insights.

If Aldo Leopold were alive, probably no one would have been surprised but himself at the reception of *A Sand County Almanac*. There are many readers ready primed for more Leopold. Here is *Round River!*

Possums. By Carl G. Hartman. University of Texas Press, Austin. 1952. xiii + 174 pp., 104 illustrations. $6.00.

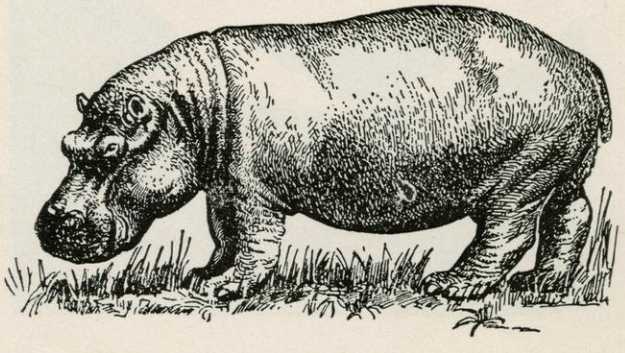
Forty years of research on one American animal, by a noted physiologist, has produced a book that has been called "a natural history classic of the first water." The story of European discovery of and subsequent fascination with the unique American opossum is of the stuff of N. J. Berrill's *Journey into Wonder.* It was none other than the captain of Columbus' *Niña,* Vicente Yáñez Pinzón, but on a voyage of his own in 1500, that "was, of all western Europeans, the first to hold in his hand a marsupial animal and to discover the marsupial pouch." It was on the coast of Brazil, on the very voyage of that land's discovery. New lands, new animals! Pinzón took the mother possum back to Ferdinand and Isabella. But in the "Age of Credulity" which followed, descriptions of the animal rose to magnificently imaginative heights in the accounts of travelers and, even more, of whomever elaborated upon their stories. Their illustrations especially – the early ones are reproduced liberally in the book, constituting, with modern work, a virtual history of animal illustration from woodcut to photograph – show the power of invention in covering ignorance. As we may expect, the strange business of the pouch with its embryo sucklings aroused the greatest wonder and curiosity. The strangest fact of all is that it took four and a half centuries after Pinzón to discover in final detail what went on there. How were possums born? Dr. Hartman has written the last chapter of possum discovery. He has digested and abstracted for us the early accounts – we easily share his fascination. He summarizes recent research; and he of all men is best qualified to zipper the whole thing up, for once and all. You see, Dr. Carl G. Hartman was the first man to *observe* and record, in complete detail, the birth of baby opossums and their journey to the pouch.

Exploring Nature with Your Child: *An introduction to the enjoyment and understanding of nature.* By Dorothy Edwards Shuttlesworth. Greystone Press, New York. 1952. 448 pp., full-color frontis., 30 halftones, numerous line drawings. $4.95.

We are glad to report on this book by the editor of *Junior Natural History Magazine* after having it put to the test of use. Two teachers of our acquaintance, who willingly tried it, have called it "truly wonderful" for its purpose, and the same can be said for its use at home. This is more than a book of facts about everything from snails to sunspots – it is also the long-needed guide to the "how" of answering the child's ceaseless and innumerable "whys." It is natural history for the teacher and teaching for the parent, nature wise or not.

The Golden Treasury of Natural History. By Bertha Morris Parker. Simon & Schuster, New York. 1952. 216 pp., profusely illustrated in full color. $5.00.

This is one of those books that parents buy "for the children" because they cannot resist it themselves. The copy in our hands has sold six others, on sight – for the kids, of course! It is a veritable encyclopedia of "the birds and reptiles, fishes and insects, mammals, amphibians, plants



↑ **Aldo Leopold. (Courtesy Oxford University Press)**
→ **Hippopotamus. (Courtesy Greystone Press)**

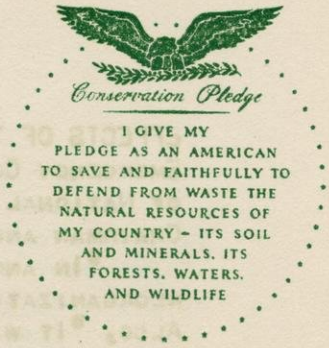
NEWS AND VIEWS

WISCONSIN FEDERATION OF CONSERVATION CLUBS
411 East Lincoln Avenue
Stevens Point, Wisconsin

Les Woerpel — Executive Secretary

Affiliated with

NATIONAL WILDLIFE FEDERATION



p. 4

NOVEMBER 21, 1953.

V

A GREAT MANY OF YOU READERS HAVE READ ALDO LEOPOLD'S "SAND COUNTY ALMANAC" AND HAVE THRILLED AT THE WAY THAT SEEMINGLY SIMPLE TRIPS AND EVERYDAY HAPPENINGS HAVE BEEN PACKED WITH THE VERY THOUGHTS THAT MAKE LIFE WORTH LIVING.

THE OXFORD UNIVERSITY PRESS, 114 FIFTH AVE., NEW YORK, N. Y., NOW PRESENTS "ROUND RIVER" FROM THE JOURNALS OF ALDO LEOPOLD AS A SEQUEL TO "A SAND COUNTY ALMANAC". THE BOOK IS WRITTEN IN THREE PARTS, THE FIRST OF WHICH IS DEVOTED TO "HOBBIES" AND IS ENTITLED "A MAN'S LEISURE TIME". IT IS AN ESSAY ON WHAT GOES TO MAKE UP A HOBBY AND ENDS WITH THE ADMONITION THAT "NONCONFORMITY IS THE HIGHEST EVOLUTIONARY ATTAINMENT OF SOCIAL ANIMALS, AND WILL GROW FASTER THAN OTHER NEW FUNCTIONS."

PART II IS A JOURNAL OF MANY TRIPS FOR HUNTING AND FISHING IN COLORADO, NEW MEXICO, MEXICO, MISSOURI, AND THE QUETICO PROVINCIAL PARK, CANADA, INTERSPERCED WITH A SERIES OF OBSERVATIONS UNRELATED TO THE TRIPS, BUT CARRYING THE DEEP THOUGHTS CHARACTERISTIC OF LEOPOLDS JOURNALS.

PART III IS MADE UP OF THOUGHTS THAT EVERY SPORTSMAN AND CONSERVATIONIST SHOULD READ, AND PREACH. THE SECTIONS OF PART THREE ARE TITLED "CONSERVATION", "THE ROUND RIVER - A PARABLE", AND "GOOSE MUSIC". THESE THREE CHAPTERS COME SO CLOSE TO THE PROBLEMS WE FACE TODAY AND POINT THE WAY TOWARD THE RIGHT PATH FOR SOLUTION THAT SOME BENEVELENT SOUL SHOULD SECURE PERMISSION TO REPRINT THEM SOMETIME IN THE FUTURE AND BROADCAST THEM TO EVERY WALK OF LIFE. SOME WOULD DISREGARD THE LESSON IT CARRIES, BUT CERTAINLY THEY SHOULD NOT BE DEPRIVED OF READING IT.

HIS DISCRIPTION OF "CONSERVATION" IS: "CONSERVATION IS A BIRD THAT FLIES FASTER THAN THE SHOT WE AIM AT IT". THE ESSAY CARRIES ALL OF THE HOPES, WORK, FRUSTRATION AND DESPARE THAT WE HAVE ALL EXPERIENCED AND LEAVES US WITH A CONVICTION THAT WE HAVE TO WORK HARDER AND LOOK DEEPER FOR SOLUTIONS THAN THE CURE-ALL REMEDIES WE SO OFTEN EXPECT TO PUT US ON EASY STREET.

"ONE OF THE MARVELS OF EARLY WISCONSIN WAS THE ROUND RIVER, A RIVER THAT FLOWED INTO ITSELF, AND THUS SPED AROUND AND AROUND IN A NEVER-ENDING CIRCUIT. PAUL BUNION DISCOVERED IT. NO ONE HAS SUSPECTED PAUL OF SPEAKING IN PARABLES, YET IN THIS INSTANCE HE DID. WISCONSIN NOT ONLY HAD A ROUND RIVER, WISCONSIN IS ONE. THE CURRENT IS THE STREAM OF ENERGY WHICH FLOWS OUT OF THE SOIL INTO PLANTS, THENCE INTO ANIMALS, THENCE BACK INTO THE SOIL IN A NEVER ENDING CIRCUIT OF LIFE. 'DUST UNTO DUST' IS A DESICCATED VERSION OF THE ROUND RIVER CONCEPT".

WHILE CONVEYING THE IMPRESSION THAT NO MONITARY PRICE CAN BE PLACED ON WILDLIFE THE CHAPTER ON "GOOSE MUSIC" NEVER-THE-LESS DRAWS UP A COMPARISON. "SUPPOSING THERE WERE NO LONGER ANY PAINTING, OR POETRY, OR GOOSE MUSIC? IT IS A BLACK THOUGHT TO DWELL UPON, BUT IT MUST BE ANSWERED. IN DIRE NECESSITY SOMEBODY MIGHT WRITE ANOTHER ILIAD, OR PAINT AN 'ANGELUS', BUT FASHION A GOOSE? 'I, THE LORD, WILL ANSWER THEM. THE HAND OF THE LORD HATH DONE THIS, AND THE HOLY ONE OF ISRAEL CREATED IT.'

"ROUND RIVER" CAN BE SECURED FROM THE PUBLISHER OR THIS OFFICE FOR THREE DOLLARS ($3). FOR THOSE THAT HAVEN'T ALREADY GOTTEN "A SAND COUNTY ALMANAC", IT CAN ALSO BE SECURED EITHER THROUGH THIS OFFICE OR THE PUBLISHER FOR THREE DOLLARS AND FIFTY CENTS ($3.50).

BOOK NEWS FROM OXFORD UNIVERSITY PRESS

FOR IMMEDIATE RELEASE

ARE YOU IN AN IZAAK WALTON MOOD?

Oxford University Press will publish on October 1 "Round River: From the Journals of Aldo Leopold," edited by his son Luna B. Leopold and illustrated with line drawings by Charles W. Schwartz (list price $3.00). To anyone who knows the charm of Aldo Leopold's writing in "A Sand County Almanac" this collection of his unpublished journals and essays will come as a new delight. It is a record of reflections and observations on nature by a man who loved it and lived with it, a book for all who would share the mood of Izaak Walton when he wrote, "I have laid aside business, and gone a-fishing."

As Aldo Leopold takes you by canoe into the wilds of Canada or deer hunting in Mexico with bow and arrow, you will realize that you are in the very special company of a complete angler and archer. The daily entries in his journals were written in camp on his many field trips--hunting, fishing, and exploring--and indicate the source of ideas on land ethics found in his longer essays. The essays are taken from more contemplative notes still in manuscript when Aldo Leopold died in 1948, after fighting a grass fire on a neighbor's farm in Wisconsin.

A great naturalist and humanist, Aldo Leopold was a pioneer in modern conservation. He was born in Iowa in 1887. From 1909 to 1924 he worked for the U.S. Forest Service in the Southwest, an area at that time imbued with a frontier attitude toward wildlife. A cormorant was bait for a bobcat trap, a coyote something that conservationists shot or trapped at every opportunity. The Delta Colorado journal, written in 1922, indicates to what extent Leopold shared this attitude. However, after he left the Southwest to become associate director of the Forest Products Laboratory at Madison, Wisconsin, his close contact with research made him increasingly critical of the factual basis of wildlife management. He soon was writing eloquently against bounty systems and indiscriminate trapping and poisoning of predators. In 1933 the University of Wisconsin created a chair of game management for Aldo Leopold.

His unfailing enthusiasm and new contacts with ecologists, ornithologists, and land managers constantly widened his horizons. Drought and dust storms of the 'thirties deepened his mounting conviction that our stewardship of the land tragically lacked an ethical basis. It was against these diverse backgrounds that the "Round River" journals were written.

BOOK NEWS FROM OXFORD UNIVERSITY PRESS

THE LOON ISLAND DECALOGUE

FROM "ROUND RIVER"

BY ALDO LEOPOLD

1. Cuss not thine ancient backlash, for the poor cast we have with us always.

2. When thou risest up to smite a mosquito, hold thy peace and lay thy shirt upon the canopy.

3. Cherish thy hat on the portage, that it may be with thee to the end of thy trip.

4. Stack not tortillas without flour, lest they cleave together and thy brother gather up thereof seven baskets full.

5. If thou wouldst bump the tent in a rainstorm, do it over thine own bed.

6. Six days shalt thou paddle and pack, but on the seventh thou shalt wash thy socks.

7. Covet not thy neighbor's shave, lest thou cast for a trout and be given a pickerel.

8. To him that eats shall be given a pancake, but from him that is always wanting to cook shall be taken away even the one that he hath.

9. An aluminum cup is made for forbearance, and a hot griddle is the trial of a patient man.

10. See not thy brothers' bum cast, and love his campsite as thine own. If there be a rock in the tent, lay thy bed upon it. Ask not for more cheese till thou see if there be any, and peace shall be with thee to the end of thy days.

* * * * *

"One of the marvels of early Wisconsin was the Round River, a river that flowed into itself, and thus sped around and around in a never-ending circuit...Wisconsin not only had a round river, Wisconsin is one. The current is the stream of energy which flows out of the soil into plants, thence into animals, thence back into the soil in a never-ending circuit of life."

"The common denominator of all hunters is the realization that there is always something to hunt. The world teems with creatures, processes, and events that are trying to elude you; there is always a deer, and always a swath down which he can be seen. Every ground is a hunting ground, whether it lies between you and the curbstone, or in those illimitable woods where rolls the Oregon. The final test of the hunter is whether he is keen to go hunting in a vacant lot."

"As I sit against a mossy rock writing up the sequel to yesterday's adventures, a cool breeze fans the blueberry bushes, which dangle big dewy fruit over the very page of this journal. Starker and Luna, after being prodded through the job of dishes and beds, are organizing the fishing tackle for the day with thoroughness and enthusiasm. Carl is trying a new way of putting the tumpline on the boys' packs. Gentle waves are lapping the canoe in invitation for the day's travel. Down the lake a loon calls, and back in the aspens a pine squirrel tells us to get the hell out o' here. We will!"

"There is much confusion between land and country. Land is the place where corn, gullies, and mortgages grow. Country is the personality of land, the collective harmony of its soil, life, and weather. Country knows no mortgages, no alphabetical agencies, no tobacco road; it is calmly aloof to these petty exigencies of its alleged owners."

114 FIFTH AVENUE NEW YORK 11, N. Y.

Reprinted from
THE JOURNAL OF WILDLIFE MANAGEMENT
Vol. 18, No. 2, April, 1954

Round River / From the journals of Aldo Leopold. Edited by Luna B. Leopold. Illustrated by Charles W. Schwartz. Oxford University Press, New York. xiii+173 pp. $3.00. 1953.

This is a series of unpublished essays and journal excerpts compiled and arranged into three parts. The first, labeled "A Man's Leisure Time," comprises only one essay of the same title. It is concerned with the benefits one can derive from a constructive hobby. The second, called "Country" is a series of journal excerpts on field trips from Canada to Mexico, plus appropriately spaced essays in the title theme. This section is the body of the book and covers some 140 pages; the third and last section is entitled "Round River" and contains three philosophical essays.

The reader should not expect this book to be of similar quality or superior to *Sand County Almanac* (Leopold, 1949, Oxford). If he does, he is in for a disappointment, albeit of short duration. *Sand County Almanac* is the essence distilled from Aldo Leopold's lifetime of experience in the field as a sportsman and professional conservationist. The substance from which this essence was drawn has not been discarded, but in *Round River* is refined as the delightful by-product of a rich outdoor life recorded on the spot or viewed in retrospect. It must be remembered that the author did not and perhaps would not have published these writings, and as a consequence they are lacking in the fine ecological and literary polish normally expected of his finished work. Indeed, *Sand County Almanac* is the sequel to *Round River*, despite the fact that they were published in reverse order.

The text shows that the author suffered from the human frailties that plague most of us and that his growth as a conservationist was slow, forceful, and lasting. For example, some of the excerpts from his field journals reveal that at one time he trapped and shot lynx, tried to trap coyotes, shot a bobcat and a fox, and that his party killed avocets. To the creased-pants woodsman this may be shocking, but not so to those who realize that this "blood and guts" stage in the author's life was a vital factor in the intellectual growth of a great conservationist. In 1922, he shot a duck hawk on the Delta of the Colorado and as a matter of fact, records this in his journal. In the essay "Conservation," which was written in 1938, he expresses the antithesis of his 1922 experience when he says "The basic question is whether a hawkless, owl-less countryside is a livable countryside for Americans with eyes to see and ears to hear. Hawks and owls are a part of the land mechanism." Here is evidence of this intellectual growth. Further, these writings show that his convictions were wrought from experience, not copied; nor were they piously assumed to be innate. The individual trips afield so pleasingly portrayed must be considered as to time and place in order to understand fully the subtle story of Aldo Leopold's evolution as a conservation thinker and teacher. In fact, that evolution is the story to be read between the lines of this book.

Round River will appeal particularly to the "hunter" and this does not mean only the powder-burning kind, but all those who thrill to a hunt. As the author puts it, "The final test of the hunter is whether he is keen to go hunting in a vacant lot." In these essays also is the why and wherefore of this man's attraction for kindred souls, the number of which has not diminished since his death.

The title essay, "Round River," is somewhat involved in that it tries to cover too much ground. Its salient idea is the concept of food chains and the interdependence of soil, plants and animals. Although the prose is pleasing to read, moving, and informative, the main theme is frequently lost. Even so, it is better than most dissertations on that subject.

The last essay, "Goose Music," is a philosophical appraisal of hunting (and fishing) as a social asset to the nation. Here also is a Leopoldian evaluation of the chase, its objects, and the hunter. So fervent is his plea for the outdoor aesthetic which to him is represented in "goose music," that to ignore or fail to understand this music is almost sacrilegious. In part, this climax essay may be rationalization, but I cannot point out where because I am blinded by the same light.

The final paragraph in the book starts with

the statement, "I have congenital hunting fever and three sons." That which follows summarizes all that is said so eloquently throughout the book. Personally, it will help me explain to my boys why and how hunting fever will make for a richer life. To each reader of this book there will also come the realization that his inner personal responses to experience in the field are most expressively phrased in the words of the author.

Often in the emotional reaction to a posthumous publication of this kind we lose sight of the fact that much hard work has gone into the compiling and editing of the manuscript. Luna B. Leopold has done an exceptionally fine job of choosing and arranging the pieces that give us further insight into the life of his father. His brief but dignified preface indicates that the Leopold flare for lucid and appealing expression may also be congenital.

Charles W. Schwartz's black-and-white illustrations capture the changing moods of the book. Even in the anatomically inaccurate ruffed grouse (p. 74) his execution is superb.

Many times since his death, Aldo Leopold's writings have been likened to those of Thoreau. This comparison would doubtless have made Thoreau very happy.—ROBERT A. MCCABE.

October 15, 1953

Dr. Alfred G. Etter
Brookhill Farm
Clarksville, Missouri

Dear Al:

Due to the gross mismanagement of the Oxford University Press, or should I say their gross liberality, I have received three copies of Leopold's recent book "Round River." I am sending one of these to you under separate cover.

The copy I am retaining here I have attempted to write in the dates of certain essays as I knew them. "A Man's Leisure Time" was written in 1920; "Country," in 1941; "Natural History--The Forgotten Science," 1938; "Blue River," in 1922; "The Deer Swath," in 1948; and "Conservation," in 1938. The journal entries are pretty well dated. I failed to learn the writing dates for the last two essays.

Shortly after Leopold's death in 1948, Ward Shepard, who knew him for so many years, wanted to write an essay on Aldo called "The Evolution of a Mind." In reading this book, I think you will undoubtedly sense something of the drama Ward had in mind. As far as I can see, Aldo's ardent enthusiasm for hunting and his contacts with the Southwest started him off with something like a frontier appreciation of wildlife. This developed into an interest in game management which as far as he could see took the form of predator control (clearly shown in the Delta, Colorado journal) and in development of refuges. I don't think this book shows clearly how and when the evolution took place. By the time Leopold wrote his game policy for the American Game Protective Association back in 1929, he had been out of the Southwest for some five years and in contact with the research activities of the Forest Products Laboratory for a similar period. As of 1929 he had dropped the idea of predator control completely and was urging the necessity for research in game management. The extension of Leopold's interest in the field of ecology apparently took place during the 1930's when he was a member of the University of Wisconsin facutty. Early in the 1920's Leopold wrote an historically interesting essay on the extent of erosion in the Southwest but it was not until he became a university professor that his interest in land use broadened and his thinking onconservation matured. It is hard to realize that a fellow who could write the journal entries of the Delta, Colorado in 1922 could in the course of twenty years develop the ethical restraints that appear in "The Land Ethic." I have the feeling that Leopold culled his best writing for the "Sand County Almanac" manuscript. The present book lacks the maturity of his later years but it does offer an interesting insight intowhat Ward Shepard called "The Evolution of a Mind."

Mrs. Leopold has been much concerned because the editing of "Round River" left so many of these things unsaid. I am afraid this is so, and I have deliberately ducked any possible invitation to review the book. About ten years ago I made a resolve never to review the published work of a close friend. You might like to tackle a review of "Round River" yourself for some periodical, but whether you do or not, I thought you would like to have this volume.

Best regards.

Sincerely,

JJH:pm

Joseph J. Hickey
Associate Professor

Page 93
Half title
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p. 95

PART II *The Quality of Landscape*

Wisconsin

Strip in
on p. 116

Deadening

The old oak had been girdled and was dead.

There are degrees of death in abandoned farms. Some old houses cock an eye at you as if to say 'Somebody will move in. Wait and see.'

But this farm was different. Girdling the old oak to squeeze one last crop out of the barnyard has the same finality as burning the furniture to keep warm.

Page 163

PART III *A Taste for Country*

164 BLANK

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new running heads
verso pp 96-162

THE QUALITY OF LANDSCAPE
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Note

Part IV

not numbered

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217B

morning star pales in the east? And when the dawn-wind stirs through the ancient cottonwoods, and the gray light steals down from the hills over the old river sliding softly past its wide brown sandbars—what if there be no more goose music?

217A

PART IV *The Upshot*

217B BLANK

The Land Ethic

When god-like Odysseus returned from the wars in Troy, he hanged all on one rope a dozen slave-girls of his household whom he suspected of misbehavior during his absence.

This hanging involved no question of propriety. The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong.

Concepts of right and wrong were not lacking from Odysseus' Greece: witness the fidelity of his wife through the long years before at last his black-prowed galleys clove the wine-dark seas for home. The ethical structure of that day covered wives, but had not yet been extended to human chattels. During the three thousand years which have since elapsed, ethical criteria have been extended to many fields of conduct, with corresponding shrinkages in those judged by expediency only.

The Ethical Sequence

This extension of ethics, so far studied only by philosophers, is actually a process in ecological evolution. Its sequences may be described in ecological as well as in philosophical terms. An ethic, ecologically, is a limitation on freedom of

The skunk track enters the woods, and crosses a glade where the rabbits have packed down the snow with their tracks, and mottled it with pinkish urinations. Newly exposed oak seedlings have paid for the thaw with their newly barked stems. Tufts of rabbit-hair bespeak the year's first battles among the amorous bucks. Further on I find a bloody spot, encircled by a wide-sweeping arc of owl's wings. To this rabbit the thaw brought freedom from want, but also a reckless abandonment of fear. The owl has reminded him that thoughts of spring are no substitute for caution.

* * *

The skunk track leads on, showing no interest in possible food, and no concern over the rompings or retributions of his neighbors. I wonder what he has on his mind; what got him out of bed? Can one impute romantic motives to this corpulent fellow, dragging his ample beltline through the slush? Finally the track enters a pile of driftwood, and does not emerge. I hear the tinkle of dripping water among the logs, and I fancy the skunk hears it too. I turn homeward, still wondering.

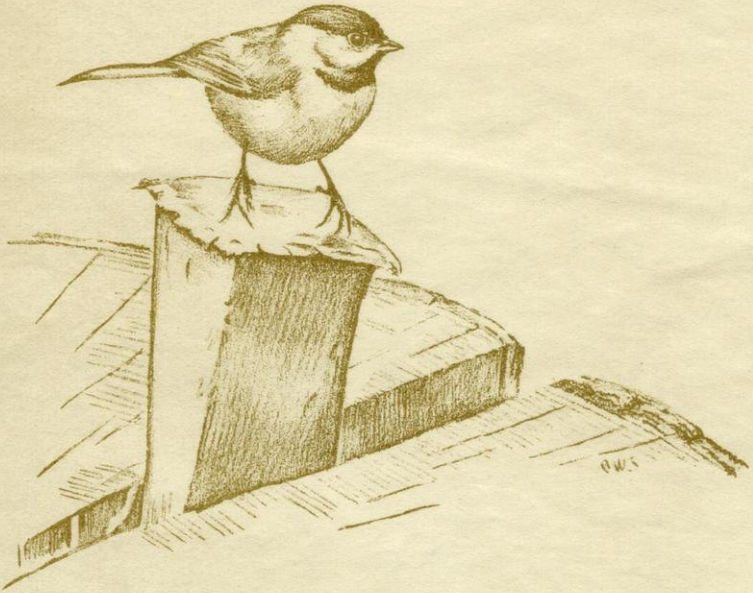
It was a bolt of lightning that put an end to wood-making by this particular oak. We were all awakened, one night in July, by the thunderous crash; we realized that the bolt must have hit near by, but, since it had not hit us, we all

went back to s things to the test of himself, and thi htning.

Next morning the sandhill rejoicing with the cone- irie clovers over their fresh accession n a great slab of bark freshly torn from the trunk of the roadside oak. The trunk showed a long spiral scar of barkless sapwood, a foot wide

wedge lies rusting in the woods, embedded in unsplittable cross-grain.)

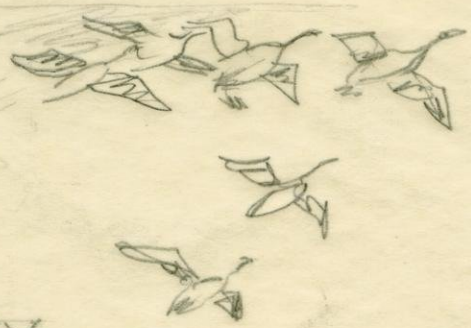
The axe functions only at an angle diagonal to the years, and this only for the peripheral rings of the recent past. Its special function is to lop limbs, for which both saw and wedge are useless.



The three tools are requis B-1 to good history. S.S.

*

These things I ponder as the FINE LINE good oak burns to red coals on white ashes. Those ashes, some spring, I will return to the orchard at the foot of the sandhill. They will come back to me again, perhaps as red apples, or per-



A SAND COUNTY ALMANAC

WITH OTHER ESSAYS ON CONSERVATION FROM Round River

ALDO LEOPOLD

ILLUSTRATED BY CHARLES W. SCHWARTZ

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A SAND COUNTY ALMANAC

With Other Essays on Conservation from ROUND RIVER

by

Aldo Leopold

illustrated by

Charles W. Schwartz

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Draft ~~5/30/66 OOL~~

Preface to the ~~Second Edition~~ Enlarged Edition

A SAND COUNTY ALMANAC was in draft form when Aldo Leopold died in 1948. His son, Luna, edited this material and saw it through to publication in 1949. He later prepared for publication another group of previously unpublished essays and journals, these appearing in 1953 under the title ROUND RIVER.

This new volume combines all of SAND COUNTY ALMANAC with eight ~~of the~~ essays from ROUND RIVER. the arrangement of the essays has been somewhat altered, and in one instance two essays have been combined, in order to avoid repetition and to present Aldo Leopold's central ideas in a meaningful relationship to one another. Because of this rearrangement the Foreword to the original edition no longer describes the sections as they appear in this book: Part II has been renamed, Part III has become Part IV, and a new Part III, made up mostly of essays from ROUND RIVER, has been introduced. We have also made minor revisions in the text itself where dated references served only to distract the reader.

* * *

Though these essays have been widely read and quoted, their basic tenets have been all but forgotten in the glare of great national publicity extolling the virtues of "natural beauty." Roadside beautification is a far cry from the harmony between man and land that Aldo Leopold knew and taught. ~~This same~~ The America that declares the preservation of natural beauty to be public policy is at the same time planning to build dams in two areas of great natural value. Bills are now before Congress to construct power dams in the Grand Canyon of the Colorado that would essentially kill the living river and flood a large part of this unique natural heritage.

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There also has been under consideration for some years the construction of a dam for the development of hydroelectric power in Alaska at a location that would flood out a large proportion of the breeding areas of the migratory waterfowl of the Pacific Coast. The construction of Rampart Dam could, in a moment of time, eliminate most of the ducks, geese, and other birds that each years for eons have passed over Washington, Oregon, and California ~~on thier annual hegira~~. When Aldo Leopold wrote 'Goose Music,' this could ~~hardly~~ scarcely be ~~more than~~ imagined: now this possibility is upon us. The shame is that the Americans proposing, agreeing to, and carrying out this plan will defend ~~thier~~ their action on financial grounds, when economics should not be the deciding factor, ~~when~~ as ~~and~~ alternative and feasible sources of electric power can be found.

* * *

This generation of Aldo Leopold's grandchildren is rebelling on college campuses, demonstrating and working for social causes, and fighting on foreign soil. This same youth is maturing at that moment of time which is pivotal in the struggle to preserve 'things wild and free' that Aldo Leopold understood so wisely and expressed so eloquently.

Of all the causes ~~which~~ that attract the attention of these young people, the plight of nature is one which may be truly a last call. Things wild and free are being destroyed by the impersonality of our attitude towards the land. What better way to fight the destruction of nature than to place ~~freely~~ in the hands of the young this powerful plea for a land ethic?

Washington, D. C. ~~1966~~
June 1966

Carolyn Clugston Leopold
Luna B. Leopold

To my ESTELLA

Foreword to ~~the Original Edition~~ Sand County Almanac

THERE are some who can live without wild things, and some who cannot. These essays are the delights and dilemmas of one who cannot.

Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild, and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech.

These wild things, I admit, had little human value until mechanization assured us of a good breakfast, and until science disclosed the drama of where they come from and how they live. The whole conflict thus boils down to a question of degree. We of the minority see a law of diminishing returns in progress; our opponents do not.

* * *

One must make shift with things as they are. These essays are my shifts. They are grouped in three parts.

Part I tells what my family sees and does at its week-end

refuge from too much modernity: 'the shack.' On this sand farm in Wisconsin, first worn out and then abandoned by our bigger-and-better society, we try to rebuild, with shovel and axe, what we are losing elsewhere. It is here that we seek—and still find—our meat from God.

These shack sketches are arranged seasonally as a 'Sand County Almanac.'

Part II, 'Sketches Here and There,' recounts some of the episodes in my life that taught me, gradually and sometimes painfully, that the company is out of step. These episodes, scattered over the continent and through forty years of time, present a fair sample of the issues that bear the collective label: conservation.

Part III, 'The Upshot,' sets forth, in more logical terms, some of the ideas whereby we dissenters rationalize our dissent. Only the very sympathetic reader will wish to wrestle with the philosophical questions of Part III. I suppose it may be said that these essays tell the company how it may get back in step.

* * *

Conservation is getting nowhere 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. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable, under science, of contributing to culture.

That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension

of ethics. That land yields a cultural harvest is a fact long known, but latterly often forgotten.

These essays attempt to weld these three concepts.

Such a view of land and people is, of course, subject to the blurs and distortions of personal experience and personal bias. But wherever the truth may lie, this much is crystal-clear: our bigger-and-better society is now like a hypochondriac, so obsessed with its own economic health as to have lost the capacity to remain healthy. The whole world is so greedy for more bathtubs that it has lost the stability necessary to build them, or even to turn off the tap. Nothing could be more salutary at this stage than a little healthy contempt for a plethora of material blessings.

Perhaps such a shift of values can be achieved by reappraising things unnatural, tame, and confined in terms of things natural, wild, and free.

ALDO LEOPOLD

Madison, Wisconsin
4 March 1948

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Part IV: THE UPSHOT

Caledonia

PART II *~~Sketches Here and There~~* The Quality of Landscape

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river banks, and as few road crossings as possible. Slowly, patiently, and sometimes expensively the Conservation Department has been buying land, removing cottages, warding off unnecessary roads, and in general pushing the clock back, as far as possible, toward the original wilderness.

The good soil that enabled the Flambeau to grow the best cork pine for Paul Bunyan likewise enabled Rusk County, during recent decades, to sprout a dairy industry. These dairy farmers wanted cheaper electric power than that offered by local power companies, hence they organized a co-operative REA and in 1947 applied for a power dam, which, when built, would clip off the lower reaches of a fifty-mile stretch in process of restoration as canoe-water.

There was a sharp and bitter political fight. The Legislature, sensitive to farmer-pressure but oblivious of wilderness values, not only approved the REA dam, but deprived the Conservation Commission of any future voice in the disposition of power sites. It thus seems likely that the remaining canoe-water on the Flambeau, as well as every other stretch of wild river in the state, will ultimately be harnessed for power.

Perhaps our grandsons, having never seen a wild river, will never miss the chance to set a

~~Deadening~~

Deadening

The old oak had been girdled and was dead.

There are degrees of death in abandoned farms. Some old houses cock an eye at you as if to say 'Somebody will move in. Wait and see.'

But this farm was different. Girdling the old oak to squeeze one last crop out of the barnyard has the same finality as burning the furniture to keep warm.

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(*Wisconsin*) set 14 pt. ital Caledonia

Marshland Elegy

A dawn wind stirs on the great marsh. With almost imperceptible slowness it rolls a bank of fog across the wide morass. Like the white ghost of a glacier the mists advance, riding over phalanxes of tamarack, sliding across bog-meadows heavy with dew. A single silence hangs from horizon to horizon.

Out of some far recess of the sky a tinkling of little bells falls soft upon the listening land. Then again silence. Now comes a baying of some sweet-throated hound, soon the clamor of a responding pack. Then a far clear blast of hunting horns, out of the sky into the fog.

High horns, low horns, silence, and finally a pandemonium of trumpets, rattles, croaks, and cries that almost shakes the bog with its nearness, but without yet disclosing whence it comes. At last a glint of sun reveals the approach of a great echelon of birds. On motionless wing they emerge from the lifting mists, sweep a final arc of sky, and settle in clangorous descending spirals to their feeding grounds. A new day has begun on the crane marsh.

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Country

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There is much confusion between land and country. Land is the place where corn, gullies, and mortgages grow. Country is the personality of land, the collective harmony of its soil, life, and weather. Country knows no mortgages, no alphabetical agencies, no tobacco road; it is calmly aloof to these petty exigencies of its alleged owners. That the previous occupant of my farm was a bootlegger mattered not one whit to its grouse; they sailed as proudly over the thickets as if they were guests of a king.

Poor land may be rich country, and vice versa. Only economists mistake physical opulence for riches. Country may be rich despite a conspicuous poverty of physical endowment, and its quality may not be apparent at first glance, nor at all times.

I know, for example, a certain lakeshore, a cool austerity of pines and wave-washed sands. All day you see it only as something for the surf to pound, a dark ribbon that stretches farther than you can paddle, a monotony to mark the miles by. But toward sunset some vagrant breeze may waft a gull across a headland, behind which a sudden roistering of loons reveals the presence of a hidden bay. You are seized with an impulse to land, to set foot on bearberry carpets, to pluck a balsam

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bed, to pilfer beach plums or blueberries, or perhaps to poach a partridge from out those bosky quietudes that lie behind the dunes. A bay? Why not also a trout stream? Incisively the paddles clip little soughing swirls athwart the gunwale, the bow swings sharp shoreward and cleaves the greening depths for camp.

Later, a supper-smoke hangs lazily upon the bay; a fire flickers under drooping boughs. It is a lean poor land, but rich country.

Some woods, perennially lush, are notably lacking in charm. Tall clean-boled oaks and tulip poplars may be good to look at, from the road, but once inside one may find a coarseness of minor vegetation, a turbidity of waters, and a paucity of wildlife. I cannot explain why a red rivulet is not a brook. Neither can I, by logical deduction, prove that a thicket without the potential roar of a quail covey is only a thorny place. Yet every outdoorsman knows that this is true. That wildlife is merely something to shoot at or to look at is the grossest of fallacies. It often represents the difference between rich country and mere land.

There are woods that are plain to look at, but not to look into. Nothing is plainer than a cornbelt woodlot; yet, if it be August, a crushed pennyroyal, or an over-ripe mayapple, tells you here is a place. October sun on a hickory nut is irrefutable evidence of good country; one senses not only hickory but a whole chain of further sequences: perhaps of oak coals in the dusk, a young squirrel browning, and a distant barred owl hilarious over his own joke.

The taste for country displays the same diversity in aesthetic competence among individuals as the taste for opera, or oils. There are those who are willing to be herded in droves through

A Man's Leisure Time

The text of this sermon is taken from the gospel according to Ariosto. I do not know the chapter and verse, but this is what he says: 'How miserable are the idle hours of the ignorant man!'

There are not many texts that I am able to accept as gospel truths, but this is one of them. I am willing to rise up and declare my belief that this text is literally true; true forward, true backward, true even before breakfast. The man who cannot enjoy his leisure is ignorant, though his degrees exhaust the alphabet, and the man who does enjoy his leisure is to some extent educated, though he has never seen the inside of a school.

I cannot easily imagine a greater fallacy than for one who has several hobbies to speak on the subject to those who may have none. For this implies prescription of avocation by one person for another, which is the antithesis of whatever virtue may inhere in having any at all. You do not annex a hobby, the hobby annexes you. To prescribe a hobby would be dangerously akin to prescribing a wife—with about the same probability of a happy outcome.

Let it be understood, then, that this is merely an exchange of reflections among those already obsessed—for better or for

worse—with the need of doing something queer. Let others listen if they will, and profit by our behavior if they can.

What is a hobby anyway? Where is the line of demarcation between hobbies and ordinary normal pursuits? I have been unable to answer this question to my own satisfaction. At first blush I am tempted to conclude that a satisfactory hobby must be in large degree useless, inefficient, laborious, or irrelevant. Certainly many of our most satisfying avocations today consist of making something by hand which machines can usually make more quickly and cheaply, and sometimes better. Nevertheless I must in fairness admit that in a different age the mere fashioning of a machine might have been an excellent hobby. Galileo, I fancy, derived a real and personal satisfaction when he set the ecclesiastical world on its ear by embodying in a new catapult some natural law that St. Peter had inadvertently omitted to catalogue. Today the invention of a new machine, however noteworthy to industry, would, as a hobby, be trite stuff. Perhaps we have here the real inwardness of our question: A hobby is a defiance of the contemporary. It is an assertion of those permanent values which the momentary eddies of social evolution have contravened or overlooked. If this is true, then we may also say that every hobbyist is inherently a radical, and that his tribe is inherently a minority.

This, however, is serious; becoming serious is a grievous fault in hobbyists. It is an axiom that no hobby should either seek or need rational justification. To wish to do it is reason enough. To find reasons why it is useful or beneficial converts it at once from an avocation into an industry—lowers it at once to the ignominious category of an 'exercise' undertaken for health, power, or profit. Lifting dumbbells is not a hobby. It is a confession of subservience, not an assertion of liberty.

When I was a boy, there was an old German merchant who

lived in a little cottage in our town. On Sundays he used to go out and knock chips off the limestone ledges along the Mississippi, and he had a great tonnage of these chips, all labeled and catalogued. The chips contained little fossil stems of some defunct water creatures called crinoids. The townspeople regarded this gentle old fellow as just a little bit abnormal, but harmless. One day the newspaper reported the arrival of certain titled strangers. It was whispered that these visitors were great scientists, some of them from foreign lands, and some were among the world's leading paleontologists. They came to visit the harmless old man, and to hear his pronouncements on crinoids, and they accepted these pronouncements as law. When the old German died, the town awoke to the fact that he was a world authority on his subject; a creator of knowledge; a maker of scientific history. He was a great man—a man beside whom the local captains of industry were mere bushwhackers. His collection went to a national museum, and his name is known in all the nations of the earth.

I knew a bank president who adventured in roses. Roses made him a happy man and a better bank president. I know a wheel manufacturer who adventures in tomatoes. He knows all about them, and, whether as a result or as a cause, he also knows all about wheels. I know a taxi driver who romances in sweet corn. Get him wound up once and you will be surprised how much he knows, and hardly less at how much there is to be known.

The most glamorous hobby I know of today is the revival of falconry. It has a few addicts in America, and perhaps a dozen in England—a minority indeed. For two and a half cents one can buy and shoot a cartridge that will kill the heron whose capture by hawking requires months or years of laborious training of both the hawk and the hawker. The cartridge, as a lethal agent, is a perfect product of industrial chemistry.

One can write a formula for its lethal reaction. The hawk, as a lethal agent, is the perfect flower of that still utterly mysterious alchemy—evolution. No living man can, or possibly ever will, understand the instinct of predation that we share with our raptorial servant. No man-made machine can, or ever

will, synthesize that perfect co-ordination of eye, muscle, and pinion as he stoops to his kill. The heron, if bagged, is inedible and hence useless (although the old falconers seem to have eaten him, just as a Boy Scout smokes and eats a flea-bitten summer cottontail that has fallen victim to his sling, club, or bow). Moreover the hawk, at the slightest error in technique of handling, may either 'go tame' like Homo sapiens or fly away into the blue. All in all falconry is the perfect hobby.

To make and shoot the longbow is another. There is a subversive belief among laymen that in the hands of an expert the bow is an efficient weapon. Each fall, less than a hundred Wisconsin experts register to hunt deer with the broadheaded arrow. One out of the hundred may get a buck, and he is surprised. One out of five riflemen gets his buck. As an archer, therefore, and on the basis of our record, I indignantly deny the allegation of efficiency. I admit only this: that making archery tackle is an effective alibi for being late at the office, or failing to carry out the ashcan on Thursdays.

One cannot make a gun—at least I can't. But I can make a bow, and some of them will shoot. And this reminds me that perhaps our definition ought to be amended; a good hobby, in these times, is one that entails either making something or making the tools to make it with, and then using it to accomplish some needless thing. When we have passed out of the present age, a good hobby will be the reverse of all these. I come again to the defiance of the contemporary.

A good hobby must also be a gamble. When I look at a rough, heavy, lumpy, splintery stave of *bois d'arc*, and envision the perfect gleaming weapon that will one day emerge from its graceless innards, and when I picture that bow, drawn in a perfect arc, ready—in a split second—to cleave the sky with its shining javelin, I must envision also the probability that it may—in a split second—burst into impotent splinters, while I

face another laborious month of evenings at the bench. The possible debacle is, in short, an essential element in all hobbies, and stands in bold contradistinction to the humdrum certainty that the endless belt will eventuate in a Ford.

A good hobby may be a solitary revolt against the commonplace, or it may be the joint conspiracy of a congenial group. That group may, on occasion, be the family. In either event it is a rebellion, and if a hopeless one, all the better. I cannot imagine a worse jumble than to have the whole body politic suddenly 'adopt' all the foolish ideas that smolder in happy discontent beneath the conventional surface of society. There is no such danger. Nonconformity is the highest evolutionary attainment of social animals, and will grow no faster than other new functions. Science is just beginning to discover what incredible regimentation prevails among the 'free' savages, and the freer mammals and birds. A hobby is perhaps creation's first denial of the 'peck-order' that burdens the gregarious universe, and of which the majority of mankind is still a part.

The Round River

A PARABLE

One of the marvels of early Wisconsin was the Round River, a river that flowed into itself, and thus sped around and around in a never-ending circuit. Paul Bunyan discovered it, and the Bunyan saga tells how he floated many a log down its restless waters.

No one has suspected Paul of speaking in parables, yet in this instance he did. Wisconsin not only *had* a round river, Wisconsin *is* one. The current is the stream of energy which flows out of the soil into plants, thence into animals, thence back into the soil in a never-ending circuit of life. 'Dust unto dust' is a desiccated version of the Round River concept.

We of the genus *Homo* ride the logs that float down the Round River, and by a little judicious 'burling' we have learned to guide their direction and speed. This feat entitles us to the specific appellation *sapiens*. The technique of burling is called economics, the remembering of old routes is called history, the selection of new ones is called statesmanship, the conversation about oncoming riffles and rapids is called politics. Some of the crew aspire to burl not only their own logs, but the whole flotilla as well. This collective bargaining with nature is called national planning.

In our educational system, the biotic continuum is seldom

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pictured to us as a stream. From our tenderest years we are fed with facts about the soils, floras, and faunas that comprise the channel of Round River (biology), about their origins in time (geology and evolution), about the technique of exploiting them (agriculture and engineering). But the concept of a current with drouths and freshets, backwaters and bars, is left to inference. To learn the hydrology of the biotic stream we must think at right angles to evolution and examine the collective behavior of biotic materials. This calls for a reversal of specialization; instead of learning more and more about less and less, we must learn more and more about the whole biotic landscape.

Ecology is a science that attempts this feat of thinking in a plane perpendicular to Darwin. Ecology is an infant just learning to talk, and, like other infants, is engrossed with its own coinage of big words. Its working days lie in the future. Ecology is destined to become the lore of Round River, a belated attempt to convert our collective knowledge of biotic materials into a collective wisdom of biotic navigation. This, in the last analysis, is conservation.

Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say,

you cannot love game and hate predators; you cannot conserve the waters and waste the ranges; you cannot build the forest and mine the farm. The land is one organism. Its parts, like our own parts, compete with each other and co-operate with each other. The competitions are as much a part of the inner workings as the co-operations. You can regulate them—cautiously—but not abolish them.

The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism. Only those who know the most about it can appreciate how little we know about it. The last word in ignorance is the man who says of an animal or plant: 'What good is it?' If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not

understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.

Have we learned this first principle of conservation: to preserve all the parts of the land mechanism? No, because even the scientist does not yet recognize all of them.

In Germany there is a mountain called the Spessart. Its south slope bears the most magnificent oaks in the world. American cabinetmakers, when they want the last word in quality, use Spessart oak. The north slope, which should be the better, bears an indifferent stand of Scotch pine. Why? Both slopes are part of the same state forest; both have been managed with equally scrupulous care for two centuries. Why the difference?

Kick up the litter under the oaks and you will see that the leaves rot almost as fast as they fall. Under the pines, though, the needles pile up as a thick duff; decay is much slower. Why? Because in the Middle Ages the south slope was preserved as a deer forest by a hunting bishop; the north slope was pastured, plowed, and cut by settlers, just as we do with our woodlots in Wisconsin and Iowa today. Only after this period of abuse was the north slope replanted to pines. During this period of abuse something happened to the microscopic flora and fauna of the soil. The number of species was greatly reduced, i.e. the digestive apparatus of the soil lost some of its parts. Two centuries of conservation have not sufficed to restore these losses. It required the modern microscope, and a century of research in soil science, to discover the existence of these 'small cogs and wheels' which determine harmony or disharmony between men and land in the Spessart.

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For the biotic community to survive, its internal processes must balance, else its member-species would disappear. That particular communities *do* survive for long periods is well known: Wisconsin, for example, in 1840 had substantially the same soil, fauna, and flora as at the end of the ice age, i.e. 12,000 years ago. We know this because the bones of its animals and the pollens of its plants are preserved in the peat bogs. The successive strata of peats, with their differing abundance of pollens, even record the weather; thus around 3000 B.C. an abundance of ragweed pollen indicates either a series of drouths, or a great stamping of buffalo, or severe fires on the prairie. These recurring exigencies did not prevent the survival of the 350 kinds of birds, 90 mammals, 150 fishes, 70 reptiles, or the thousands of insects and plants. That all these should survive as an internally balanced community for so many centuries shows an astonishing stability in the original biota. Science cannot explain the mechanisms of stability, but even a layman can see two of its effects: (1) Fertility, when extracted from rocks, circulated through such elaborate food chains that it accumulated as fast as or faster than it washed away. (2) This geological accumulation of soil fertility paralleled the diversification of flora and fauna; stability and diversity were apparently interdependent.

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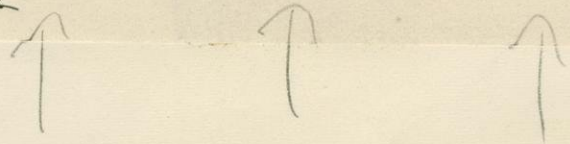

American conservation is, I fear, still concerned for the most part with show pieces. We have not yet learned to think;

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in terms of small cogs and wheels. Look at our own back yard: at the prairies of Iowa and southern Wisconsin. What is the most valuable part of the prairie? The fat black soil, the chernozem. Who built the chernozem? The black prairie was built by the prairie plants, a hundred distinctive species of grasses, herbs, and shrubs; by the prairie fungi, insects, and bacteria; by the prairie mammals and birds, all interlocked in one humming community of co-operations and competitions, one biota. This biota, through ten thousand years of living and dying, burning and growing, preying and fleeing, freezing and thawing, built that dark and bloody ground we call prairie.

Our grandfathers did not, could not, know the origin of their prairie empire. They killed off the prairie fauna and they drove the flora to a last refuge on railroad embankments and roadsides. To our engineers this flora is merely weeds and brush; they ply it with grader and mower. Through processes of plant succession predictable by any botanist, the prairie garden becomes a refuge for quack grass. After the garden is gone, the highway department employs landscapers to dot the quack with elms, and with artistic clumps of Scotch pine, Japanese barberry, and Spiraea. Conservation Committees, en route to some important convention, whiz by and applaud this zeal for roadside beauty.

Some day we may need this prairie flora not only to look at but to rebuild the wasting soil of prairie farms. Many species may then be missing. We have our hearts in the right place, but we do not yet recognize the small cogs and wheels.

In our attempts to save the bigger cogs and wheels, we are still pretty naïve. A little repentance just before a species goes over the brink is enough to make us feel virtuous. When the species is gone we have a good cry and repeat the performance.

The recent extermination of the grizzly from most of the western stock-raising states is a case in point. Yes, we still have

grizzlies in the Yellowstone. But the species is ridden by imported parasites; the rifles wait on every refuge boundary; new dude ranches and new roads constantly shrink the remaining range; every year sees fewer grizzlies on fewer ranges in fewer states. We console ourselves with the comfortable fallacy that a single museum-piece will do, ignoring the clear dictum of history that a species must be saved *in many places* if it is to be saved at all.

We need knowledge—public awareness—of the small cogs and wheels, but sometimes I think there is something we need even more. It is the thing that *Forest and Stream*, on its editorial masthead, once called 'a refined taste in natural objects.' Have we made any headway in developing 'a refined taste in natural objects'?

In the northern parts of the lake states we have a few wolves left. Each state offers a bounty on wolves. In addition, it may invoke the expert services of the U. S. Fish and Wildlife Service in wolf-control. Yet both this agency and the several conservation commissions complain of an increasing number of localities where there are too many deer for the available feed. Foresters complain of periodic damage from too many rabbits. Why, then, continue the public policy of wolf-extermination? We debate such questions in terms of economics and biology. The mammalogists assert the wolf is the natural check on too many deer. The sportsmen reply they will take care of excess deer. Another decade of argument and there will be no wolves to argue about. One conservation inkpot cancels an-

the issue again is 'good' and 'bad' predators, but basically the issue is deeper. Any club privileged to own such a piece of land is morally obligated to keep all its parts, even though it means a few less trout in the creel.

In the lake states we are proud of our forest nurseries, and of the progress we are making in replanting what was once the north woods. But look in these nurseries and you will find no white cedar, no tamarack. Why no cedar? It grows too slowly, the deer eat it, the alders choke it. The prospect of a cedarless north woods does not depress our foresters; cedar has, in effect, been purged on grounds of economic inefficiency. For the

'scenic' places; who find mountains grand if they be proper mountains, with waterfalls, cliffs, and lakes. To such the Kansas plains are tedious. They see the endless corn, but not the heave and the grunt of ox teams breaking the prairie. History, for them, grows on campuses. They look at the low hori-

zon, but they cannot see it, as de Vaca did, under the bellies of the buffalo.

In country, as in people, a plain exterior often conceals hidden riches, to perceive which requires much living in and with. Nothing is more monotonous than the juniper foothills, until some veteran of a thousand summers, laden blue with berries, explodes in a blue burst of chattering jays. The drab sogginess of a March cornfield, saluted by one honker from the sky, is drab no more.

same reason beech has been purged from the future forests of the Southeast. To these voluntary expungements of species from our future flora, we must add the involuntary ones arising from the importation of diseases: chestnut, persimmon, white pine. Is it sound economics to regard any plant as a separate entity, to proscribe or encourage it on the grounds of its individual performance? What will be the effect on animal life, on the soil, and on the health of the forest as an organism? ~~Is there not an aesthetic as well as an economic issue?~~

"~~A refined taste in natural objects" implies esthetic as well as economic considerations.~~

"A refined taste in natural objects" perceives, the economic issue is a separate consideration.

extra #

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We who are the heirs and assigns of Paul Bunyan have not found out either what we are doing to the river or what the river is doing to us. We burl our logs of state with more energy than skill.

~~THE ROUND RIVER~~

We have dealt, so far, with the characteristics of Round River in the pre-Bunyan eras. What now of that *enfant terrible*, Paul, and we, his heirs and assigns? What are we doing to the river, and what is the river doing to us? Are we burling our log of state with skill, or only with energy?

We have radically modified the biotic stream; we had to. Food chains now begin with corn and alfalfa instead of oaks and bluestem, flow through cows, hogs, and poultry instead of into elk, deer, and grouse, thence into farmers, flappers, and freshmen instead of Indians. That the flow is voluminous you can determine by consulting the telephone directory, or the roster of government agencies. The flow in this biotic stream is probably much greater than in the pre-Bunyan eras, but curiously enough science has never measured this.

Tame animals and plants have no tenacity as links in the new food chain; they are maintained, artificially, by the labor of farmers, aided by tractors ~~and horses~~, and abetted by a new kind of animal: the Professor of Agriculture. Paul Bunyan's burling was self-taught; now we have a 'pro' standing on the bank giving free instruction.

Each substitution of a tame plant or animal for a wild one, or an artificial waterway for a natural one, is accompanied by a readjustment in the circulating system of the land. We do not understand or foresee these readjustments; we are unconscious of them unless the end effect is bad. Whether it be the President rebuilding Florida for a ship canal, or Farmer Jones rebuilding a Wisconsin meadow for cow pasture, we are too busy with new tinkerings to think of end effects. That so many are painless attests the youth and elasticity of the land organism.

replaces this ¶

One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise.

The government tells us we need flood control and comes to straighten the creek in our pasture. The engineer on the job tells us the creek is now able to carry off more flood water, but in the process we lost our old willows ~~where~~ and under which the cows switched flies in the noon shade ~~and~~ where the owl hooted on a winter night. We lost the little marshy spot where our fringed gentians bloomed.

Hydrologists have demonstrated that the meanderings of a creek are a necessary part of the hydrologic functioning. The flood plain belongs to the river. The ecologist sees clearly that for similar reasons we can get along with less channel improvement on Round River.

Now to appraise the new order in terms of the two criteria: (1) Does it maintain fertility? (2) Does it maintain a diverse fauna and flora? Soils in the first stages of exploitation display

a burst of plant and animal life. The abundant crops that evoked thanksgiving in the pioneers are well known, but there was also a burst of wild plants and animals. A score of imported food-bearing weeds had been added to the native flora, the soil was still rich, and landscape had been diversified by patches of plowland and pasture. The abundance of wildlife reported by the pioneers was in part the response to this diversity.

Such high metabolism is characteristic of new-found lands. It may represent normal circulation, or it may represent the combustion of stored fertility, i.e. biotic fever. One cannot distinguish the fever from normality by asking the biota to bite a thermometer. It can only be told *ex post facto* by the effect on the soil. What was the effect? The answer is written in gullies on a thousand fields and CCC camps on a thousand hills. Crop yields per acre have remained about stationary. The vast technological improvements in farming have only offset the wastage in soil. In some regions, such as the dust bowl, the biotic stream has already shrunk below the point of navigability, and Paul's heirs have moved to California to ferment the grapes of wrath.

As for diversity, what remains of our native fauna and flora remains only because agriculture has not got around to destroying it. The present ideal of agriculture is clean farming; clean farming means a food chain aimed solely at economic profit and purged of all non-conforming links, a sort of *Pax Germanica* of the agricultural world. Diversity, on the other hand, means a food chain aimed to harmonize the wild and the tame in the joint interest of stability, productivity, and beauty.

Clean farming, to be sure, aspires to rebuild the soil, but it employs to this end only imported plants, animals, and fertilizers. It sees no need for the native flora and fauna that built

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the soil in the first place. Can stability be synthesized out of imported plants and animals? Is fertility that comes in sacks sufficient? These are the questions at issue.

No living man really knows. Testifying for the workability of clean farming is northeastern Europe, where a degree of biotic stability has been retained (except in humans) despite the wholesale artificialization of the landscape.

Testifying for its non-workability are all the other lands where it has ever been tried, including our own, and the tacit evidence of evolution, in which diversity and stability are so closely intertwined as to seem two names for one fact.

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extra #

I had a bird dog named Gus. When Gus couldn't find pheasants he worked up an enthusiasm for Sora rails and meadowlarks. This whipped-up zeal for unsatisfactory substitutes masked his failure to find the real thing. It assuaged his inner frustration.

We conservationists are like that. We set out a generation ago to convince the American landowner to control fire, to grow forests, to manage wildlife. He did not respond very well. We have virtually no forestry, and mighty little range management, game management, wildflower management, pollution control, or erosion control being practiced voluntarily by private landowners. In many instances the abuse of private land is worse than it was before we started. If you don't believe that, watch the strawstacks burn on the Canadian prairies; watch the fertile mud flowing down the Rio Grande; watch the gullies climb the hillsides in the Palouse, in the Ozarks, in the river-breaks of southern Iowa and western Wisconsin.

To assuage our inner frustration over this failure, we have found us a meadowlark. I don't know which dog first caught the scent; I do know that every dog on the field whipped into

an enthusiastic backing-point. I did myself. The meadowlark was the idea that if the private landowner won't practice conservation, let's build a bureau to do it for him.

Like the meadowlark, this substitute has its good points. It smells like success. It is satisfactory on poor land which bureaus can buy. The trouble is that it contains no device for preventing good private land from becoming poor public land. There is danger in the assuagement of honest frustration; it helps us forget we have not yet found a pheasant.

I'm afraid the meadowlark is not going to remind us. He is flattered by his sudden importance.

When one considers the prodigious achievements of the profit motive in wrecking land, one hesitates to reject it as a vehicle for restoring land. I incline to believe we have overestimated the scope of the profit motive. Is it profitable for the individual to build a beautiful home? To give his children a higher education? No, it is seldom profitable, yet we do both. These are, in fact, ethical and aesthetic premises which underlie the economic system. Once accepted, economic forces tend to align the smaller details of social organization into harmony with them.

No such ethical and aesthetic premise yet exists for the condition of the land these children must live in. Our children

are our signature to the roster of history; our land is merely the place our money was made. There is as yet no social stigma in the possession of a gullied farm, a wrecked forest, or a polluted stream, provided the dividends suffice to send the youngsters to college. Whatever ails the land, the government will fix it.

I think we have here the root of the problem. What conservation education must build is an ethical underpinning for land economics and a universal curiosity to understand the land mechanism. Conservation may then follow.

Natural History

THE FORGOTTEN SCIENCE

One Saturday night not long ago, two middle-aged farmers set the alarm clock for a dark hour of what proved to be a snowy, blowy Sunday. Milking over, they jumped into a pick-up and sped for the sand counties of central Wisconsin, a region productive of tax deeds, tamaracks, and wild hay. In the evening they returned with a truck full of young tamarack trees and a heart full of high adventure. The last tree was planted in the home marsh by lantern-light. There was still the milking.

In Wisconsin 'man bites dog' is stale news compared with 'farmer plants tamarack.' Our farmers have been grubbing, burning, draining, and chopping tamarack since 1840. In the region where these farmers live the tree is exterminated. Why then should they want to replace it? Because after twenty years they hope to reintroduce sphagnum moss under the grove, and then lady's-slippers, pitcher plants, and the other nearly extinct wildflowers of the aboriginal Wisconsin bogs.

No extension bureau had offered these farmers any prize for this utterly quixotic undertaking. Certainly no hope of gain motivated it. How then can one interpret its meaning? I call it Revolt—revolt against the tedium of the merely economic

attitude toward land. We assume that because we had to subjugate the land to live on it, the best farm is therefore the one most completely tamed. These two farmers have learned from experience that the wholly tamed farm offers not only a slender livelihood but a constricted life. They have caught the idea that there is pleasure to be had in raising wild crops as well as tame ones. They propose to devote a little spot of marsh to growing native wildflowers. Perhaps they wish for their land what we all wish for our children—not only a chance to make a living but also a chance to express and develop a rich and varied assortment of inherent capabilities, both wild and tame. What better expresses land than the plants that originally grew on it?

I here talk about the pleasure to be had in wild things, about natural-history studies as a combination sport and science.

History has not conspired to make my task an easy one. We naturalists have much to live down. There was a time when ladies and gentlemen wandered afield not so much to learn how the world is put together as to gather subject matter for tea-time conversation. This was the era of dickey-bird ornithology, of botany expressed in bad verse, of ejaculatory vapors such as 'ain't nature grand.' But if you will scan the amateur ornithological or botanical journals of today you will see that a new attitude is abroad. But this is hardly the result of our present system of formal education.

I know an industrial chemist who spends his spare time reconstructing the history of the passenger pigeon and its dramatic demise as a member of our fauna. The pigeon became extinct before this chemist was born, but he has dug up more knowledge of pigeons than anyone had previously possessed. How? By reading every newspaper ever printed in our state, as well as contemporary diaries, letters, and books. I estimate that he has read 100,000 documents in his search for pigeon

data. This gigantic labor, which would kill any man undertaking it as a task, fills him with the keen delight of a hunter scouring the hills for scarce deer, of an archeologist digging up Egypt for a scarab. And of course such an undertaking re-

quires more than digging. After the scarab is found its interpretation requires the highest skill—a skill not to be learned from others but rather to be developed by the digger as he digs. Here, then, is a man who has found adventure, exploration, science, and sport, all in the back yard of current history, where millions of lesser men find only boredom.

Another exploration—this time literally of a back yard—is a study of the song sparrow conducted by an Ohio housewife. This commonest of birds had been scientifically labeled and classified a hundred years ago, and forthwith forgotten. Our Ohio amateur had the notion that in birds, as in people, there are things to be known over and above name, sex, and clothes. She began trapping the song sparrows in her garden, marking each with a celluloid anklet, and thus she was able to identify each individual by its colored marker, to observe and record their migrations, feedings, fightings, singings, matings, nestings, and deaths; in short, to decipher the inner workings of the sparrow community. In ten years she knew more about sparrow society, sparrow politics, sparrow economics, and sparrow psychology than anyone had ever learned about any bird. Science beat a path to her door. Ornithologists of all nations seek her counsel.

These two amateurs happen to have achieved fame, but no thought of fame motivated their original work. Fame came *ex post facto*. It is not fame, however, that I am talking about. They achieved personal satisfactions which are more important than fame, and hundreds of other amateurs are achieving these satisfactions. I now ask: What is our educational system doing to encourage personal amateur scholarship in the natural-history field? We can perhaps seek an answer to this question by dropping in on a typical class in a typical zoology department. We find there students memorizing the names of the bumps on the bones of a cat. It is important, of course, to study bones; otherwise we should never comprehend the evolutionary process by which animals came into existence. But why memorize the bumps? We are told that this is part of biological discipline. I ask, though, whether a comprehension of the living animal and how it holds its place in the sun is not an equally important part. Unfortunately the living animal is virtually

omitted from the present system of zoological education. In my own university, for example, we offer no course in ornithology or mammalogy.

Botanical education is in like case, except perhaps that the displacement of interest in the living flora has been not quite so extreme.

The reasons for this eviction of outdoor studies from the schools goes back into history. Laboratory biology came into existence at about the time when amateur natural history was of the dickey-bird variety, and when professional natural history consisted of labeling species and amassing facts about food habits without interpreting them. In short, a growing and vital laboratory technique was at that time placed in competition with a stagnated outdoor technique. It was quite natural that laboratory biology soon came to be regarded as the superior form of science. As it grew it crowded natural history out of the educational picture.

The present educational marathon in memorizing the geography of bones is the aftermath of this perfectly logical process of competition. It has, of course, other justifications: medical students need it. Zoology teachers need it. But I contend that the average citizen does not need it so badly as he needs some understanding of the living world.

In the interim, field studies have developed techniques and ideas quite as scientific as those of the laboratory. The amateur student is no longer confined to pleasant ambles in the country resulting merely in lists of species, lists of migration dates, and lists of rarities. Bird banding, feather-marking, censusing, and experimental manipulations of behavior and environment are techniques available to all, and they are quantitative science. The amateur can, if he has imagination and persistence, select and solve actual scientific natural-history problems as virgin as the stratosphere. SUN.

Sun.

Country

The modern view is to regard laboratory and field not as competitive but rather as complementary studies. Curricula, however, do not yet reflect this new situation. It takes money to enlarge curricula, hence the average college student who inclines toward natural-history avocations is rebuffed rather than encouraged by his university. Instead of being taught to see his native countryside with appreciation and intelligence, he is taught to carve cats. Let him be taught both if this is possible, but if one must be omitted let it be the latter.

To visualize more clearly the lopsidedness and sterility of biological education as a means of building citizens, let's go afield with some typical bright student and ask him some questions. We can safely assume he knows how plants grow and cats are put together, but let us test his comprehension of how the land is put together.

We are driving down a country road in northern Missouri. Here is a farmstead. Look at the trees in the yard and the soil in the field and tell us whether the original settler carved his farm out of prairie or woods. Did he eat prairie chicken or wild turkey for his Thanksgiving? What plants grew here originally which do not grow here now? Why did they disappear? What did the prairie plants have to do with creating the corn-yielding capacity of this soil? Why does this soil erode now but not then?

Again, suppose we are touring the Ozarks. Here is an abandoned field in which the ragweed is sparse and short. Does this tell us anything about why the mortgage was foreclosed? About how long ago? Would this field be a good place to look for quail? Does short ragweed have any connection with the human story behind yonder graveyard? If all the ragweed in this watershed were short, would that tell us anything about the future of floods in the stream? About the future prospects for bass or trout?

many students

NATURAL ~~HISTORY~~ STUDENT

~~I fear that our Phi Beta Kappa biologist~~ would consider these questions insane, but they are not. Any amateur naturalist with a seeing eye should be able to speculate intelligently on all of them, and have a lot of fun doing it. You will see,

too, that modern natural history deals only incidentally with the identity of plants and animals, and only incidentally with their habits and behaviors. It deals principally with their relations to each other, their relation to the soil and water in which they grow, and their relations to the human beings who sing

about 'my country' but see little or nothing of its inner workings. This new science of relationships is called ecology, but what we call it matters nothing. 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 wealth 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. We shall be ready, I think, to practice conservation when 'farmer plants tamarack' is no longer news.

We shall never achieve harmony with land, any more than we shall achieve absolute justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive. It is only in mechanical enterprises that we can expect that early or complete fruition of effort which we call 'success.'

The problem, then, is how to bring about a striving for harmony with land among a people many of whom have forgotten there is any such thing as land, among whom education and culture have become almost synonymous with landlessness. This is the problem of 'conservation education.'

When we say 'striving,' we admit at the outset that the thing we need must grow from within. No striving for an idea was ever injected wholly from without.

Wildlife in American Culture

The culture of primitive peoples is often based on wildlife. Thus the plains Indian not only ate buffalo, but buffalo largely determined his architecture, dress, language, arts, and religion.

In civilized peoples the cultural base shifts elsewhere, but the culture nevertheless retains part of its wild roots. I here discuss the value of this wild rootage.

No one can weigh or measure culture, hence I shall waste no time trying to do so. Suffice it to say that by common consent of thinking people, there are cultural values in the sports, customs, and experiences that renew contacts with wild things. I venture the opinion that these values are of three kinds.

First there is value in any experience that reminds us of our distinctive national origins and evolution, i.e. that stimulates awareness of history. Such awareness is 'nationalism' in its best sense. For lack of any other short name, I shall call this, in our case, the 'split-rail value.' For example: a boy scout has tanned a coonskin cap, and goes Daniel-Booneing in the willow thicket below the tracks. He is reenacting American history. He is, to that extent, culturally prepared to face the dark and bloody realities of the present. Again: a farmer boy arrives in the schoolroom reeking of

muskrat; he has tended his traps before breakfast. He is re-enacting the romance of the fur trade. Ontogeny repeats phylogeny in society as well as in the individual.

Second, there is value in any experience that reminds us of our dependency on the soil-plant-animal-man food chain, and of the fundamental organization of the biota. Civilization has so cluttered this elemental man-earth relation with gadgets and middlemen that awareness of it is growing dim. We fancy that industry supports us, forgetting what supports industry. Time was when education moved toward soil, not away from it. The nursery jingle about bringing home a rabbit skin to wrap the baby bunting in is one of many reminders in folk-lore that man once hunted to feed and clothe his family.

Third, there is value in any experience that exercises those ethical restraints collectively called 'sportsmanship.' Our tools for the pursuit of wildlife improve faster than we do, and sportsmanship is a voluntary limitation in the use of these armaments. It is aimed to augment the role of skill and shrink the role of gadgets in the pursuit of wild things.

A peculiar virtue in wildlife ethics is that the hunter ordinarily has no gallery to applaud or disapprove of his conduct. Whatever his acts, they are dictated by his own conscience, rather than by a mob of onlookers. It is difficult to exaggerate the importance of this fact.

Voluntary adherence to an ethical code elevates the self-respect of the sportsman, but it should not be forgotten that voluntary disregard of the code degenerates and depraves him. For example, a common denominator of all sporting codes is not to waste good meat. Yet it is now a demonstrable fact that Wisconsin deer-hunters, in their pursuit of a legal buck, kill and abandon in the woods at least one doe,

fawn, or spike buck for every two legal bucks taken out. In other words, approximately half the hunters shoot any deer until a legal deer is killed. The illegal carcasses are left where they fall. Such deer-hunting is not only without social value, but constitutes actual training for ethical depravity elsewhere.

It seems, then, that split-rail and man-earth experiences have zero or plus values, but that ethical experiences may have minus values as well.

This, then, defines roughly three kinds of cultural nutriment available to our outdoor roots. It does not follow that culture is fed. The extraction of value is never automatic; only a healthy culture can feed and grow. Is culture fed by our present forms of outdoor recreation?

The pioneer period gave birth to two ideas that are the essence of split-rail value in outdoor sports. One is the 'go-light' idea, the other the 'one-bullet-one-buck' idea. The pioneer went light of necessity. He shot with economy and precision because he lacked the transport, the cash, and the weapons requisite for machine-gun tactics. Let it be clear, then, that in their inception, both of these ideas were forced on us; we made a virtue of necessity.

In their later evolution, however, they became a code of sportsmanship, a self-imposed limitation on sport. On them is based a distinctively American tradition of self-reliance, hardihood, woodcraft, and marksmanship. These are intangibles, but they are not abstractions. Theodore Roosevelt was a great sportsman, not because he hung up many trophies, but because he expressed this intangible American tradition in words any schoolboy could understand. A more subtle and accurate expression is found in the early writings of Stewart Edward White. It is not far amiss to say that

such men created cultural value by being aware of it, and by creating a pattern for its growth.

Then came the gadgeteer, otherwise known as the sporting-goods dealer. He has draped the American outdoorsman with an infinity of contraptions, all offered as aids to self-reliance, hardihood, woodcraft, or marksmanship, but too often functioning as substitutes for them. Gadgets fill the pockets, they dangle from neck and belt. The overflow fills the auto-trunk, and also the trailer. Each item of outdoor equipment grows lighter and often better, but the aggregate poundage becomes tonnage. The traffic in gadgets adds up to astronomical sums, which are soberly published as representing 'the economic value of wildlife.' But what of cultural values?

As an end-case consider the duck-hunter, sitting in a steel boat behind composition decoys. A put-put motor has brought him to the blind without exercise. Canned heat stands by to warm him in case of a chilling wind. He talks to the passing flocks on a factory caller, in what he hopes are seductive tones; home lessons from a phonograph record have taught him how. The decoys work, despite the caller; a flock circles in. It must be shot at before it circles twice, for the marsh bristles with other sportsmen, similarly accoutred, who might shoot first. He opens up at 70 yards, for his poly-choke is set for infinity, and the advertisements have told him that Super-Z shells, and plenty of them, have a long reach. The flock flares. A couple of cripples scale off to die elsewhere. Is this sportsman absorbing cultural value? Or is he just feeding minks? The next blind opens up at 75 yards; how else is a fellow to get some shooting? This is duck shooting, current model. It is typical of all public grounds, and

of many clubs. Where is the go-light idea, the one-bullet tradition?

The answer is not a simple one. Roosevelt did not disdain the modern rifle; White used freely the aluminum pot, the silk tent, dehydrated foods. Somehow they used mechanical aids, in moderation, without being used by them.

I do not pretend to know what is moderation, or where the line is between legitimate and illegitimate gadgets. It seems clear, though, that the origin of gadgets has much to do with their cultural effects. Homemade aids to sport or outdoor life often enhance, rather than destroy, the man-earth drama; he who kills a trout with his own fly has scored two coups, not one. I use many factory-made gadgets myself. Yet there must be some limit beyond which money-bought aids to sport destroy the cultural value of sport.

Not all sports have degenerated to the same extent as duck-hunting. Defenders of the American tradition still exist. Perhaps the bow-and-arrow movement and the revival of falconry mark the beginnings of a reaction. The net trend, however, is clearly toward more and more mechanization, with a corresponding shrinkage in cultural values, especially split-rail values and ethical restraints.

I have the impression that the American sportsman is puzzled; he doesn't understand what is happening to him. Bigger and better gadgets are good for industry, so why not for outdoor recreation? It has not dawned on him that outdoor recreations are essentially primitive, atavistic; that their value is a contrast-value; that excessive mechanization destroys contrasts by moving the factory to the woods or to the marsh.

The sportsman has no leaders to tell him what is wrong. The sporting press no longer represents sport; it has turned

billboard for the gadgeteer. Wildlife administrators are too busy producing something to shoot at to worry much about the cultural value of the shooting. Because everybody from Xenophon to Teddy Roosevelt said sport has value, it is assumed that this value must be indestructible.

Among non-gunpowder sports, the impact of mechanization has had diverse effects. The modern field glass, camera, and the aluminum bird-band have certainly *not* deteriorated the cultural value of ornithology. Fishing, but for outboard motors and aluminum canoes, seems less severely mechanized than hunting. On the other hand, motorized transport has nearly destroyed the sport of wilderness travel by leaving only fly-specks of wilderness to travel in.

Fox-hunting with hounds, backwoods style, presents a dramatic instance of partial and perhaps harmless mechanized invasion. This is one of the purest of sports; it has real split-rail flavor; it has man-earth drama of the first water. The fox is deliberately left unshot, hence ethical restraint is also present. But we now follow the chase in Fords! The voice of Bugle Ann mingles with the honk of the flivver! However, no one is likely to invent a mechanical foxhound, or to screw a polychoke on the hound's nose. No one is likely to teach dog-training by phonograph, or by other painless shortcuts. I think the gadgeteer has reached the end of his tether in dogdom.

It is not quite accurate to ascribe all the ills of sport to the inventor of physical aids-to-sport. The advertiser invents ideas, and ideas are seldom as honest as physical objects, even though they may be equally useless. One such deserves special mention: the 'where-to-go' department. Knowledge of the whereabouts of good hunting or fishing is a very personal form of property. It is like rod, dog, or gun: a thing to

be loaned or given as a personal courtesy. But to hawk it in the marketplace of the sports column as an aid to circulation seems to me another matter. To hand it to all and sundry as free public 'service' seems to me distinctly another matter. Even 'conservation' departments now tell Tom, Dick, and Harry where the fish are biting, and where a flock of ducks has ventured to alight for a meal.

All of these organized promiscuities tend to depersonalize one of the essentially personal elements in outdoor sports. I do not know where the line lies between legitimate and illegitimate practice; I am convinced, though, that 'where-to-go' service has broken all bounds of reason.

If the hunting or fishing is good, the 'where-to-go' service suffices to attract the desired excess of sportsmen. But if it is no good, the advertiser must resort to more forcible means. One such is the fishing lottery, in which a few hatchery fish are tagged, and a prize is offered for the fisherman catching the winning number. This curious hybrid between the techniques of science and of the pool hall insures the overfishing of many an already exhausted lake, and brings a glow of civic pride to many a village Chamber of Commerce.

It is idle for the professional wildlife managers to consider themselves aloof from these affairs. The production engineer and the salesman belong to the same company; both are tarred with the same stick.

Wildlife managers are trying to raise game in the wild by manipulating its environment, and thus to convert hunting from exploitation to cropping. If the conversion takes place, how will it affect cultural values? It must be admitted that split-rail flavor and free-for-all exploitation are historically associated. Daniel Boone had scant patience with agricultural cropping, let alone wildlife cropping. Perhaps

the stubborn reluctance of the 'one-gallus' sportsman to be converted to the cropping idea is an expression of his split-rail inheritance. Probably cropping is resisted because it is incompatible with one component of the split-rail tradition: free hunting.

Mechanization offers no cultural substitute for the split-rail values it destroys; at least none visible to me. Cropping or management does offer a substitute, which to me has at least equal value: wild husbandry. The experience of managing land for wildlife crops has the same value as any other form of farming; it is a reminder of the man-earth relation. Moreover ethical restraints are involved; thus managing game without resorting to predator-control calls for ethical restraint of a high order. It may be concluded, then, that game cropping shrinks one value (split-rail) but enhances both of the others.

If we regard outdoor sports as a field of conflict between an immensely vigorous process of mechanization and a wholly static tradition, then the outlook for cultural values is indeed dark. But why cannot our concept of sport grow with the same vigor as our list of gadgets? Perhaps the salvation of cultural value lies in seizing the offensive. I, for one, believe that the time is ripe. Sportsmen can determine for themselves the shape of things to come.

The last decade, for example, has disclosed a totally new form of sport, which does not destroy wildlife, which uses gadgets without being used by them, which outflanks the problem of posted land, and which greatly increases the human carrying capacity of a unit area. This sport knows no bag limit, no closed season. It needs teachers, but not wardens. It calls for a new woodcraft of the highest cultural value. The sport I refer to is wildlife research.

Wildlife research started as a professional priestcraft. The more difficult and laborious research problems must doubtless remain in professional hands, but there are plenty of problems suitable for all grades of amateurs. In the field of mechanical invention research has long since spread to amateurs. In the biological field the sport-value of amateur research is just beginning to be realized.

Thus Margaret Morse Nice, an amateur ornithologist, studied song sparrows in her back yard. She has become a world-authority on bird behavior, and has out-thought and outworked many a professional student of social organization in birds. Charles L. Broley, a banker, banded eagles for fun. He discovered a hitherto unknown fact: that some eagles nest in the South in winter, and then go vacationing to the north woods. Norman and Stuart Criddle, wheat ranchers on the Manitoba prairies, studied the fauna and flora of their farm, and became recognized authorities on everything from local botany to wildlife cycles. Elliott S. Barker, a cowman in the New Mexico mountains, has written one of the two best books on that elusive cat: the mountain lion. Do not let anyone tell you that these people made work out of play. They simply realized that the most fun lies in seeing and studying the unknown.

Ornithology, mammalogy, and botany, as now known to most amateurs, are but kindergarten games compared with what is possible for (and open to) amateurs in these fields. One reason for this is that the whole structure of biological education (including education in wildlife) is aimed to perpetuate the professional monopoly on research. To the amateur are allotted only make-believe voyages of discovery, to verify what professional authority already knows. What the

youth needs to be told is that a ship is a-building in his own mental dry dock, a ship with freedom of the seas.

In my opinion, the promotion of wildlife research sports is the most important job confronting the profession of wildlife management. Wildlife has still another value, now visible only to a few ecologists, but of potential importance to the whole human enterprise.

We now know that animal populations have behavior patterns of which the individual animal is unaware, but which he nevertheless helps to execute. Thus the rabbit is unaware of cycles, but he is the vehicle for cycles.

We cannot discern these behavior patterns in the individual, or in short periods of time. The most intense scrutiny of an individual rabbit tells us nothing of cycles. The cycle concept springs from a scrutiny of the mass through decades.

This raises the disquieting question: do human populations have behavior patterns of which we are unaware, but which we help to execute? Are mobs and wars, unrests and revolutions, cut of such cloth?

Many historians and philosophers persist in interpreting our mass behaviors as the collective result of individual acts of volition. The whole subject matter of diplomacy assumes that the political group has the properties of an honorable person. On the other hand, some economists see the whole of society as a plaything for processes, our knowledge of which is largely *ex post facto.*

It is reasonable to suppose that our social processes have a higher volitional content than those of the rabbit, but it is also reasonable to suppose that we, as a species, contain population behavior patterns of which nothing is known because circumstance has never evoked them. We may have others the meaning of which we have misread.

This state of doubt about the fundamentals of human population behavior lends exceptional interest, and exceptional value, to the only available analogue: the higher animals. Errington, among others, has pointed out the cultural value of these animal analogues. For centuries this rich library of knowledge has been inaccessible to us because we did not know where or how to look for it. Ecology is now teaching us to search in animal populations for analogies to our own problems. By learning how some small part of the biota ticks, we can guess how the whole mechanism ticks. The ability to perceive these deeper meanings, and to appraise them critically, is the woodcraft of the future.

To sum up, wildlife once fed us and shaped our culture. It still yields us pleasure for leisure hours, but we try to reap that pleasure by modern machinery and thus destroy part of its value. Reaping it by modern mentality would yield not only pleasure, but wisdom as well.

The Deer Swath

One hot afternoon in August I sat under the elm, idling, when I saw a deer pass across a small opening a quarter mile east. A deer trail crosses our farm, and at this point any deer traveling is briefly visible from the shack.

I then realized that half an hour before I had moved my chair to the best spot for watching the deer trail; that I had done this habitually for years, without being clearly conscious of it. This led to the thought that by cutting some brush I could widen the zone of visibility. Before night the swath was cleared, and within the mouth I detected several deer which otherwise could likely have passed unseen.

The new deer swath was pointed out to a series of week-end guests for the purpose of watching their later reactions to it. It was soon clear that most of them forgot it quickly, while others watched it, as I did, whenever chance allowed. The upshot was the realization that there are four categories of outdoors men: deer hunters, duck hunters, bird hunters, and non-hunters. These categories have nothing to do with sex or age, or accoutrements; they represent four diverse habits of the human eye. The deer hunter habitually watches the next bend; the duck hunter watches the skyline; the bird hunter watches the dog; the non-hunter does not watch.

When the deer hunter sits down he sits where he can see ahead, and with his back to something. The duck hunter sits where he can see overhead, and behind something. The non-hunter sits where he is comfortable. None of these watches the dog. The bird hunter watches only the dog, and always knows where the dog is, whether or not visible at the moment. The dog's nose is the bird hunter's eye. Many hunters who carry a shotgun in season have never learned to watch the dog, or to interpret his reactions to scent.

There are good outdoors men who do not conform to these categories. There is the ornithologist who hunts by ear, and uses the eye only to follow up on what his ear has detected. There is the botanist who hunts by eye, but at much closer range; he is a marvel at finding plants, but seldom sees birds or mammals. There is the forester who sees only trees, and the insects and fungi that prey upon trees; he is oblivious to all else. And finally there is the sportsman who sees only game, and regards all else as of little interest or value.

There is one illusive mode of hunting which I cannot associate exclusively with any of these groups: the search for scats, tracks, feathers, dens, roostings, rubbings, dustings, diggings, feedings, fightings, or preyings collectively known to woodsmen as 'reading sign.' This skill is rare, and too often seems to be inverse to book learning.

The counterpart of reading animal sign exists in the plant field, but skill is equally rare in occurrence, and illusive in distribution. To prove this I cite the African explorer who detected the scratchings of a lion on the bark of a tree, 20 feet up. The scratchings, he said, had been made when the tree was young.

That biological jack-of-all-trades called ecologist tries to be and do all of these things. Needless to say, he does not succeed;

Goose Music

Some years ago the game of golf was commonly regarded in this country as a kind of social ornament, a pretty diversion for the idle rich, but hardly worthy of the curiosity, much less of the serious interest, of men of affairs.

Today scores of cities are building municipal golf courses to make golf available to the rank and file of their citizens.

What has happened? Golf has not changed, and certainly golfers have not. The change has been in the public point of view. Golf is no longer regarded as an ornamental sport, but as a valuable means of physical, mental (and, to the golfer, spiritual) recreation. Golf has become a valuable part of our social economy. Of course it has always been valuable to society, but the twentieth century has been the first to realize the fact.

The same change in point of view has occurred toward most other outdoor sports—the frivolities of fifty years ago have become the social necessities of today. But strangely enough, this change is only just beginning to permeate our attitude toward the oldest and most universal of all sports, hunting and fishing.

We have realized dimly, of course, that a day afield was good for the tired businessman. We have also realized that the destruction of wildlife removed the incentive for days afield.

But we have not yet learned to express the value of wildlife in terms of social welfare. Some have attempted to justify wildlife conservation in terms of meat, others in terms of personal pleasure, others in terms of cash, still others in the interest of science, education, agriculture, art, public health, and even military preparedness. But few have so far clearly realized and expressed the whole truth, namely, that all these things are but factors in a broad social value, and that wildlife, like golf, is a social asset.

But to those whose hearts are stirred by the sound of whistling wings and quacking mallards, wildlife is something even more than this. Golf is an acquired taste, but the instinct that finds delight in the sight and pursuit of game is bred into the very fiber of the race. Golf is a delightful accomplishment, but the love of hunting is almost a physiological characteristic. A man may not care for golf and still be human, but the man who does not like to see, hunt, photograph, or otherwise outwit birds or animals is hardly normal. He is supercivilized, and I for one do not know how to deal with him. 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. We are dealing, therefore, with something that lies pretty deep. Some can live without opportunity for the exercise and control of the hunting instinct, just as I suppose some can live without work, play, love, business, or other vital adventure. But in these days we regard such deprivations as unsocial. Opportunity for exercise of all the normal instincts has become to be regarded more and more as an inalienable right. The men who are destroying our wildlife are alienating one of these rights, and doing a terribly thorough job of it. More than that, they are doing a permanent job of it. When the last corner lot is covered with tenements we can still make a playground by tearing them down, but when the last antelope

goes by the board, not all the playground associations in Christendom can do aught to replace the loss.

One of the anomalies of conservation is that our social asset is being destroyed by the very instinct, for the exercise of which we seek to preserve it. I have often wondered why many Americans, decent at home, are such barbarians afield. The paper plates blowing in the wind at picnic sites and the beer cans along the road attest to this. In old days the gentle art of poaching was one of the standard accomplishments of a self-respecting yeoman. If the King still owned all the game, I think I should make a very good poacher myself. I often feel the promptings of the breed. But the King no longer owns the game and the countryside. It belongs to my friends and neighbors. The gentle art of poaching, therefore, has assumed a new complexion. The poacher is no longer a hero. It is the duty of the forward-looking citizen to speed the day when respect for the countryside is a matter of public principle.

If wild birds and animals are a social asset, how much of an asset are they? It is easy to say that some of us, afflicted with hereditary hunting fever, cannot live satisfactory lives without them. But this does not establish any comparative value, and in these days it is sometimes necessary to choose between necessities. In short, what is a wild goose worth? I would forego many other experiences for the sight of the big gander that sailed honking into my decoys at daybreak this morning. It was bitter cold and I was all thumbs, so I blithely missed him. But miss or no

The dollars were well spent, but I would forgo the experience for the sight

~~GOOSE MUSIC~~

miss, I saw him, I heard the wind whistle through his set wings as he came honking out of the gray west, and I felt him so that even now I tingle at the recollection. I doubt not that this very

gander has given ten other men ~~two dollars'~~ worth of thrills. ~~Therefore I say he is worth at least twenty dollars to the human race.~~

My notes tell me I have seen a thousand geese this fall. Every one of these in the course of their epic journey from the

a symphony ticket's worth of thrills

arctic to the gulf has on one occasion or another probably served man to the equivalent of twenty dollars. One flock perhaps has thrilled a score of schoolboys, and sent them scurrying home with tales of high adventure. Another, passing overhead of a dark night, has serenaded a whole city with goose music, and awakened who knows what questionings and memories and hopes. A third perhaps has given pause to some farmer at his plow, and brought new thoughts of far lands and journeyings and peoples, where before was only drudgery, barren of any thought at all. I am sure those thousand geese are paying human dividends on a value of twenty dollars each. But the resulting $20,000 is only an exchange value, like the sale value of a painting or the copyright of a poem. What about the replacement value? Supposing there were no longer any painting, or poetry, or goose music? It is a black thought to dwell upon, but it must be answered. In dire necessity somebody might write another *Iliad*, or paint an 'Angelus,' but fashion a goose? 'I, the Lord, will answer them. The hand of the Lord hath done this, and the Holy One of Israel created it.'

Is it impious to weigh goose music and art in the same scales? I think not, because the true hunter is merely a non-creative artist. Who painted the first picture on a bone in the caves of France? A hunter. Who alone in our modern life so thrills to the sight of living beauty that he will endure hunger and thirst and cold to feed his eye upon it? The hunter. Who wrote the great hunter's poem about the sheer wonder of the wind, the hail, and the snow, the stars, the lightnings, and the clouds, the lion, the deer, and the wild goat, the raven, the hawk, and the eagle, and above all the eulogy of the horse? Job, one of the great dramatic artists of all time. Poets sing and hunters scale the mountains primarily for one and the same reason—the thrill to beauty. Critics write and hunters outwit their game primarily for one and the same reason—to

reduce that beauty to possession. The differences are largely matters of degree, consciousness, and that sly arbiter of the classification of human activities, language. If, then, we can live without goose music, we may as well do away with stars, or sunsets, or *Iliads*. But the point is that we would be fools to do away with any of them.

What value has wildlife from the standpoint of morals and religion? I heard of a boy once who was brought up an atheist. He changed his mind when he saw that there were a hundred-odd species of warblers, each bedecked like to the rainbow, and each performing yearly sundry thousands of miles of migration about which scientists wrote wisely but did not understand. No 'fortuitous concourse of elements' working blindly through any number of millions of years could quite account for why warblers are so beautiful. No mechanistic theory, even bolstered by mutations, has ever quite answered for the colors of the cerulean warbler, or the vespers of the woodthrush, or the swansong, or—goose music. I dare say this boy's convictions would be harder to shake than those of many inductive theologians. There are yet many boys to be born who, like Isaiah, 'may see, and know, and consider, and understand together, that the hand of the Lord hath done this.' But where shall they see, and know, and consider? In museums?

What is the effect of hunting and fishing on character as compared with other outdoor sports? I have already pointed out that the desire lies deeper, that its source is a matter of instinct as well as of competition. A son of a Robinson Crusoe, having never seen a tennis racket, might get along nicely without one, but he would be pretty sure to hunt or fish whether or not he were taught to do so. But this does not establish any superiority as to subjective benefits. Which helps the more to build a man? This question (like the one we used to debate in school about whether boys or girls are the best scholars) might

be argued till doomsday. I shall not attempt it. But there are two points about hunting that deserve special emphasis. One is that the ethics of sportsmanship is not a fixed code, but must be formulated and practiced by the individual, with no referee but the Almighty. The other is that hunting generally involves the handling of dogs and horses, and the lack of this experience is one of the most serious defects of our gasoline-driven civilization. There was much truth in the old idea that any man ignorant of dogs and horses was not a gentleman. In the West the abuse of horses is still a universal blackball. This rule of thumb was adopted in the cow country long before 'character analysis' was invented and, for all we know, may yet outlive it.

But after all, it is poor business to prove that one good thing is better than another. The point is that some six or eight millions of Americans like to hunt and fish, that the hunting fever is endemic in the race, that the race is benefited by any incentive to get out into the open, and is being injured by the destruction of the incentive in this case. To combat this destruction is therefore a social issue.

The difficulty, however, is not so much in proving this principle in the abstract as in getting people to see and respect its applications. I have seen many a women's club pass resolutions on bird protection, but the 'aigrettes' do not come off. I have seen many a law-abiding citizen sit down to a banquet of illegal quail-on-toast, and loudly proclaim his sportsmanship or patriotism. Many of the 'best people' at our summer resorts unblushingly buy trout or grouse or venison, and feel delightfully wicked about it, because they see nothing broken but a law. Members of the 'Four Hundred' in a Middle Western town I know openly flout the spring-shooting regulations, and their friends accept with warm thanks the ducks thus stolen from their sons. Nightingales' tongues were doubtless merely meat

to Nero, but it is about time to expect enlightened Americans to know and do better than he.

To conclude: I have congenital hunting fever and three sons. As little tots, they spent their time playing with my decoys and scouring vacant lots with wooden guns. I hope to leave them good health, an education, and possibly even a competence. But what are they going to do with these things if there be no more deer in the hills, and no more quail in the coverts? No more snipe whistling in the meadow, no more piping of widgeons and chattering of teal as darkness covers the marshes; no more whistling of swift wings when the morning star pales in the east! And when the dawn-wind stirs through the ancient cottonwoods, and the gray light steals down from the hills over the old river sliding softly past its wide brown sandbars—what if there be no more goose music?

PART ~~III~~ IV *The Upshot*) 14 Mt. Caledonia

The Land Ethic

When god-like Odysseus returned from the wars in Troy, he hanged all on one rope a dozen slave-girls of his household whom he suspected of misbehavior during his absence.

This hanging involved no question of propriety. The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong.

Concepts of right and wrong were not lacking from Odysseus' Greece: witness the fidelity of his wife through the

long years before at last his black-prowed galleys clove the wine-dark seas for home. The ethical structure of that day covered wives, but had not yet been extended to human chattels. During the three thousand years which have since elapsed, ethical criteria have been extended to many fields of conduct, with corresponding shrinkages in those judged by expediency only.

The Ethical Sequence

This extension of ethics, so far studied only by philosophers, is actually a process in ecological evolution. Its sequences may be described in ecological as well as in philosophical terms. An ethic, ecologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. These are two definitions of one thing. The thing has its origin in the tendency of interdependent individuals or groups to evolve modes of co-operation. The ecologist calls these symbioses. Politics and economics are advanced symbioses in which the original free-for-all competition has been replaced, in part, by co-operative mechanisms with an ethical content.

The complexity of co-operative mechanisms has increased with population density, and with the efficiency of tools. It was simpler, for example, to define the anti-social uses of sticks and stones in the days of the mastodons than of bullets and billboards in the age of motors.

The first ethics dealt with the relation between individuals; the Mosaic Decalogue is an example. Later accretions dealt with the relation between the individual and

society. The Golden Rule tries to integrate the individual to society; democracy to integrate social organization to the individual.

There is as yet no ethic dealing with man's relation to land and to the animals and plants which grow upon it. Land, like Odysseus' slave-girls, is still property. The land-relation is still strictly economic, entailing privileges but not obligations.

The extension of ethics to this third element in human environment is, if I read the evidence correctly, an evolutionary possibility and an ecological necessity. It is the third step in a sequence. The first two have already been taken. Individual thinkers since the days of Ezekiel and Isaiah have asserted that the despoliation of land is not only inexpedient but wrong. Society, however, has not yet affirmed their belief. I regard the present conservation movement as the embryo of such an affirmation.

An ethic may be regarded as a mode of guidance for meeting ecological situations so new or intricate, or involving such deferred reactions, that the path of social expediency is not discernible to the average individual. Animal instincts are modes of guidance for the individual in meeting such situations. Ethics are possibly a kind of community instinct in-the-making.

The Community Concept

All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to

co-operate (perhaps in order that there may be a place to compete for).

The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.

This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter downriver. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic of course cannot prevent the alteration, management, and use of these 'resources,' but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state.

In short, 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 his fellow-members, and also respect for the community as such.

In human history, we have learned (I hope) that the conqueror role is eventually self-defeating. Why? Because it is implicit in such a role that the conqueror knows, *ex cathedra,* just what makes the community clock tick, and just what and who is valuable, and what and who is worthless, in community life. It always turns out that he knows neither, and this is why his conquests eventually defeat themselves.

In the biotic community, a parallel situation exists. Abra-

ham knew exactly what the land was for: it was to drip milk and honey into Abraham's mouth. At the present moment, the assurance with which we regard this assumption is inverse to the degree of our education.

The ordinary citizen today assumes that science knows what makes the community clock tick; the scientist is equally sure that he does not. He knows that the biotic mechanism is so complex that its workings may never be fully understood.

That man is, in fact, only a member of a biotic team is shown by an ecological interpretation of history. Many historical events, hitherto explained solely in terms of human enterprise, were actually biotic interactions between people and land. The characteristics of the land determined the facts quite as potently as the characteristics of the men who lived on it.

Consider, for example, the settlement of the Mississippi valley. In the years following the Revolution, three groups were contending for its control: the native Indian, the French and English traders, and the American settlers. Historians wonder what would have happened if the English at Detroit had thrown a little more weight into the Indian side of those tipsy scales which decided the outcome of the colonial migration into the cane-lands of Kentucky. It is time now to ponder the fact that the cane-lands, when subjected to the particular mixture of forces represented by the cow, plow, fire, and axe of the pioneer, became bluegrass. What if the plant succession inherent in this dark and bloody ground had, under the impact of these forces, given us some worthless sedge, shrub, or weed? Would Boone and Kenton have held out? Would there have been any overflow into Ohio, Indiana, Illinois, and Missouri? Any Louisiana Pur-

chase? Any transcontinental union of new states? Any Civil War?

Kentucky was one sentence in the drama of history. We are commonly told what the human actors in this drama tried to do, but we are seldom told that their success, or the lack of it, hung in large degree on the reaction of particular soils to the impact of the particular forces exerted by their occupancy. In the case of Kentucky, we do not even know where the bluegrass came from—whether it is a native species, or a stowaway from Europe.

Contrast the cane-lands with what hindsight tells us about the Southwest, where the pioneers were equally brave, resourceful, and persevering. The impact of occupancy here brought no bluegrass, or other plant fitted to withstand the bumps and buffetings of hard use. This region, when grazed by livestock, reverted through a series of more and more worthless grasses, shrubs, and weeds to a condition of unstable equilibrium. Each recession of plant types bred erosion; each increment to erosion bred a further recession of plants. The result today is a progressive and mutual deterioration, not only of plants and soils, but of the animal community subsisting thereon. The early settlers did not expect this: on the ciénegas of New Mexico some even cut ditches to hasten it. So subtle has been its progress that few residents of the region are aware of it. It is quite invisible to the tourist who finds this wrecked landscape colorful and charming (as indeed it is, but it bears scant resemblance to what it was in 1848).

This same landscape was 'developed' once before, but with quite different results. The Pueblo Indians settled the Southwest in pre-Columbian times, but they happened *not*

to be equipped with range livestock. Their civilization expired, but not because their land expired.

In India, regions devoid of any sod-forming grass have been settled, apparently without wrecking the land, by the simple expedient of carrying the grass to the cow, rather than vice versa. (Was this the result of some deep wisdom, or was it just good luck? I do not know.)

In short, the plant succession steered the course of history; the pioneer simply demonstrated, for good or ill, what successions inhered in the land. Is history taught in this spirit? It will be, once the concept of land as a community really penetrates our intellectual life.

The Ecological Conscience

Conservation is a state of harmony between men and land. Despite nearly a century of propaganda, conservation still proceeds at a snail's pace; progress still consists largely of letterhead pieties and convention oratory. On the back forty we still slip two steps backward for each forward stride.

The usual answer to this dilemma is 'more conservation education.' No one will debate this, but is it certain that only the *volume* of education needs stepping up? Is something lacking in the *content* as well?

It is difficult to give a fair summary of its content in brief form, but, as I understand it, the content is substantially this: obey the law, vote right, join some organizations, and practice what conservation is profitable on your own land; the government will do the rest.

Is not this formula too easy to accomplish anything worth-while? It defines no right or wrong, assigns no obliga-

tion, calls for no sacrifice, implies no change in the current philosophy of values. In respect of land-use, it urges only enlightened self-interest. Just how far will such education take us? An example will perhaps yield a partial answer.

By 1930 it had become clear to all except the ecologically blind that southwestern Wisconsin's topsoil was slipping seaward. In 1933 the farmers were told that if they would adopt certain remedial practices for five years, the public would donate CCC labor to install them, plus the necessary machinery and materials. The offer was widely accepted, but the practices were widely forgotten when the five-year contract period was up. The farmers continued only those practices that yielded an immediate and visible economic gain for themselves.

This led to the idea that maybe farmers would learn more quickly if they themselves wrote the rules. Accordingly the Wisconsin Legislature in 1937 passed the Soil Conservation District Law. This said to farmers, in effect: *We, the public, will furnish you free technical service and loan you specialized machinery, if you will write your own rules for land-use. Each county may write its own rules, and these will have the force of law.* Nearly all the counties promptly organized to accept the proffered help, but after a decade of operation, *no county has yet written a single rule.* There has been visible progress in such practices as strip-cropping, pasture renovation, and soil liming, but none in fencing woodlots against grazing, and none in excluding plow and cow from steep slopes. The farmers, in short, have selected those remedial practices which were profitable anyhow, and ignored those which were profitable to the community, but not clearly profitable to themselves.

When one asks why no rules have been written, one is

told that the community is not yet ready to support them; education must precede rules. But the education actually in progress makes no mention of obligations to land over and above those dictated by self-interest. The net result is that we have more education but less soil, fewer healthy woods, and as many floods as in 1937.

The puzzling aspect of such situations is that the existence of obligations over and above self-interest is taken for granted in such rural community enterprises as the betterment of roads, schools, churches, and baseball teams. Their existence is not taken for granted, nor as yet seriously discussed, in bettering the behavior of the water that falls on the land, or in the preserving of the beauty or diversity of the farm landscape. Land-use ethics are still governed wholly by economic self-interest, just as social ethics were a century ago.

To sum up: we asked the farmer to do what he conveniently could to save his soil, and he has done just that, and only that. The farmer who clears the woods off a 75 per cent slope, turns his cows into the clearing, and dumps its rainfall, rocks, and soil into the community creek, is still (if otherwise decent) a respected member of society. If he puts lime on his fields and plants his crops on contour, he is still entitled to all the privileges and emoluments of his Soil Conservation District. The District is a beautiful piece of social machinery, but it is coughing along on two cylinders because we have been too timid, and too anxious for quick success, to tell the farmer the true magnitude of his obligations. Obligations have no meaning without conscience, and the problem we face is the extension of the social conscience from people to land.

No important change in ethics was ever accomplished

without an internal change in our intellectual emphasis, loyalties, affections, and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy and religion have not yet heard of it. In our attempt to make conservation easy, we have made it trivial.

Substitutes for a Land Ethic

When the logic of history hungers for bread and we hand out a stone, we are at pains to explain how much the stone resembles bread. I now describe some of the stones which serve in lieu of a land ethic.

One basic weakness in a conservation system based wholly on economic motives is that most members of the land community have no economic value. Wildflowers and songbirds are examples. Of the 22,000 higher plants and animals native to Wisconsin, it is doubtful whether more than 5 per cent can be sold, fed, eaten, or otherwise put to economic use. Yet these creatures are members of the biotic community, and if (as I believe) its stability depends on its integrity, they are entitled to continuance.

When one of these non-economic categories is threatened, and if we happen to love it, we invent subterfuges to give it economic importance. At the beginning of the century songbirds were supposed to be disappearing. Ornithologists jumped to the rescue with some distinctly shaky evidence to the effect that insects would eat us up if birds failed to control them. The evidence had to be economic in order to be valid.

It is painful to read these circumlocutions today. We have

no land ethic yet, but we have at least drawn nearer the point of admitting that birds should continue as a matter of biotic right, regardless of the presence or absence of economic advantage to us.

A parallel situation exists in respect of predatory mammals, raptorial birds, and fish-eating birds. Time was when biologists somewhat overworked the evidence that these creatures preserve the health of game by killing weaklings, or that they control rodents for the farmer, or that they prey only on 'worthless' species. Here again, the evidence had to be economic in order to be valid. It is only in recent years that we hear the more honest argument that predators are members of the community, and that no special interest has the right to exterminate them for the sake of a benefit, real

or fancied, to itself. Unfortunately this enlightened view is still in the talk stage. In the field the extermination of predators goes merrily on: witness the impending erasure of the timber wolf by fiat of Congress, the Conservation Bureaus, and many state legislatures.

Some species of trees have been 'read out of the party' by economics-minded foresters because they grow too slowly, or have too low a sale value to pay as timber crops: white cedar, tamarack, cypress, beech, and hemlock are examples. In Europe, where forestry is ecologically more advanced, the non-commercial tree species are recognized as members of the native forest community, to be preserved as such, within reason. Moreover some (like beech) have been found to have a valuable function in building up soil fertility. The interdependence of the forest and its constituent tree species, ground flora, and fauna is taken for granted.

Lack of economic value is sometimes a character not only of species or groups, but of entire biotic communities: marshes, bogs, dunes, and 'deserts' are examples. Our formula in such cases is to relegate their conservation to government as refuges, monuments, or parks. The difficulty is that these communities are usually interspersed with more valuable private lands; the government cannot possibly own or control such scattered parcels. The net effect is that we have relegated some of them to ultimate extinction over large areas. If the private owner were ecologically minded, he would be proud to be the custodian of a reasonable proportion of such areas, which add diversity and beauty to his farm and to his community.

In some instances, the assumed lack of profit in these 'waste' areas has proved to be wrong, but only after most

of them had been done away with. The present scramble to reflood muskrat marshes is a case in point.

There is a clear tendency in American conservation to relegate to government all necessary jobs that private landowners fail to perform. Government ownership, operation, subsidy, or regulation is now widely prevalent in forestry, range management, soil and watershed management, park and wilderness conservation, fisheries management, and migratory bird management, with more to come. Most of this growth in governmental conservation is proper and logical, some of it is inevitable. That I imply no disapproval of it is implicit in the fact that I have spent most of my life working for it. Nevertheless the question arises: What is the ultimate magnitude of the enterprise? Will the tax base carry its eventual ramifications? At what point will governmental conservation, like the mastodon, become handicapped by its own dimensions? The answer, if there is any, seems to be in a land ethic, or some other force which assigns more obligation to the private landowner.

Industrial landowners and users, especially lumbermen and stockmen, are inclined to wail long and loudly about the extension of government ownership and regulation to land, but (with notable exceptions) they show little disposition to develop the only visible alternative: the voluntary practice of conservation on their own lands.

When the private landowner is asked to perform some unprofitable act for the good of the community, he today assents only with outstretched palm. If the act costs him cash this is fair and proper, but when it costs only forethought, open-mindedness, or time, the issue is at least debatable. The overwhelming growth of land-use subsidies in recent years must be ascribed, in large part, to the govern-

ment's own agencies for conservation education: the land bureaus, the agricultural colleges, and the extension services. As far as I can detect, no ethical obligation toward land is taught in these institutions.

To sum up: a system of conservation based solely on economic self-interest is hopelessly lopsided. It tends to ignore, and thus eventually to eliminate, many elements in the land community that lack commercial value, but that are (as far as we know) essential to its healthy functioning. It assumes, falsely, I think, that the economic parts of the biotic clock will function without the uneconomic parts. It tends to relegate to government many functions eventually too large, too complex, or too widely dispersed to be performed by government.

An ethical obligation on the part of the private owner is the only visible remedy for these situations.

The Land Pyramid

An ethic to supplement and guide the economic relation to land presupposes the existence of some mental image of land as a biotic mechanism. We can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in.

The image commonly employed in conservation education is 'the balance of nature.' For reasons too lengthy to detail here, this figure of speech fails to describe accurately what little we know about the land mechanism. A much truer image is the one employed in ecology: the biotic pyramid. I shall first sketch the pyramid as a symbol of land, and later develop some of its implications in terms of land-use.

Plants absorb energy from the sun. This energy flows through a circuit called the biota, which may be represented by a pyramid consisting of layers. The bottom layer is the soil. A plant layer rests on the soil, an insect layer on the plants, a bird and rodent layer on the insects, and so on up through various animal groups to the apex layer, which consists of the larger carnivores.

The species of a layer are alike not in where they came from, or in what they look like, but rather in what they eat. Each successive layer depends on those below it for food and often for other services, and each in turn furnishes food and services to those above. Proceeding upward, each successive layer decreases in numerical abundance. Thus, for every carnivore there are hundreds of his prey, thousands of their prey, millions of insects, uncountable plants. The pyramidal form of the system reflects this numerical progression from apex to base. Man shares an intermediate layer with the bears, raccoons, and squirrels which eat both meat and vegetables.

The lines of dependency for food and other services are called food chains. Thus soil-oak-deer-Indian is a chain that has now been largely converted to soil-corn-cow-farmer. Each species, including ourselves, is a link in many chains. The deer eats a hundred plants other than oak, and the cow a hundred plants other than corn. Both, then, are links in a hundred chains. The pyramid is a tangle of chains so complex as to seem disorderly, yet the stability of the system proves it to be a highly organized structure. Its functioning depends on the co-operation and competition of its diverse parts.

In the beginning, the pyramid of life was low and squat; the food chains short and simple. Evolution has added layer

after layer, link after link. Man is one of thousands of accretions to the height and complexity of the pyramid. Science has given us many doubts, but it has given us at least one certainty: the trend of evolution is to elaborate and diversify the biota.

Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals. Food chains are the living channels which conduct energy upward; death and decay return it to the soil. The circuit is not closed; some energy is dissipated in decay, some is added by absorption from the air, some is stored in soils, peats, and long-lived forests; but it is a sustained circuit, like a slowly augmented revolving fund of life. There is always a net loss by downhill wash, but this is normally small and offset by the decay of rocks. It is deposited in the ocean and, in the course of geological time, raised to form new lands and new pyramids.

The velocity and character of the upward flow of energy depend on the complex structure of the plant and animal community, much as the upward flow of sap in a tree depends on its complex cellular organization. Without this complexity, normal circulation would presumably not occur. Structure means the characteristic numbers, as well as the characteristic kinds and functions, of the component species. This interdependence between the complex structure of the land and its smooth functioning as an energy unit is one of its basic attributes.

When a change occurs in one part of the circuit, many other parts must adjust themselves to it. Change does not necessarily obstruct or divert the flow of energy; evolution is a long series of self-induced changes, the net result of which has been to elaborate the flow mechanism and to

lengthen the circuit. Evolutionary changes, however, are usually slow and local. Man's invention of tools has enabled him to make changes of unprecedented violence, rapidity, and scope.

One change is in the composition of floras and faunas. The larger predators are lopped off the apex of the pyramid; food chains, for the first time in history, become shorter rather than longer. Domesticated species from other lands are substituted for wild ones, and wild ones are moved to new habitats. In this world-wide pooling of faunas and floras, some species get out of bounds as pests and diseases, others are extinguished. Such effects are seldom intended or foreseen; they represent unpredicted and often untraceable readjustments in the structure. Agricultural science is largely a race between the emergence of new pests and the emergence of new techniques for their control.

Another change touches the flow of energy through plants and animals and its return to the soil. Fertility is the ability of soil to receive, store, and release energy. Agriculture, by overdrafts on the soil, or by too radical a substitution of domestic for native species in the superstructure, may derange the channels of flow or deplete storage. Soils depleted of their storage, or of the organic matter which anchors it, wash away faster than they form. This is erosion.

Waters, like soil, are part of the energy circuit. Industry, by polluting waters or obstructing them with dams, may exclude the plants and animals necessary to keep energy in circulation.

Transportation brings about another basic change: the plants or animals grown in one region are now consumed and returned to the soil in another. Transportation taps the

energy stored in rocks, and in the air, and uses it elsewhere; thus we fertilize the garden with nitrogen gleaned by the guano birds from the fishes of seas on the other side of the Equator. Thus the formerly localized and self-contained circuits are pooled on a world-wide scale.

The process of altering the pyramid for human occupation releases stored energy, and this often gives rise, during the pioneering period, to a deceptive exuberance of plant and animal life, both wild and tame. These releases of biotic capital tend to becloud or postpone the penalties of violence.

* * *

This thumbnail sketch of land as an energy circuit conveys three basic ideas:

(1) That land is not merely soil.

(2) That the native plants and animals kept the energy circuit open; others may or may not.

(3) That man-made changes are of a different order than evolutionary changes, and have effects more comprehensive than is intended or foreseen.

These ideas, collectively, raise two basic issues: Can the land adjust itself to the new order? Can the desired alterations be accomplished with less violence?

Biotas seem to differ in their capacity to sustain violent conversion. Western Europe, for example, carries a far different pyramid than Caesar found there. Some large animals are lost; swampy forests have become meadows or plowland; many new plants and animals are introduced, some of which escape as pests; the remaining natives are greatly changed in distribution and abundance. Yet the soil is still there and, with the help of imported nutrients, still fertile; the waters flow normally; the new structure seems to func-

tion and to persist. There is no visible stoppage or derangement of the circuit.

Western Europe, then, has a resistant biota. Its inner processes are tough, elastic, resistant to strain. No matter how violent the alterations, the pyramid, so far, has developed some new *modus vivendi* which preserves its habitability for man, and for most of the other natives.

Japan seems to present another instance of radical conversion without disorganization.

Most other civilized regions, and some as yet barely touched by civilization, display various stages of disorganization, varying from initial symptoms to advanced wastage. In Asia Minor and North Africa diagnosis is confused by climatic changes, which may have been either the cause or the effect of advanced wastage. In the United States the degree of disorganization varies locally; it is worst in the Southwest, the Ozarks, and parts of the South, and least in New England and the Northwest. Better land-uses may still arrest it in the less advanced regions. In parts of Mexico, South America, South Africa, and Australia a violent and accelerating wastage is in progress, but I cannot assess the prospects.

This almost world-wide display of disorganization in the land seems to be similar to disease in an animal, except that it never culminates in complete disorganization or death. The land recovers, but at some reduced level of complexity, and with a reduced carrying capacity for people, plants, and animals. Many biotas currently regarded as 'lands of opportunity' are in fact already subsisting on exploitative agriculture, i.e. they have already exceeded their sustained carrying capacity. Most of South America is overpopulated in this sense.

In arid regions we attempt to offset the process of wastage by reclamation, but it is only too evident that the prospective longevity of reclamation projects is often short. In our own West, the best of them may not last a century.

The combined evidence of history and ecology seems to support one general deduction: the less violent the man-made changes, the greater the probability of successful readjustment in the pyramid. Violence, in turn, varies with human population density; a dense population requires a more violent conversion. In this respect, North America has a better chance for permanence than Europe, if she can contrive to limit her density.

This deduction runs counter to our current philosophy, which assumes that because a small increase in density enriched human life, that an indefinite increase will enrich it indefinitely. Ecology knows of no density relationship that holds for indefinitely wide limits. All gains from density are subject to a law of diminishing returns.

Whatever may be the equation for men and land, it is improbable that we as yet know all its terms. Recent discoveries in mineral and vitamin nutrition reveal unsuspected dependencies in the up-circuit: incredibly minute quantities of certain substances determine the value of soils to plants, of plants to animals. What of the down-circuit? What of the vanishing species, the preservation of which we now regard as an esthetic luxury? They helped build the soil; in what unsuspected ways may they be essential to its maintenance? Professor Weaver proposes that we use prairie flowers to reflocculate the wasting soils of the dust bowl; who knows for what purpose cranes and condors, otters and grizzlies may some day be used?

Land Health and the A-B Cleavage

A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity.

Conservationists are notorious for their dissensions. Superficially these seem to add up to mere confusion, but a more careful scrutiny reveals a single plane of cleavage common to many specialized fields. In each field one group (A) regards the land as soil, and its function as commodity-production; another group (B) regards the land as a biota, and its function as something broader. How much broader is admittedly in a state of doubt and confusion.

In my own field, forestry, group A is quite content to grow trees like cabbages, with cellulose as the basic forest commodity. It feels no inhibition against violence; its ideology is agronomic. Group B, on the other hand, sees forestry as fundamentally different from agronomy because it employs natural species, and manages a natural environment rather than creating an artificial one. Group B prefers natural reproduction on principle. It worries on biotic as well as economic grounds about the loss of species like chestnut, and the threatened loss of the white pines. It worries about a whole series of secondary forest functions: wildlife, recreation, watersheds, wilderness areas. To my mind, Group B feels the stirrings of an ecological conscience.

In the wildlife field, a parallel cleavage exists. For Group A the basic commodities are sport and meat; the yardsticks of production are ciphers of take in pheasants and trout.

Artificial propagation is acceptable as a permanent as well as a temporary recourse—if its unit costs permit. Group B, on the other hand, worries about a whole series of biotic side-issues. What is the cost in predators of producing a game crop? Should we have further recourse to exotics? How can management restore the shrinking species, like prairie grouse, already hopeless as shootable game? How can management restore the threatened rarities, like trumpeter swan and whooping crane? Can management principles be extended to wildflowers? Here again it is clear to me that we have the same A-B cleavage as in forestry.

In the larger field of agriculture I am less competent to speak, but there seem to be somewhat parallel cleavages. Scientific agriculture was actively developing before ecology was born, hence a slower penetration of ecological concepts might be expected. Moreover the farmer, by the very nature of his techniques, must modify the biota more radically than the forester or the wildlife manager. Nevertheless, there are many discontents in agriculture which seem to add up to a new vision of 'biotic farming.'

Perhaps the most important of these is the new evidence that poundage or tonnage is no measure of the food-value of farm crops; the products of fertile soil may be qualitatively as well as quantitatively superior. We can bolster poundage from depleted soils by pouring on imported fertility, but we are not necessarily bolstering food-value. The possible ultimate ramifications of this idea are so immense that I must leave their exposition to abler pens.

The discontent that labels itself 'organic farming,' while bearing some of the earmarks of a cult, is nevertheless biotic in its direction, particularly in its insistence on the importance of soil flora and fauna.

The ecological fundamentals of agriculture are just as poorly known to the public as in other fields of land-use. For example, few educated people realize that the marvelous advances in technique made during recent decades are improvements in the pump, rather than the well. Acre for acre, they have barely sufficed to offset the sinking level of fertility.

In all of these cleavages, we see repeated the same basic paradoxes: man the conqueror *versus* man the biotic citizen; science the sharpener of his sword *versus* science the searchlight on his universe; land the slave and servant *versus* land the collective organism. Robinson's injunction to Tristram may well be applied, at this juncture, to *Homo sapiens* as a species in geological time:

> Whether you will or not
> You are a King, Tristram, for you are one
> Of the time-tested few that leave the world,
> When they are gone, not the same place it was.
> Mark what you leave.

The Outlook

It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.

Perhaps the most serious obstacle impeding the evolution of a land ethic is the fact that our educational and economic system is headed away from, rather than toward, an intense consciousness of land. Your true modern is separated

from the land by many middlemen, and by innumerable physical gadgets. He has no vital relation to it; to him it is the space between cities on which crops grow. Turn him loose for a day on the land, and if the spot does not happen to be a golf links or a 'scenic' area, he is bored stiff. If crops could be raised by hydroponics instead of farming, it would suit him very well. Synthetic substitutes for wood, leather, wool, and other natural land products suit him better than the originals. In short, land is something he has 'outgrown.'

Almost equally serious as an obstacle to a land ethic is the attitude of the farmer for whom the land is still an adversary, or a taskmaster that keeps him in slavery. Theoretically, the mechanization of farming ought to cut the farmer's chains, but whether it really does is debatable.

One of the requisites for an ecological comprehension of land is an understanding of ecology, and this is by no means co-extensive with 'education'; in fact, much higher education seems deliberately to avoid ecological concepts. An understanding of ecology does not necessarily originate in courses bearing ecological labels; it is quite as likely to be labeled geography, botany, agronomy, history, or economics. This is as it should be, but whatever the label, ecological training is scarce.

The case for a land ethic would appear hopeless but for the minority which is in obvious revolt against these 'modern' trends.

The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stabil-

ity, and beauty of the biotic community. It is wrong when it tends otherwise.

It of course goes without saying that economic feasibility limits the tether of what can or cannot be done for land. It always has and it always will. The fallacy the economic determinists have tied around our collective neck, and which we now need to cast off, is the belief that economics determines *all* land-use. This is simply not true. An innumerable host of actions and attitudes, comprising perhaps the bulk of all land relations, is determined by the land-users' tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. As a land-user thinketh, so is he.

I have purposely presented the land ethic as a product of social evolution because nothing so important as an ethic is ever 'written.' Only the most superficial student of history supposes that Moses 'wrote' the Decalogue; it evolved in the minds of a thinking community, and Moses wrote a tentative summary of it for a 'seminar.' I say tentative because evolution never stops.

The evolution of a land ethic is an intellectual as well as emotional process. Conservation is paved with good intentions which prove to be futile, or even dangerous, because they are devoid of critical understanding either of the land, or of economic land-use. I think it is a truism that as the ethical frontier advances from the individual to the community, its intellectual content increases.

The mechanism of operation is the same for any ethic: social approbation for right actions: social disapproval for wrong actions.

By and large, our present problem is one of attitudes and

implements. We are remodeling the Alhambra with a steam-shovel, and we are proud of our yardage. We shall hardly relinquish the shovel, which after all has many good points, but we are in need of gentler and more objective criteria for its successful use.

Wilderness

Wilderness is the raw material out of which man has hammered the artifact called civilization.

Wilderness was never a homogeneous raw material. It was very diverse, and the resulting artifacts are very diverse. These differences in the end-product are known as cultures. The rich diversity of the world's cultures reflects a corresponding diversity in the wilds that gave them birth.

For the first time in the history of the human species, two changes are now impending. One is the exhaustion of wilderness in the more habitable portions of the globe. The other is the world-wide hybridization of cultures through modern transport and industrialization. Neither can be prevented, and perhaps should not be, but the question arises whether, by some slight amelioration of the impending changes, certain values can be preserved that would otherwise be lost.

To the laborer in the sweat of his labor, the raw stuff on his anvil is an adversary to be conquered. So was wilderness an adversary to the pioneer.

But to the laborer in repose, able for the moment to cast a philosophical eye on his world, that same raw stuff is something to be loved and cherished, because it gives definition and meaning to his life. This is a plea for the preservation of some tag-ends of wilderness, as museum pieces, for the edification of those who may one day wish to see, feel, or study the origins of their cultural inheritance.

The Remnants

Many of the diverse wildernesses out of which we have hammered America are already gone; hence in any practical program the unit areas to be preserved must vary greatly in size and in degree of wildness.

No living man will see again the long-grass prairie, where a sea of prairie flowers lapped at the stirrups of the pioneer. We shall do well to find a forty here and there on which the prairie plants can be kept alive as species. There were a hundred such plants, many of exceptional beauty. Most of them are quite unknown to those who have inherited their domain.

But the short-grass prairie, where Cabeza de Vaca saw the horizon under the bellies of the buffalo, is still extant in a few spots of 10,000-acre size, albeit severely chewed up by sheep, cattle, and dry-farmers. If the forty-niners are worth commemorating on the walls of state capitols, is not the scene of their mighty hegira worth commemorating in several national prairie reservations?

Of the coastal prairie there is one block in Florida, and one in Texas, but oil wells, onion fields, and citrus groves are closing in, armed to the teeth with drills and bulldozers. It is last call.

No living man will see again the virgin pineries of the Lake States, or the flatwoods of the coastal plain, or the giant hardwoods; of these, samples of a few acres each will have to suffice. But there are still several blocks of maple-hemlock of thousand-acre size; there are similar blocks of Appalachian hardwoods, of southern hardwood swamp, of cypress swamp, and of Adirondack spruce. Few of these

tag-ends are secure from prospective cuttings, and fewer still from prospective tourist roads.

One of the fastest-shrinking categories of wilderness is coastlines. Cottages and tourist roads have all but annihilated wild coasts on both oceans, and Lake Superior is now losing the last large remnant of wild shoreline on the Great Lakes. No single kind of wilderness is more intimately interwoven with history, and none nearer the point of complete disappearance.

In all of North America east of the Rockies, there is only one large area formally reserved as a wilderness: the Quetico-Superior International Park in Minnesota and Ontario. This magnificent block of canoe-country, a mosaic of lakes and rivers, lies mostly in Canada, and can be about as large as Canada chooses to make it, but its integrity is threatened by two recent developments: the growth of fishing resorts served by pontoon-equipped airplanes, and a jurisdictional dispute whether the Minnesota end of the area shall be all National Forest, or partly State Forest. The whole region is in danger of power impoundments, and this regrettable cleavage among proponents of wilderness may end in giving power the whip-hand.

In the Rocky Mountain states, a score of areas in the National Forests, varying in size from a hundred thousand to half a million acres, are withdrawn as wilderness, and closed to roads, hotels, and other inimical uses. In the National Parks the same principle is recognized, but no specific boundaries are delimited. Collectively, these federal areas are the backbone of the wilderness program, but they are not so secure as the paper record might lead one to believe. Local pressures for new tourist roads knock off a chip here and a slab there. There is perennial pressure for extension of roads

for forest-fire control, and these, by slow degrees, become public highways. Idle CCC camps presented a widespread temptation to build new and often needless roads. Lumber shortages during the war gave the impetus of military necessity to many road extensions, legitimate and otherwise. At the present moment, ski-tows and ski-hotels are being promoted in many mountain areas, often without regard to their prior designation as wilderness.

One of the most insidious invasions of wilderness is via predator control. It works thus: wolves and lions are cleaned out of a wilderness area in the interest of big-game management. The big-game herds (usually deer or elk) then increase to the point of overbrowsing the range. Hunters must then be encouraged to harvest the surplus, but modern hunters refuse to operate far from a car; hence a road must be built to provide access to the surplus game. Again and again, wilderness areas have been split by this process, but it still continues.

The Rocky Mountain system of wilderness areas covers a wide gamut of forest types, from the juniper breaks of the Southwest to the 'illimitable woods where rolls the Oregon.' It is lacking, however, in desert areas, probably because of that under-aged brand of esthetics which limits the definition of 'scenery' to lakes and pine trees.

In Canada and Alaska there are still large expanses of virgin country

> Where nameless men by nameless rivers wander
> and in strange valleys die strange deaths alone.

A representative series of these areas can, and should, be kept. Many are of negligible or negative value for economic use. It will be contended, of course, that no deliberate plan-

.....faunas? There are now organizations and development groups actively embarked on the industrialization of the Arctic wastes, and plans even larger are actively being pressed. The wilderness of the far North as yet has no formal protection and though ~~yet~~ still extensive, is beginning to dwindle.

ning to this end is necessary; that adequate areas will survive anyhow. All recent history belies so comforting an assumption. Even if wild spots do survive, what of their fauna? The woodland caribou, the several races of mountain sheep, the pure form of woods buffalo, the barren ground grizzly, the freshwater seals, and the whales are even now threatened. Of what use are wild areas destitute of their distinctive faunas? ~~The recently organized Arctic Institute has embarked on the industrialization of the Arctic wastes, with excellent chances of enough success to ruin them as wilderness. It is last call, even in the Far North.~~

To what extent Canada and Alaska will be able to see and grasp their opportunities is anybody's guess. Pioneers usually scoff at any effort to perpetuate pioneering.

Wilderness for Recreation

Physical combat for the means of subsistence was, for unnumbered centuries, 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 was, in like manner, an economic fact, now preserved as hunting and fishing for sport.

Public wilderness areas are, first of all, a means of perpetuating, in sport form, the more virile and primitive skills in pioneering travel and subsistence.

Some of these skills are of generalized distribution; the details have been adapted to the American scene, but the skill is world-wide. Hunting, fishing, and foot travel by pack are examples.

Two of them, however, are as American as a hickory tree; they have been copied elsewhere, but they were developed to their full perfection only on this continent. One of these is canoe travel, and the other is travel by pack-train. Both are shrinking rapidly. Your Hudson Bay Indian now has a put-put, and your mountaineer a Ford. If I had to make a living by canoe or packhorse, I should likely do likewise, for both are grueling labor. But we who seek wilderness travel for sport are foiled when we are forced to compete with mechanized substitutes. It is footless to execute a portage to the tune of motor launches, or to turn out your bell-mare in the pasture of a summer hotel. It is better to stay home.

Wilderness areas are first of all a series of sanctuaries for the primitive arts of wilderness travel, especially canoeing and packing.

I suppose some will wish to debate whether it is important to keep these primitive arts alive. I shall not debate it. Either you know it in your bones, or you are very, very old.

European hunting and fishing are largely devoid of the thing that wilderness areas might be the means of preserving in this country. Europeans do not camp, cook, or do their own work in the woods if they can avoid doing so. Work chores are delegated to beaters and servants, and a hunt carries the atmosphere of a picnic, rather than of pioneering. The test of skill is confined largely to the actual taking of game or fish.

There are those who decry wilderness sports as 'undemocratic' because the recreational carrying capacity of a wilderness is small, as compared with a golf links or a tourist camp. The basic error in such argument is that it applies the philosophy of mass-production to what is intended to coun-

teract mass-production. The value of recreation is not a matter of ciphers. Recreation is valuable in proportion to the intensity of its experiences, and to the degree to which it *differs from* and *contrasts with* workaday life. By these criteria, mechanized outings are at best a milk-and-water affair.

Mechanized recreation already has seized nine-tenths of the woods and mountains; a decent respect for minorities should dedicate the other tenth to wilderness.

Wilderness for Science

The most important characteristic of an organism is that capacity for internal self-renewal known as health.

There are two organisms whose processes of self-renewal have been subjected to human interference and control. One of these is man himself (medicine and public health). The other is land (agriculture and conservation).

The effort to control the health of land has not been very successful. It is now generally understood that when soil loses fertility, or washes away faster than it forms, and when water systems exhibit abnormal floods and shortages, the land is sick.

Other derangements are known as facts, but are not yet thought of as symptoms of land sickness. The disappearance of plants and animal species without visible cause, despite efforts to protect them, and the irruption of others as pests despite efforts to control them, must, in the absence of simpler explanations, be regarded as symptoms of sickness in the land organism. Both are occurring too frequently to be dismissed as normal evolutionary events.

The status of thought on these ailments of the land is

reflected in the fact that our treatments for them are still prevailingly local. Thus when a soil loses fertility we pour on fertilizer, or at best alter its tame flora and fauna, without considering the fact that its wild flora and fauna, which built the soil to begin with, may likewise be important to its maintenance. It was recently discovered, for example, that good tobacco crops depend, for some unknown reason, on the preconditioning of the soil by wild ragweed. It does not occur to us that such unexpected chains of dependency may have wide prevalence in nature.

When prairie dogs, ground squirrels, or mice increase to pest levels we poison them, but we do not look beyond the animal to find the cause of the irruption. We assume that animal troubles must have animal causes. The latest scientific evidence points to derangements of the *plant* community as the real seat of rodent irruptions, but few explorations of this clue are being made.

Many forest plantations are producing one-log or two-log trees on soil which originally grew three-log and four-log trees. Why? Thinking foresters know that the cause probably lies not in the tree, but in the micro-flora of the soil, and that it may take more years to restore the soil flora than it took to destroy it.

Many conservation treatments are obviously superficial. Flood-control dams have no relation to the cause of floods. Check dams and terraces do not touch the cause of erosion. Refuges and hatcheries to maintain the supply of game and fish do not explain why the supply fails to maintain itself.

In general, the trend of the evidence indicates that in land, just as in the human body, the symptoms may lie in one organ and the cause in another. The practices we now call conservation are, to a large extent, local alleviations of

biotic pain. They are necessary, but they must not be confused with cures. The art of land doctoring is being practiced with vigor, but the science of land health is yet to be born.

A science of land health needs, first of all, a base datum of normality, a picture of how healthy land maintains itself as an organism.

We have two available norms. One is found where land physiology remains largely normal despite centuries of human occupation. I know of only one such place: northeastern Europe. It is not likely that we shall fail to study it.

The other and most perfect norm is wilderness. Paleontology offers abundant evidence that wilderness maintained itself for immensely long periods; that its component species were rarely lost, neither did they get out of hand; that weather and water built soil as fast or faster than it was carried away. Wilderness, then, assumes unexpected importance as a laboratory for the study of land-health.

One cannot study the physiology of Montana in the Amazon; each biotic province needs its own wilderness for comparative studies of used and unused land. It is of course too late to salvage more than a lopsided system of wilderness study areas, and most of these remnants are far too small to retain their normality in all respects. Even the National Parks, which run up to a million acres each in size, have not been large enough to retain their natural predators, or to exclude animal diseases carried by livestock. Thus the Yellowstone has lost its wolves and cougars, with the result that elk are ruining the flora, particularly on the winter range. At the same time the grizzly bear and the mountain sheep are shrinking, the latter by reason of disease.

While even the largest wilderness areas become partially

deranged, it required only a few wild acres for J. E. Weaver to discover why the prairie flora is more drouth-resistant than the agronomic flora which has supplanted it. Weaver found that the prairie species practice 'team work' underground by distributing their root-systems to cover all levels, whereas the species comprising the agronomic rotation overdraw one level and neglect another, thus building up cumulative deficits. An important agronomic principle emerged from Weaver's researches.

Again, it required only a few wild acres for Togrediak to discover why pines on old fields never achieve the size or wind-firmness of pines on uncleared forest soils. In the latter case, the roots follow old root channels, and thus strike deeper.

In many cases we literally do not know how good a performance to expect of healthy land unless we have a wild area for comparison with sick ones. Thus most of the early travelers in the Southwest describe the mountain rivers as originally clear, but a doubt remains, for they may, by accident, have seen them at favorable seasons. Erosion engineers had no base datum until it was discovered that exactly similar rivers in the Sierra Madre of Chihuahua, never grazed or used for fear of Indians, show at their worst a milky hue, not too cloudy for a trout fly. Moss grows to the water's edge on their banks. Most of the corresponding rivers in Arizona and New Mexico are ribbons of boulders, mossless, soil-less, and all but treeless. The preservation and study of the Sierra Madre wilderness, by an international experiment station, as a norm for the cure of sick land on both sides of the border, would be a good-neighbor enterprise well worthy of consideration.

In short all available wild areas, large or small, are likely

to have value as norms for land science. Recreation is not their only, or even their principal, utility.

Wilderness for Wildlife

The National Parks do not suffice as a means of perpetuating the larger carnivores; witness the precarious status of the grizzly bear, and the fact that the park system is already wolfless. Neither do they suffice for mountain sheep; most sheep herds are shrinking.

The reasons for this are clear in some cases and obscure in others. The parks are certainly too small for such a far-ranging species as the wolf. Many animal species, for reasons unknown, do not seem to thrive as detached islands of population.

The most feasible way to enlarge the area available for wilderness fauna is for the wilder parts of the National Forests, which usually surround the Parks, to function as parks in respect of threatened species. That they have not so functioned is tragically illustrated in the case of the grizzly bear.

In 1909, when I first saw the West, there were grizzlies in every major mountain mass, but you could travel for months without meeting a conservation officer. Today there is some kind of conservation officer 'behind every bush,' yet as wildlife bureaus grow, our most magnificent mammal retreats steadily toward the Canadian border. Of the 6000 grizzlies officially reported as remaining in areas owned by the United States, 5000 are in Alaska. Only five states have any at all. There seems to be a tacit assumption that if grizzlies survive in Canada and Alaska, that is good enough. It is not good enough for me. The Alaskan bears are a dis-

tinct species. Relegating grizzlies to Alaska is about like relegating happiness to heaven; one may never get there.

Saving the grizzly requires a series of large areas from which roads and livestock are excluded, or in which livestock damage is compensated. Buying out scattered livestock ranches is the only way to create such areas, but despite large authority to buy and exchange lands, the conservation bureaus have accomplished virtually nothing toward this end. The Forest Service has, I am told, established one grizzly range in Montana, but I know of a mountain range in Utah in which the Forest Service actually promoted a sheep industry, despite the fact that it harbored the sole remnant of grizzlies in that state.

Permanent grizzly ranges and permanent wilderness areas are of course two names for one problem. Enthusiasm about either requires a long view of conservation, and a historical perspective. Only those able to see the pageant of evolution can be expected to value its theater, the wilderness, or its outstanding achievement, the grizzly. But if education really educates, there will, in time, be more and more citizens who understand that relics of the old West add meaning and value to the new. Youth yet unborn will pole up the Missouri with Lewis and Clark, or climb the Sierras with James Capen Adams, and each generation in turn will ask: Where is the big white bear? It will be a sorry answer to say he went under while conservationists weren't looking.

Defenders of Wilderness

Wilderness is a resource which can shrink but not grow. Invasions can be arrested or modified in a manner to keep

..... remnants in America. The Sierra Club is doing yeoman work toward the same end.

an area usable either for recreation, or for science, or for wildlife, but the creation of new wilderness in the full sense of the word is impossible.

It follows, then, that any wilderness program is a rear-guard action, through which retreats are reduced to a minimum. The Wilderness Society was organized in 1935 'for the one purpose of saving the wilderness remnants in America.'

It does not suffice, however, to have such a society. Unless

..... , however, to have a few such societies, nor can one be content that Congress has enacted a bill aimed at wilderness preservation.

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In Europe, where wilderness has now retreated to the Carpathians and Siberia, every thinking conservationist bemoans its loss. Even in Britain, which has less room for landluxuries than almost any other civilized country, there is a vigorous if belated movement for saving a few small spots of semi-wild land.

Ability to see the cultural value of wilderness boils down, in the last analysis, to a question of intellectual humility. The shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important; it is such who prate of empires, political or economic, that will last a thousand years. It is only the scholar who appreciates that all history consists of successive excursions from a single starting-point, to which man returns again and again to organize yet another search for a durable scale of values. It is only the scholar who understands why the

raw wilderness gives definition and meaning to the human enterprise.

order of essays to be
1 The Land Ethic (201-226)
2 Wilderness (188-201)
3 Conservation Esthetic (165-177)

Conservation Esthetic

Barring love and war, few enterprises are undertaken with such abandon, or by such diverse individuals, or with so paradoxical a mixture of appetite and altruism, as that group of avocations known as outdoor recreation. It is, by common consent, a good thing for people to get back to nature. But wherein lies the goodness, and what can be done to encourage its pursuit? On these questions there is confusion of counsel, and only the most uncritical minds are free from doubt.

Recreation became a problem with a name in the days of the elder Roosevelt, when the railroads which had banished the countryside from the city began to carry city-dwellers, *en masse,* to the countryside. It began to be noticed that the greater the exodus, the smaller the per-capita ration of peace, solitude, wildlife, and scenery, and the longer the migration to reach them.

The automobile has spread this once mild and local predicament to the outermost limits of good roads—it has made scarce in the hinterlands something once abundant on the back forty. But that something must nevertheless be found. Like ions shot from the sun, the week-enders radiate from every town, generating heat and friction as they go. A tour-

ist industry purveys bed and board to bait more ions, faster, further. Advertisements on rock and rill confide to all and sundry the whereabouts of new retreats, landscapes, hunting-grounds, and fishing-lakes just beyond those recently overrun. Bureaus build roads into new hinterlands, then buy more hinterlands to absorb the exodus accelerated by the roads. A gadget industry pads the bumps against nature-in-the-raw; woodcraft becomes the art of using gadgets. And now, to cap the pyramid of banalities, the trailer. To him who seeks in the woods and mountains only those things obtainable from travel or golf, the present situation is tolerable. But to him who seeks something more, recreation has become a self-destructive process of seeking but never quite finding, a major frustration of mechanized society.

The retreat of the wilderness under the barrage of motorized tourists is no local thing; Hudson Bay, Alaska, Mexico, South Africa are giving way, South America and Siberia are next. Drums along the Mohawk are now honks along the rivers of the world. *Homo sapiens* putters no more under his own vine and fig tree; he has poured into his gas tank the stored motivity of countless creatures aspiring through the ages to wiggle their way to pastures new. Ant-like he swarms the continents.

This is Outdoor Recreation, Latest Model.

Who now is the recreationist, and what does he seek? A few samples will remind us.

Take a look, first, at any duck marsh. A cordon of parked cars surrounds it. Crouched on each point of its reedy margin is some pillar of society, automatic ready, trigger finger itching to break, if need be, every law of commonwealth or commonweal to kill a duck. That he is already overfed in no way dampens his avidity for gathering his meat from God.

Wandering in the near-by woods is another pillar, hunting rare ferns or new warblers. 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.

At some near-by resort is still another nature-lover—the kind who writes bad verse on birchbark. Everywhere is the unspecialized motorist whose recreation is mileage, who has run the gamut of the National Parks in one summer, and now is headed for Mexico City and points south.

Lastly, there is the professional, striving through countless conservation organizations to give the nature-seeking public what it wants, or to make it want what he has to give.

Why, it may be asked, should such a diversity of folk be bracketed in a single category? Because each, in his own way, is a hunter. And why does each call himself a conservationist? Because the wild things he hunts for have eluded his grasp, and he hopes by some necromancy of laws, appropriations, regional plans, reorganization of departments, or other form of mass-wishing to make them stay put.

Recreation is commonly spoken of as an economic resource. Senate committees tell us, in reverent ciphers, how many millions the public spends in its pursuit. It has indeed an economic aspect—a cottage on a fishing-lake, or even a duck-point on a marsh, may cost as much as the entire adjacent farm.

It has also an ethical aspect. In the scramble for unspoiled places, codes and decalogues evolve. We hear of 'outdoor manners.' We indoctrinate youth. We print definitions of 'What is a sportsman?' and hang a copy on the wall of whosoever will pay a dollar for the propagation of the faith.

It is clear, though, that these economic and ethical manifestations are results, not causes, of the motive force. We

seek contacts with nature because we derive pleasure from them. As in opera, economic machinery is employed to create and maintain facilities. As in opera, professionals make a living out of creating and maintaining them, but it would be false to say of either that the basic motive, the *raison d'être*, is economic. The duck-hunter in his blind and the operatic singer on the stage, despite the disparity of their accoutrements, are doing the same thing. Each is reviving, in play, a drama formerly inherent in daily life. Both are, in the last analysis, esthetic exercises.

Public policies for outdoor recreation are controversial. Equally conscientious citizens hold opposite views on what it is and what should be done to conserve its resource-base. Thus the Wilderness Society seeks to exclude roads from the hinterlands, and the Chamber of Commerce to extend them, both in the name of recreation. The game-farmer kills hawks and the bird-lover protects them in the name of shotgun and field-glass hunting respectively. Such factions commonly label each other with short and ugly names, when, in fact, each is considering a different component of the recreational process. These components *differ widely in their characteristics or properties.* A given policy may be true for one but false for another.

It seems timely, therefore, to segregate the components, and to examine the distinctive characteristics or properties of each.

We begin with the simplest and most obvious: the physical objects that the outdoorsman may seek, find, capture, and carry away. In this category are wild crops such as game and fish, and the symbols or tokens of achievement such as heads, hides, photographs, and specimens.

All these things rest upon the idea of *trophy*. The pleasure

they give is, or should be, in the seeking as well as in the getting. The trophy, whether it be a bird's egg, a mess of trout, a basket of mushrooms, the photograph of a bear, the pressed specimen of a wild flower, or a note tucked into the cairn on a mountain peak, is a *certificate*. It attests that its owner has been somewhere and done something—that he has exercised skill, persistence, or discrimination in the age-old feat of overcoming, outwitting, or reducing-to-possession. These connotations which attach to the trophy usually far exceed its physical value.

But trophies differ in their reactions to mass-pursuit. The yield of game and fish can, by means of propagation or management, be increased so as to give each hunter more, or to give more hunters the same amount. During the past decade a profession of wildlife management has sprung into existence. A score of universities teach its techniques, conduct research for bigger and better wild animal crops. However, when carried too far, this stepping-up of yields is subject to a law of diminishing returns. Very intensive management of game or fish lowers the unit value of the trophy by artificializing it.

Consider, for example, a trout raised in a hatchery and newly liberated in an over-fished stream. The stream is no longer capable of natural trout production. Pollution has fouled its waters, or deforestation and trampling have warmed or silted them. No one would claim that this trout has the same value as a wholly wild one caught out of some unmanaged stream in the high Rockies. Its esthetic connotations are inferior, even though its capture may require skill. (Its liver, one authority says, is also so degenerated by hatchery feeding as to forebode an early death.) Yet several

over-fished states now depend almost entirely on such man-made trout.

All intergrades of artificiality exist, but as mass-use increases it tends to push the whole gamut of conservation techniques toward the artificial end, and the whole scale of trophy-values downward.

To safeguard this expensive, artificial, and more or less helpless trout, the Conservation Commission feels impelled to kill all herons and terns visiting the hatchery where it was raised, and all mergansers and otters inhabiting the stream in which it is released. The fisherman perhaps feels no loss in this sacrifice of one kind of wild life for another, but the ornithologist is ready to bite off ten-penny nails. Artificialized management has, in effect, bought fishing at the expense of another and perhaps higher recreation; it has paid dividends to one citizen out of capital stock belonging to all. The same kind of biological wildcatting prevails in game management. In Europe, where wild-crop statistics are available for long periods, we even know the 'rate of exchange' of game for predators. Thus, in Saxony one hawk is killed for each seven game birds bagged, and one predator of some kind for each three head of small game.

Damage to plant life usually follows artificialized management of animals—for example, damage to forests by deer. One may see this in north Germany, in northeast Pennsylvania, in the Kaibab, and in dozens of other less publicized regions. In each case over-abundant deer, when deprived of their natural enemies, have made it impossible for deer food plants to survive or reproduce. Beech, maple, and yew in Europe, ground hemlock and white cedar in the eastern states, mountain mahogany and cliff-rose in the West, are deer foods threatened by artificialized deer. The composi-

tion of the flora, from wild flowers to forest trees, is gradually impoverished, and the deer in turn are dwarfed by malnutrition. There are no stags in the woods today like those on the walls of feudal castles.

On the English heaths, reproduction of trees is inhibited by rabbits over-protected in the process of cropping partridges and pheasants. On scores of tropical islands both flora and fauna have been destroyed by goats introduced for meat and sport. It would be hard to calculate the mutual injuries by and between mammals deprived of their natural predators, and ranges stripped of their natural food plants. Agricultural crops caught between these upper and nether millstones of ecological mismanagement are saved only at the cost of endless indemnities and barbed wire.

We generalize, then, by saying that mass-use tends to dilute the quality of organic trophies like game and fish, and to induce damage to other resources such as non-game animals, natural vegetation, and farm crops.

The same dilution and damage is not apparent in the yield of 'indirect' trophies, such as photographs. Broadly speaking, a piece of scenery snapped by a dozen tourist cameras daily is not physically impaired thereby, nor does any other resource suffer when the rate increases to a hundred. The camera industry is one of the few innocuous parasites on wild nature.

We have, then, a basic difference in reaction to mass-use as between two categories of physical objects pursued as trophies.

Let us now consider another component of recreation, which is more subtle and complex: the feeling of isolation in nature. That this is acquiring a scarcity-value that is very high to some persons is attested by the wilderness contro-

.... thereby, nor does it suffer if photographed a hundred times .

versy. The proponents of wilderness have achieved a compromise with the road-building bureaus which have the custody of our National Parks and Forests. They have agreed on the formal reservation of roadless areas. Out of every dozen wild areas opened up, one may be officially proclaimed 'wilderness,' and roads built only to its edge. It is then advertised as unique, as indeed it is. Before long its trails are congested, it is being dolled up to make work for CCC's, or an unexpected fire necessitates splitting it in two with a road to haul fire-fighters. Or the congestion induced by advertising may whip up the price of guides and packers, whereupon somebody discovers that the wilderness policy is undemocratic. Or the local Chamber of Commerce, at first quiescent at the novelty of a hinterland officially labeled as 'wild,' tastes its first blood of tourist-money. It then wants more, wilderness or no wilderness.

In short, the very scarcity of wild places, reacting with the *mores* of advertising and promotion, tends to defeat any deliberate effort to prevent their growing still more scarce.

It is clear without further discussion that mass-use involves a direct dilution of the opportunity for solitude; that when we speak of roads, campgrounds, trails, and toilets as 'development' of recreational resources, we speak falsely in respect of this component. Such accommodations for the crowd are not developing (in the sense of adding or creating) anything. On the contrary, they are merely water poured into the already-thin soup.

We now contrast with the isolation-component that very distinct if simple one which we may label 'fresh-air and change of scene.' Mass-use neither destroys nor dilutes this value. The thousandth tourist who clicks the gate of the

National Park breathes approximately the same air, and experiences the same contrast with Monday-at-the-office, as does the first. One might even believe that the gregarious assault on the outdoors enhances the contrast. We may say, then, that the fresh-air and change-of-scene component is like the photographic trophy—it withstands mass-use without damage.

We come now to another component: the perception of the natural processes by which the land and the living things upon it have achieved their characteristic forms (evolution) and by which they maintain their existence (ecology). That thing called 'nature study,' despite the shiver it brings to the spines of the elect, constitutes the first embryonic groping of the mass-mind toward perception.

The outstanding characteristic of perception is that it entails no consumption and no dilution of any resource. The swoop of a hawk, for example, is perceived by one as the drama of evolution. To another it is only a threat to the full frying-pan. The drama may thrill a hundred successive witnesses; the threat only one—for he responds with a shotgun.

To promote perception is the only truly creative part of recreational engineering.

This fact is important, and its potential power for bettering 'the good life' only dimly understood. When Daniel Boone first entered into the forests and prairies of 'the dark and bloody ground,' he reduced to his possession the pure essence of 'outdoor America.' He didn't call it that, but what he found is the thing we now seek, and we here deal with things, not names.

Recreation, however, is not the outdoors, but our reaction to it. Daniel Boone's reaction depended not only on the

quality of what he saw, but on the quality of the mental eye with which he saw it. Ecological science has wrought a change in the mental eye. It has disclosed origins and functions for what to Boone were only facts. It has disclosed mechanisms for what to Boone were only attributes. We have no yardstick to measure this change, but we may safely say that, as compared with the competent ecologist of the present day, Boone saw only the surface of things. The incredible intricacies of the plant and animal community—the intrinsic beauty of the organism called America, then in the full bloom of her maidenhood—were as invisible and incomprehensible to Daniel Boone as they are today to Mr. Babbitt. The only true development in American recreational resources is the development of the perceptive faculty in Americans. All of the other acts we grace by that name are, at best, attempts to retard or mask the process of dilution.

Let no man jump to the conclusion that Babbitt must take his Ph.D. in ecology before he can 'see' his country. On the contrary, the Ph.D. may become as callous as an undertaker to the mysteries at which he officiates. Like all real treasures of the mind, perception can be split into infinitely small fractions without losing its quality. The weeds in a city lot convey the same lesson as the redwoods; the farmer may see in his cow-pasture what may not be vouchsafed to the scientist adventuring in the South Seas. Perception, in short, cannot be purchased with either learned degrees or dollars; it grows at home as well as abroad, and he who has a little may use it to as good advantage as he who has much. As a search for perception, the recreational stampede is footless and unnecessary.

There is, lastly, a fifth component: the sense of husbandry. It is unknown to the outdoorsman who works for conservation with his vote rather than with his hands. It is realized only when some art of management is applied to land by some person of perception. That is to say, its enjoyment is reserved for landholders too poor to buy their sport, and land administrators with a sharp eye and an ecological mind. The tourist who buys access to his scenery misses it altogether; so also the sportsman who hires the state, or some underling, to be his gamekeeper. The Government, which essays to substitute public for private operation of recreational lands, is unwittingly giving away to its field officers a large share of what it seeks to offer its citizens. We foresters and game managers might logically pay for, instead of being paid for, our job as husbandmen of wild crops.

That a sense of husbandry exercised in the production of crops may be quite as important as the crops themselves is realized to some extent in agriculture, but not in conservation. American sportsmen hold in small esteem the intensive game-cropping of the Scottish moors and the German forests, and in some respects rightly. But they overlook entirely the sense of husbandry developed by the European landholder in the process of cropping. We have no such thing as yet. It is important. When we conclude that we must bait the farmer with subsidies to induce him to raise a forest, or with gate receipts to induce him to raise game, we are merely admitting that the pleasures of husbandry-in-the-wild are as yet unknown both to the farmer and to ourselves.

Scientists have an epigram: ontogeny repeats phylogeny. What they mean is that the development of each individual

repeats the evolutionary history of the race. This is true of mental as well as physical things. The trophy-hunter is the caveman reborn. Trophy-hunting is the prerogative of youth, racial or individual, and nothing to apologize for.

The disquieting thing in the modern picture is the trophy-hunter who never grows up, in whom the capacity for isolation, perception, and husbandry is undeveloped, or perhaps lost. He is the motorized ant who swarms the continents before learning to see his own back yard, who consumes but never creates outdoor satisfactions. For him the recreational engineer dilutes the wilderness and artificializes its trophies in the fond belief that he is rendering a public service.

The trophy-recreationist has peculiarities that contribute in subtle ways to his own undoing. To enjoy he must possess, invade, appropriate. Hence the wilderness that he cannot personally see has no value to him. Hence the universal assumption that an unused hinterland is rendering no service to society. To those devoid of imagination, a blank place 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?)

It would appear, in short, that the rudimentary grades of outdoor recreation consume their resource-base; the higher grades, at least to a degree, create their own satisfactions with little or no attrition of land or life. It is the expansion of transport without a corresponding growth of perception that threatens us with qualitative bankruptcy of the recreational process. Recreational development is a job not of

building roads into lovely country, but of building receptivity into the still unlovely human mind.

COMMENTS FROM THE CRITICS

'It is safe to assume that *A Sand County Almanac* will be read for decades, and probably centuries, to come.'—WILLIAM VOGT.

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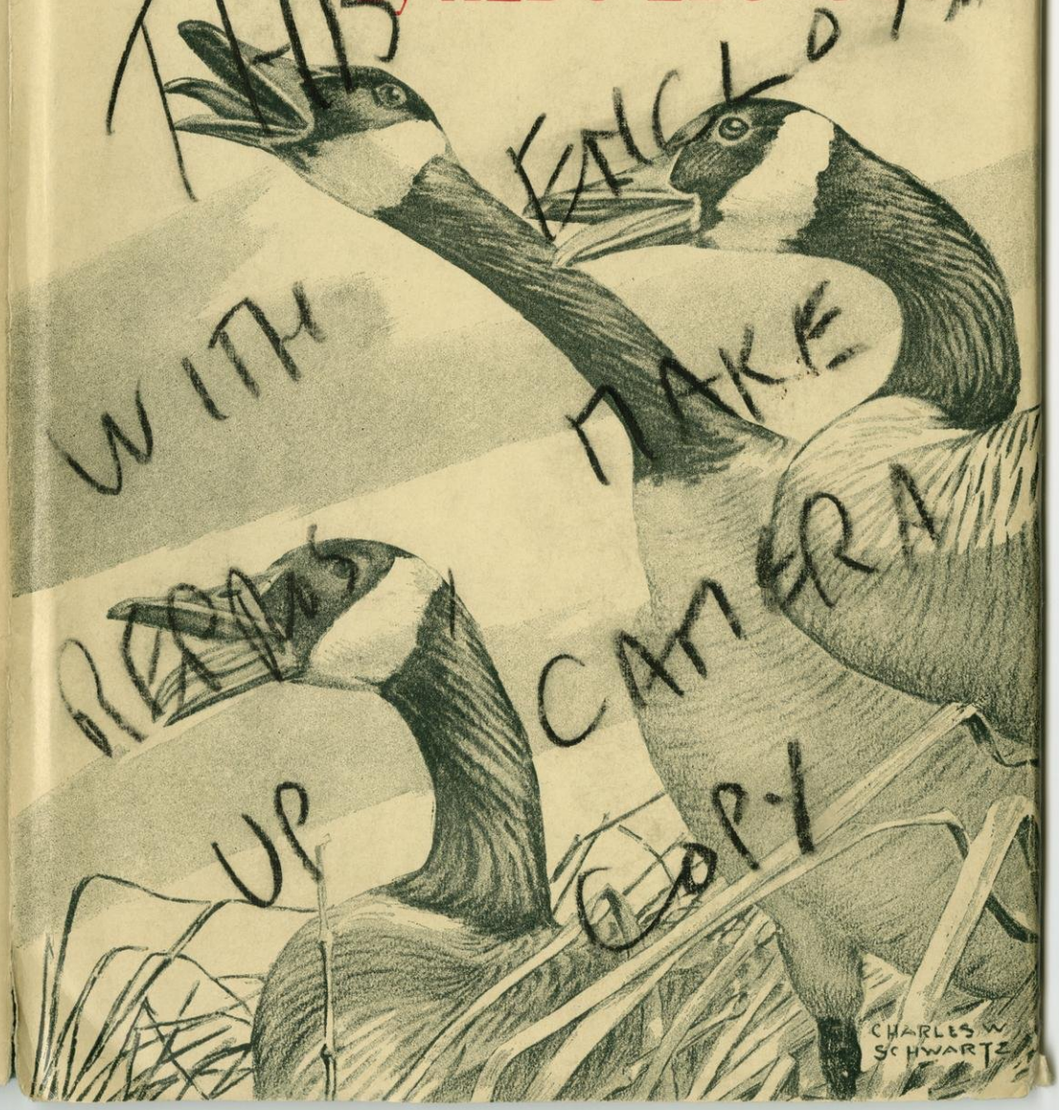
AND SKETCHES HERE AND THERE

By ALDO LEOPOLD



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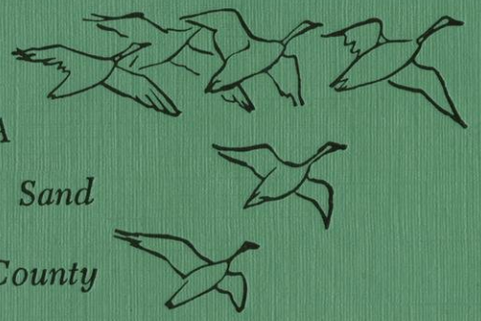

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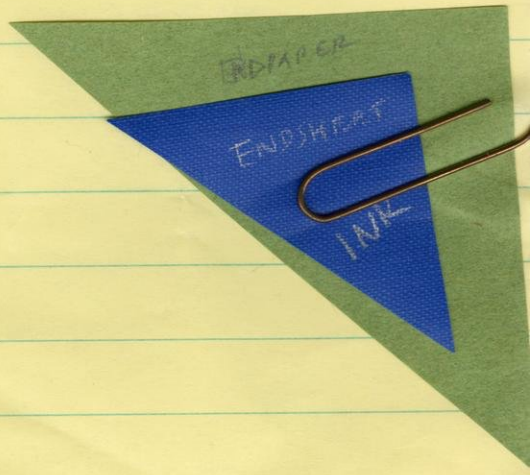
Jacket #2251 green #2 Book
2153 Blue #4 Book } Hallmark color chart



A Sand County ALMANAC

WITH OTHER ESSAYS ON CONSERVATION

FROM *Round River*

A SAND COUNTY ALMANAC

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ALDO LEOPOLD

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