

man over nature

origins of the conservation movement

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The ideas of four nineteenth-century philosopher-scientists provided the theoretical framework for the conservation movement of the early twentieth century and found parallels in the ecology movement of the 1960's. The ideas of George Perkins Marsh, John Wesley Powell, Lester Frank Ward and W J McGee reached maturity at the turn of the century and gave guidance to the first conservation movement.¹ Their ideas on conservation recognized that the effective use of one resource depended upon the complementary management of related resources. A balance existed in nature which it behooved man to follow in developing and managing his resources. They believed that disruption of the balance through ignorance, carelessness or greed threatened man's welfare. To maintain the natural balance, they advocated the coordinated management of natural resources. Self-trained in various natural sciences, they synthesized an ecological theory of resource management. By the time conservation became a public issue, scientists were specializing in particular disciplines and the generalists attracted fewer followers. Nevertheless the theory of comprehensive management provided a frame of reference for the early conservation movement, and similar ideas appeared in the ecology movement of the 1960's. The ideas were not necessarily contiguous from one period to the next, but agencies such as the Tennessee Valley Authority and commissions like the President's Water Resources Policy Commission of 1950 suggest their currency in the scientific and professional communities.

The "new conservation" movement exemplified the eclectic approach of Marsh and the three other pioneers. Ecologists in the "new conservation" movement, alarmed by the damage technological man was wreaking on himself and his environment, forged a fresh movement to turn the tide of destruction. Contemporary scientists, such as Aldo Leopold, Rachael Carson, Barry Commoner, Paul Ehrlich and Rene Dubos, observed disturbing trends in the post-war world: lack of reverence for the land, an

obsession with conquering insects and disease, an extreme specialization and secretiveness in scientific research and a blindness about the carrying capacity of the earth.² Subscribing to a method common to Powell and his associates, these new conservationists applied their ecological insight to social and political issues of the environment, wed their science to action for the public welfare and assumed a responsibility for informing the public of the consequences or effects of science and technology. Both groups drew the scorn of both the purists and those who concentrated on learning more and more about less and less. But events have borne out their common assumption that ecology was the base datum for a healthy environment and the first principle of resource management.

Marsh, Powell, Ward and McGee gave birth to a theory that brought focus and momentum to conservation efforts. Synthetic in method, they brought together ideas from several branches of science to formulate a comprehensive view of resource conservation. As Darwinists they subscribed to the theory of evolution and interpreted nature in that context. As evolutionists they were ecologists who saw the interrelationship between organisms and their environment. Their view of resource problems was both ecological and political. Being both democratic and anti-monopolistic, they called upon government to protect the balance of nature and to prevent a monopoly of resources.

The conservation theory that they spawned was multiple-purpose waterway management; it became the framework for the conservation movement inaugurated officially in 1907. In an ecological sense, the watershed was the key to their theory. Forests in a hydrological basin protected and regulated the water-flow necessary for domestic supply, irrigation, navigation and waterpower. By this concept conservationists would develop a watershed as a unit. Forestry and reservoir construction in the upper reaches of a stream were an integral part of the efforts to improve navigation, provide irrigation, control floods, prevent erosion and create waterpower. The theory grew out of their understanding of nature and their attempts to change methods of land and forest use.

The new theory of resource management blossomed from ideas held in common by these four thinkers. All were avid students of nature, broadly learned and appreciative of the material and esthetic aspects of nature. To them man was a product of nature who had evolved to master it and who could use the institution of government to protect the harmony in nature and to benefit the general welfare.

Nature lured them into the field at an early age. Observation and study of natural phenomena whetted their curiosity. Marsh, his vision impaired by endless reading by the age of seven or eight, lived the next four years wandering among the trees, flowers, animals and birds in the hills and fields around Woodstock, Vermont, where he was born on March 15, 1801. Years later Marsh recalled that the bubbling brook, the trees, the flowers and the wild animals were like persons to him.³ A backwoods farm surrounded by forests, Indians and trails inspired

Powell. First-hand, he studied nature on field excursions with a private tutor, George Crookham, a botanist, geologist, zoologist, ethnologist, archeologist, historian and philosopher.⁴ Ward's appreciation of nature came suddenly on the prairie as he followed his restless father west. On the trail Ward and his brother slept on the ground and fed the family by hunting. In Iowa he roamed freely over the prairie cherishing every animal, bird, insect and flower he saw. These excursions instilled in him a life-long love of nature.⁵ McGee, like Powell, was inspired by farm life. His birth-place stood on the open prairie fronted by a forest tract where tall trees framed by smaller trees and blooming shrubs abounded. The memory of this beautiful scene inspired McGee for the remainder of his days.⁶

A breadth of knowledge and versatile careers gave these men an intellectual daring and synthesizing bent. It was a short step from their eclecticism to the concept of ecology and comprehensive resource management. Marsh graduated from Dartmouth at the head of his class and began a teaching career cut short by recurrent eye trouble. His subsequent career included law, politics, business, diplomacy and scholarship. As minister to Turkey and Italy he continued the observations of nature he had begun in Woodstock and in 1864 published his *Man and Nature* which chronicled man's disruptive influence on nature. His wide travels and command of twenty languages aided him in writing the book.⁷

Ward, Powell and McGee were self-made men. Powell interspersed his formal education at Illinois College and Wheaton College with public school teaching. While teaching at Hennepin, Illinois, he began to study geology and after the Civil War became professor of geology at Illinois Wesleyan University. His famed exploration of the Grand Canyon grew out of his field trips under the auspices of the university and won him the directorship of the United States Geographical and Geological Survey of the Rocky Mountain Region. His field work for the survey developed his skill as a geologist and in 1881 he became director of the U.S. Geological Survey.⁸

McGee began the study of geology in 1875 while Powell was conducting his study of the arid lands. McGee began investigating the contours and formations of the Iowa countryside by climbing down numerous wells. On foot he undertook the first extensive geological and topographical survey of Iowa. In 1878 he met Powell, and in 1882 Powell brought him into the U.S. Geological Survey. Here he became close friends with Powell and Ward, developed an interest in anthropology and helped Powell shape the policies of the Survey.⁹

Ward joined the U.S. Geological Survey in 1881 and was soon Chief Paleontologist. Previous to joining the Survey, he had worked in the Treasury Department and the Bureau of Statistics and studied and catalogued the flora of the Rock Creek region around Washington, D.C. He enrolled in evening classes in 1867 and within five years had earned diplomas in arts, law and medicine.¹⁰

The exchange of ideas among these four men began with Marsh; Marsh's work was a catalyst for Powell, and Powell was the seminal leader for Ward and McGee. The influence of Powell and Ward on each other is unclear. Ward did a study of the prairie grasses in the arid region for Powell in 1875 and, since both started writing in 1869, they probably influenced each other's opinions. Ward was Powell's favorite on the Survey, and Powell gave Ward a position so he could finish his *Dynamic Sociology*. Ward was the sole member of the Survey capable of engaging in a philosophical discussion with Powell, and he undoubtedly helped to persuade Powell to accept positive government as an agent in resource management.¹¹ McGee worked closely with Powell and helped him develop the policies of the Survey. Powell encouraged McGee in geological hydrological and ethnological research and McGee advanced to produce works in hydrology and geology that surpassed the work of Powell. Ward and Powell formulated a social theory based on Darwinism and oriented for positive democratic action, but it was McGee who applied the ecological insight of the group to the main conservation efforts of the day and brought them together in a legislative program that reflected the natural relationships between resources.¹²

Marsh and Powell were among the first to call for a careful stewardship of land, forests and water. Marsh in *Man and Nature* warned that man's influence and activity were having a disruptive effect on the balance of nature and were threatening his very existence. In the United States and abroad Marsh's observations led him to conclude that the destruction of forests and wildlife, overgrazing and a too ambitious agriculture had produced deserts, as well as waterways that alternately flooded and ran dry.¹³ Beavers and hats were a graphic illustration of how man's actions affected the ecology. Marsh noted that beavers reappeared in America when Parisian hatmakers substituted silk in hats for beaver skins. He was also aware of aquatic ecosystems, observing that destruction of the mosquito which fed the trout that protected the spawn of the salmon could occasion a scarcity of the salmon. Marsh concluded that all nature was linked together by invisible bonds and every organic creature was necessary to the well-being of some other form of life.¹⁴

Marsh in 1874 prepared a pioneer report on the arid west and marked the trail for subsequent studies. He questioned the popular notion that irrigation was a panacea for the problem of aridity. He warned that the diversion of water could disturb the balance of nature, that the construction of reservoirs was expensive and beyond the means of individuals and that the amount of water available for irrigation was unknown. He called for hydrographic studies to pinpoint the supply of water available in each river basin and to develop a new code that would make water the property of the state. Under the old law of riparian rights a landowner controlled the water fronting his property and could deprive downstream settlers of a supply by diverting the stream.¹⁵

Powell read Marsh's work and remembered the lessons in his survey

of the arid lands west of the 100th meridian. In his *Report on the Arid Lands of the United States*, Powell outlined a new method of land use based on a hydrographic basin in which forests, water, soil and grass were in a delicate balance. To maintain this balance Powell envisioned new laws and institutions that conformed to the arid climate and assured the settler of success.¹⁶ Essentially, Powell wanted land surveys to conform to the catchment basin and natural terrain rather than to the arbitrary gridiron pattern; water would go with the land and each settler would have access to water to prevent a monopoly of either land or water; Powell would classify land for use as forest, grazing, mineral or irrigable and alter land laws to permit 2,500 acres for a pasturage farm and eight acres for an irrigation farm. The vegetation was too thin and fragile to support a family on less than 2,500 grazing acres, but irrigated land was lush enough to support a family on 80 acres with intensive cultivation.

The immediate result of Powell's *Report* was the creation of the U.S. Geological Survey. Powell became director of the Survey in 1881 after resignation of Clarence King, the first director. As director Powell began the process of changing public land policy. In 1888 Congress made provision for irrigation surveys because the irrigation sites on the small streams were in private hands and westerners wanted to build dams and reservoirs on the larger rivers. Authorized to locate potential irrigation sites, Powell wanted to use the surveys to implement a new policy for the arid lands. While the survey was in progress Powell closed to entry all dam sites and land susceptible to irrigation, a provision Congress had approved to prevent speculators from unduly benefiting from the work. Powell's work proceeded too slowly to satisfy the land-hunger of settlers who, unable to stake out claims to land, reacted savagely. Unable to stomach the delay the planning aspects of Powell's program entailed, they pressured Congress into killing the program by repealing the provision for reserving land from entry and by cutting the appropriations for the Geological Survey. His power crushed, Powell resigned in 1894. But by this time he had trained the men who would implement the Reclamation Act of 1902.¹⁷

Congress did not comprehend Powell's message: that man and nature were interdependent, that man did not own the earth. Before Powell, Marsh rejected the idea of ownership for the idea of usufruct. Marsh saw that man did not own the earth and that, although he could master it, he had a moral obligation to manage nature wisely. Nature was indifferent to man's fate; if man destroyed himself it would not be nature's fault. Marsh cited instances where man was restoring nature by planting forests, draining marshes and seeding grass on the sand dunes. Man, then, had the power to destroy or maintain his source of existence.¹⁸

Powell, Ward and McGee placed man above nature but did not exalt him in the way Marsh had. As evolutionists and Darwinists¹⁹ they saw man as a part of nature, yet they believed man had evolved an intelli-

gence that gave him mastery over nature. As Lamarckians²⁰ they believed man had inherited acquired characteristics which enabled him to cope with his environment. In 1895, in a series of Saturday lectures at the Smithsonian Institution, Powell and McGee formally presented their view that man created optimum conditions for himself in his environment. Powell noted that in the Arctic, where animals developed blubber, hair or wool to protect themselves from the elements, man invented a house, fire and clothing made from the furs of animals and the down of birds to protect himself.²¹ McGee emphasized the effects of the environment on mental characteristics. Man had common characteristics but developed techniques to survive in a peculiar environment. A nomad developed the art of obtaining food and water; dwellers along the seashore became fishermen and sailors; mountain men used weapons to protect themselves; plainsmen learned to hunt and herd animals; and man in the Arctic learned to make clothes and build houses. McGee stressed that the earth was the home of man, but that he had become superior to other animals because of his intelligence. Man altered nature to make life more enjoyable.²²

Similarly, Ward in his philosophy of sociology freed man from natural law by emphasizing psychic factors. Ward saw man as a product of evolution, but different from other animals because of his mental powers: reason, memory, imagination and foresight. Ward said that man should assume an attitude of mastery toward nature and direct and control natural forces to protect himself from injury and to derive all benefits that nature could give. Nature in its method was slipshod and wasteful whereas man's success in building civilization was based on interfering with the natural processes of organic evolution. It was absurd for man to copy nature in his social policies; the common notion that the laws of nature were competent to govern society was a misconception of man's place in nature. His mind emancipated man from bondage to nature, and as master he could control and direct natural forces to benefit himself.²³

Contrary to the laissez-faire assumptions of American individualism, these thinkers advocated planned and deliberate efforts to guide resource use. Their vehicle of power was both private, cooperative efforts and governmental action. Powell based his programs for the arid lands on the cooperative efforts of settlers to overcome the obstacles the solitary pioneer faced. Too many pioneers were "busted" because land laws for the humid East were not applicable in the arid West. Powell knew that man had progressed because he cooperated with his fellows. Like Ward, he denied that the concept of survival of the fittest was applicable to man. From the Mormons he had learned the advantages of cooperation and in his *Report* recommended for the arid lands pasturage, irrigation and forestry districts controlled by the settlers of a district. The federal government would survey and classify the lands and the state governments would designate water rights for each irrigation and pasturage farm. By

tying the water right to the land, Powell hoped to get the fullest possible use from land and water and prevent one party from monopolizing all the water.²⁴ McGee added that cooperation was indigenous to the arid environment; institutions in the arid region reflected the interdependence of the organism and the environment. In the desert the interdependence of carnivore, herbivore, birds, insects, field mice, grass and shrub illustrated the necessity for cooperation. Men, plants and animals cooperated to survive in an arid environment, developed organizations good for all and then erected institutions that bound them together in a unity. Man learned to live as part of a fragile and balanced environment.²⁵

Ward envisioned a broader role for the federal government in resource management than did Marsh or Powell. Ward had been a government employee since 1865 and his experience convinced him that information gathered in federal agencies could become the basis for legislation. Similarly, he thought that man could study nature to discover its laws and use this knowledge to control and direct nature.²⁶ Many activities of man, such as agriculture and horticulture, could disrupt the harmony in nature, but the disruption was often beneficial. Artificial products often contributed more to man's welfare than the natural ones. Unlike the Social Darwinists, Ward was not disturbed with legislation that interfered with natural laws. He would discover natural laws so that legislators could pass scientific legislation.²⁷ In his report on irrigation for the Missouri and Yellowstone Valleys, Ward recommended that the government develop the reservoirs and canals for irrigation in order to prevent a monopoly of water by private developers. His recommendation accorded with his view that man was moving away from the natural or genetic method and using the method of foresight or calculation. Positive government was the cutting edge of Ward's sociocracy, a system in which informed legislators made laws to benefit society.²⁸

As pioneer conservationists, these four thinkers laid the foundation for a new stewardship of nature, the use of resources patterned to preserve the harmony in nature. They drafted blue prints for new institutions in consultation with nature. The new institutions dealt mainly with man's economic and material existence, but the influence of the primeval was evident in the blue prints for a new approach. As conservationists, they were concerned with the most efficient and lasting use of resources; as preservationists they wanted to save a remnant of the primeval for economic, aesthetic and scientific purposes.

Of romantic temperament, Marsh wanted to preserve a bit of the primeval landscape. He was torn between praising industrialism and civilization for their benefits and condemning cities for their blighting effects on man. Aware that the forests would mainly be used for lumber and the land for agriculture, Marsh was akin to Thoreau in wanting to enjoy the advantages of civilization as well as the psychological benefits of wilderness. He did not make a fetish of wilderness but believed that a balance between woodland, pasture and crop land would stabilize the

restlessness he sensed in American society. It was necessary for man first to conquer nature, then he would have the time to conquer the world within.²⁹

Powell as director of the Geological Survey created a division of the Yellowstone under geologist Arnold Hague to study and protect Yellowstone Park. Hague was instrumental in preventing the Northern Pacific Railroad from running a line through the northern section of the park on the pretext of opening the mineral veins in Cooke City, Montana. What the railroad actually wanted was the tourist business in the park. Hague defended the park to protect its unique natural attractions and, of more consequence to Hague, to preserve it as a wildlife refuge and as a watershed for the Snake and Yellowstone Rivers. Hague's efforts were rewarded in 1891 when President Harrison extended the boundaries of the forests surrounding Yellowstone enlarging the area for wildlife as well as the watershed.³⁰

Nature, in Ward's opinion, was the helpmate of art and culture. Isolated from nature or natural objects, man degenerated; proof for Ward existed in the cities which were producing an effete race. Modern forms of recreation, such as "outing" and "wheeling," did not solve the problem. The solution was to ruralize the population of the cities, to bring art and nature together. It was important to have children begin their early education with natural objects and lay the framework for their subsequent intellectual development. The strains of adulthood would not be as taxing if everyone realized that they were the children of the earth, the common mother of all life.³¹

Ward had been an avowed preservationist since joining the Potomac-Side Naturalists Club of Washington in 1873. As a botanist he produced "The Flora of Washington and Vicinity" and consequently urged the preservation of Rock Creek Park as a biologist's delight. Ward was thrilled by the winding streams bounded by hills and deep ravines and urged the citizens of Washington to have Congress save this ready-made park from the axe and plow. Frederick Law Olmsted subsequently used Ward's report to have Rock Creek preserved as a part of the Zoological Park of Washington.³² In 1899 Ward also investigated the Petrified Forests of Arizona at the request of Land Commissioner Binger Hermann. In 1895 the Legislature of Arizona had requested that the area be saved from vandals who were breaking up the petrified wood for souvenirs. The Armstrong Abrasive Company had even considered crushing the trunks for emery, until a Canadian company produced emery at a lower price than possible from the petrified wood. Ward recommended that Congress set aside the area before the fossils became as extinct as the buffalo. He wanted the area preserved for science and art, for the paleontologist and for the visitor whose appetite for culture the area might whet. Happily for Ward, President Theodore Roosevelt reserved the Petrified Forest as a National Monument in 1906.³³

McGee's interest in preservation appears to have been mainly scien-

tific. After the death of Powell, McGee resigned from the Bureau of Ethnology and in 1906 became the curator of the proposed St. Louis Museum. In seeking to build a collection for it, McGee supported a bill for the preservation of the ruins of Mesa Verde. McGee wanted Congress to provide for excavations and collection by educational and scientific institutions; he also wanted to protect the antiquities from vandalism and destruction. McGee's interest was genuine. He had spent years in the Bureau of Ethnology with Powell and was also the first white man to study the Tiburon Indians of Lower California.³⁴ McGee's museum effort, however, was abortive and he diverted his energies to other pursuits.

While in St. Louis, McGee became interested in the campaign to create a lakes-to-the-Gulf-waterway, a pet project of commercial and farm groups in the Midwest who were seeking a navigable waterway from the Gulf to Chicago. The complexity of the project struck McGee since he knew that development of the Mississippi River involved more than dredging a deeper channel. He drafted a plan for the river inspired by the philosophy of conservation he had developed working with Ward and Powell. McGee sought to persuade the advocates of the waterway that the Mississippi River was an integrated unit from its sources to its mouth. The river was a geologic agent, difficult to control by singular efforts.³⁵ He formulated comprehensive plans for the Mississippi River Valley adapted to the requirements of each state, section and city in the basin. Following his plan, engineers would construct works, designed at the same time for preserving forests, for conserving soils, for impounding potable waters, for developing waterpower, for reclaiming irrigable lands toward the western headwaters, for protecting the bottomlands bordering the main rivers and for canalizing all the larger waterways to make navigation safe and economical.³⁶

On March 12, 1907, McGee sent President Theodore Roosevelt a petition requesting the appointment of a waterway commission to study the Mississippi River in a comprehensive manner. McGee's timing was perfect; public support for the idea was strong in the Mississippi Valley and the Roosevelt administration was already seeking to centralize resource management. Roosevelt also seized the idea to quiet the demands of farmers and merchants in the valley. He was attempting to put out a brush fire started by the Army Corps of Engineers and Representative Theodore E. Burton of Ohio when they rejected part of the project. Burton was chairman of the House Rivers and Harbors Committee and an obstacle to "pork barrel" projects as well as to coordinated management.³⁷ McGee's plan also came at a time when Chief Forester Gifford Pinchot was consolidating the National Forest Reserves under his control in the Department of Agriculture and not only managing the forests but also regulating grazing and waterpower in the national forests. But the Reclamation Service created in 1902 directed irrigation work and the Army Corps of Engineers supervised navigation improvements. McGee's

idea provided a scheme for coordinating the existing resource programs conducted by separate governmental agencies. Roosevelt used McGee's idea to satisfy various political groups as well as to advance the conservation program and appointed an Inland Waterway Commission to study the waterways of the entire country.³⁸

McGee became the "brains" of the conservation movement, although neither McGee nor Pinchot claim originality in developing ideas on conservation. Ideas on forestry, irrigation and conservation had been fermenting for some time in the minds of other men, such as Charles Sprague Sargent, John Muir and George B. Grinnell. McGee helped Pinchot work out the logistics for the conservation movement, arranging the Conference of Governors which met in May, 1908 to launch the movement.³⁹ McGee also contributed the concept of comprehensive resource management; Roosevelt and Pinchot sought to implement the idea by giving it a moral and democratic tone and wedding it to progressivism. Protection of the public interest from special interests was a common refrain during the Roosevelt administration and conservation appealed to a public alerted to "malefactors of great wealth" and the dangers of a dwindling supply of timber. Opposition to monopoly was central to the thought of McGee, Powell, Ward and Marsh. McGee emphasized that the concentration of natural resources in the hands of monopolists was one of the greatest conservation problems.⁴⁰ In fact, McGee believed the conservation movement constituted a revolution precipitated after citizens realized that ravaged forests sacrificed streams. Awareness led to an inventory of resources and an analysis of their interrelations. Conservation also arose because citizens realized that they had turned over their heritage to a few men who had come to control the industrial and commercial destiny of eighty million Americans. In short, McGee saw it as a democratic revolution.⁴¹

Since his youth, Ward had abhorred privilege and erected a system of thought to counter the tenets in Social Darwinism that sanctioned monopoly. Ward feared that if a few men got control of natural resources they could extort tribute from the rest of mankind. Petroleum was already controlled by a single trust, and several railroad combinations had virtual control of the mining and sale of coal. Monopoly, said Ward, was aided and abetted by government which protected the strong. Ward would have the government protect society from crimes of cunning as well as crimes of passion.⁴² Both Powell and Marsh proposed institutions to prevent monopoly and speculation in land and water. Powell pointed out in 1896 that individuals held half of the irrigable land, 50,000,000 acres, for speculative purposes.⁴³ All wanted to unite science and government to manage natural resources for the public welfare.

The union of science and government appealed to progressives like Roosevelt and Pinchot. Both favored the use of scientific experts to gather facts and make impartial decisions about resource use. Progressives were alarmed over the influence of economic power in government as well

as the scarcity of resources. They assumed that a decision based on science would be impartial and in the public interest.

The efforts to coordinate science and government, however, were only partially successful. The efforts of Pinchot and Roosevelt to implement resource management failed when Congress rejected the coordination of resource management by an executive commission. States' rights, "pork barrel" projects and Congressional antipathy toward executive commissions colored the attitude of Congress toward coordinated resource management. The Army Corps of Engineers doubted the validity of the multiple-purpose approach to water management and opposed legislation to effect such a policy. Congress did approve a National Waterways Commission in 1909, but this legislative body did not undertake the comprehensive planning that McGee had proposed. An Inland Waterways Commission authorized in 1917 never functioned and Congress repealed the enabling act in 1920.⁴⁴ The Corps of Engineers and a number of congressmen and senators discouraged President Woodrow Wilson from appointing the commission. Even the informal arrangement for coordination that Roosevelt and Pinchot had worked out among the various governmental agencies fell apart during the Ballinger-Pinchot controversy.⁴⁵ Ironically, the Roosevelt administration was seeking Congressional approval of comprehensive planning while the scientific community was rejecting the synthetic view of Powell and McGee for a more analytic approach.⁴⁶ Multiple-purpose river development was not accepted until the thirties; the primacy of ecology in managing resource use came in the sixties.

The accomplishments of these early conservationists were considerable for immediate and long-range conservation efforts. Marsh's *Man and Nature* inspired Franklin B. Hough to write the recommendation for the American Association for the Advancement of Science which inaugurated federal concern for forest management in the Division of Forestry. Marsh also laid the broad framework for the study of ecology and society, but two generations of use and waste passed before conservationists began to appreciate him. Powell, Ward and McGee pioneered in guiding federal agencies to assume responsibilities for resource management. Ward cloaked the national government with authority to manage nature's store house for the general welfare and his studies of resource problems gave his advocacy of positive government a note of authority. Powell drafted plans which if carried out would have demonstrated the new approach to resource use. His *Report* of 1878 brought about the creation of the United States Geological Survey and as director he guided studies which eventually led to modifications in land and water use. His ideas and policies laid foundation for the Reclamation Act of 1902 and the Taylor Grazing Act of 1934. But it was McGee who tied forestry, soil and water conservation together in an ecological fabric. A solid geologist and an expert hydrologist, McGee saw a river and its watershed as an ecosystem. He seized the political movement for naviga-

tion and flood control as a vehicle for achieving his idea, and his actions possibly transmitted the beliefs of the trio into the Twentieth-Century conservation movement.

Congress rejected the initial efforts to implement a new conservation policy, but environmental problems have returned conservationists to the ecological idea time and again. As in 1900 society has again recognized the finite nature of natural resources and the delicate balance of ecosystems. Whereas the first conservation movement wanted to check the depletion of certain resources, such as timber and soil, by working with nature, the "new conservation" movement saw threats to the entire environment. Industry and technology were creating pollutants of air, water and soil, the very fabric of the food chain. The environment, leaders realized, was as finite as specific resources. All was one web of life. Hence the "new conservation" movement breathed new life into the efforts to maintain a balance in nature; university ecology centers have replaced the closed-shop division of academic disciplines with an eclectic approach; and interdisciplinary work has encouraged the movement of studies into the field to confront the social and political ramifications of resource problems. The "new conservation" movement has conceived anew the idea of the scholar-citizen who relates his knowledge to community needs. Rekindled, the spirit of Marsh, Ward, Powell and McGee guides the new movement.

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footnotes

1. Numerous articles and monographs have dealt with the origins of the conservation movement see Henry Clepper, ed., *Origins of American Conservation* (New York, 1966); Gifford Pinchot, "How Conservation Began in the United States," *Agricultural History*, XI (October, 1937), 255-265; also note three essays in Ian Burton and Robert W. Kates, eds., *Readings in Resource Management and Conservation* (Chicago, 1960): Clarence J. Glacken, "The Origins of the Conservation Philosophy," 158-163; Charles R. Van Hise, "History of the Conservation Movement," 179-185; and Grant McConnell, "The Conservation Movement—Past and Present," 189-201; Samuel P. Hays, *Conservation and the Gospel of Efficiency, The Progressive Conservation Movement, 1890-1920* (New York, 1969), 1-26, 261-276. The following monographs and periodicals have indicated the impact of these individuals on the conservation movement. The career and accomplishments of Marsh are recorded by David Lowenthal's *George Perkins Marsh, Versatile Vermonter* (New York, 1958) and Franklin Russell, "The Vermont Prophet: George Perkins Marsh," *Horizon*, X (Summer, 1968), 17-23. The most valuable works on the work of John Wesley Powell are the following: Wallace Stegner, *Beyond The Hundredth Meridian, John Wesley Powell and The Second Opening of the West* (Boston, 1954); Thomas G. Manning, *Government in Science, The U.S. Geological Survey, 1867-1894* (Lexington, Kentucky, 1967). The best analysis of McGee's contribution is Whitney R. Cross's, "W J McGee and the Idea of Conservation," *Historian*, XV (Spring, 1953), 48-162; also of value is Gifford Pinchot's *Breaking New Ground* (New York, 1947), 319-360. The connection between the thought of Lester Frank Ward and the conservation movement merits closer scrutiny. His activities and ideas on conservatives are recorded in his *Glimpses of the Cosmos* (6 vols.; New York, 1917). Brief summaries of the contributions of Marsh and Powell as well as other leaders in the conservation movement can be found in Douglas H. Strong, *The Conservationists* (Menlo Park, 1970), 29-64. Frank E. Smith in his general history of *The Politics of Conservation* (New York, 1966), 55-109, notes the influence of Powell and McGee. Stewart L. Udall in *The Quiet Crisis* (New York, 1970), 81-109, a history of conservation, emphasizes the contributions of Marsh and Powell.

2. The following works helped launch the ecology movement of the 1960's: Barry Commoner, *Science and Survival* (New York, 1967), Rachael Carson, *Silent Spring* (Greenwich, 1970), Paul R. Ehrlich, *The Population Bomb* (New York, 1968), Aldo Leopold, *A Sand*

County Almanac (New York, 1949). Donald Fleming's "Roots of the New Conservation Movement," *Perspectives in American History*, VI (Cambridge, Massachusetts, 1972), 7-91, traces the growth of the new conservation movement.

3. Lowenthal, 9, 17.
4. Stegner, 11-15. Stegner's biography is a sympathetic account of Powell's career and his attempts to change the land and water laws of the arid region only to be frustrated by the "myth of the garden."
5. Samuel Chugerman, Lester F. Ward, *The American Aristotle* (New York, 1965), 24-28; Ward, *Cosmos*, V, 31-32.
6. F. W. Hodge, "W J McGee," *American Anthropologist*, n.s. (October-December, 1912), 683; Washington, D.C. Academy of Sciences, *The McGee Memorial Meeting of the Washington Academy of Sciences*, held at the Carnegie Institution, Washington, D.C., December 5, 1913 (Baltimore, 1916), 91-92.
7. Lowenthal, 17, 26-28; George Perkins Marsh, *Man and Nature*, David Lowenthal, ed. (Cambridge, Massachusetts, 1965), x-xiii; Russell, 17.
8. Stegner, 11-19, 114, 248; Ward, *Cosmos*, II, 426-431; M. D. Lincoln, "John Wesley Powell," *Open Court*, XVI (December, 1902), 705-713; M. D. Lincoln, "John Wesley Powell: The Professor," *Open Court*, XVII (February, 1903), 86-94.
9. Autobiographical sketch in W J McGee Papers, Library of Congress; Cross, 150; Pinchot, 360.
10. Chugerman, 29; Ward, *Cosmos*, I, 177; IV, 72; V, 31-32; Richard Hofstadter, *Social Darwinism in American Thought* (New York, 1959), 68-69; John W. Powell to Lester Frank Ward, August 12, 1882, U.S. Geological Survey, Letters Sent, 1879-1895, National Archives.
11. William Culp Darrah, *Powell of the Colorado* (Princeton, 1951), 280-282, 322.
12. Cross, 155.
13. Lowenthal, 14, 252; Russell, 18; Marsh, 38.
14. Marsh, 96; Lowenthal, 258-59.
15. Lowenthal, 306-307.
16. John Wesley Powell, *Report on the Lands of the Arid Region of the United States, With a More Detailed Account of the Lands of Utah*. Wallace Stegner, ed. (Cambridge, Massachusetts, 1962), 16-56; Stegner, 214-227.
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46. Cross, 152-53.