

Robert F. Legget

A PROPHET OF CONSERVATION

"IT IS TIME for some abatement in the restless love of change which characterizes us, and makes us almost a nomad rather than a sedentary people. We have now felled forest enough everywhere, in many districts far too much. Let us restore this one element of material life to its normal proportions, and devise means of maintaining the permanence of its relations to the fields, the meadows, and the pastures. . . . The establishment of an approximately fixed ratio between the two most broadly characterized distinctions of rural surface—woodland and ploughland—would involve a certain persistence of character in all the branches of industry . . . and would thus help us become, more emphatically, a well-ordered and stable commonwealth, and, not less conspicuously, a people of progress." This reads like a tract for the times, apart perhaps from that slightly archaic reference to "rural surface", but the quotation is from a book that was published just over one hundred years ago. Centenaries of historical events, of great scientific discoveries, of the births and deaths of famous men, are a part of our social fabric. May not the appearance of a book be similarly marked, one hundred years later, particularly when the book carried a message that is as much needed today as when first it appeared, a message that has been all too long neglected despite the ringing terms in which it was advanced.

The Earth and Man was the title of a massive, well-printed volume that appeared on the shelves of booksellers in New York and London in 1864. Its author had dated his introductory note on the first day of December, 1863, but the book was actually published some months later by Charles Scribner at 124 Grand Street, New York, having been printed by John J. Trow, "Printer, Stereotyper and Electrotyper." Some indication of the reception it received is given by the fact that it was very soon translated into Italian and an Italian edition appeared in 1870. Even before this, however, the author had assembled more information on his subject and so was able to publish an

enlarged and amended edition in 1867. A third edition appeared in 1874, and a final and posthumous edition in 1886. English editions were published by Sampson Low, Marston, Low, and Searle, publishers of Fleet Street, London. The later editions were given a broader title—*The Earth as Modified by Human Action*—but despite the change in title, they are basically the same as the original book. In a note that appears in the last edition, upon which the author was working on the day of his death, in his eighty-sixth year, he said that “on the whole . . . it will be seen that the author’s general conclusions remain unchanged and his conviction of the vital importance to the future of our need of a wiser economy . . . in the use of Nature’s gifts was only deepened and strengthened by the study and observation of every additional year of his life.”

The author addressed himself “not to professed physicists, but to the general intelligence of observing and thinking men.” His success in attaining this objective is well shown by the ease with which the book may be read today, its occasional Victorian overtones being of small moment as the argument and theme of the work are logically developed with an abundance of illustrative material. The purpose of the author, he says, is to make practical suggestions rather than to “indulge in theoretical speculations more properly suited to a different class from that for which I write.” His theme is well set out in the pithy opening chapter in which he discusses the fact that “Nature, left undisturbed, so fashions her territory as to give it almost unchanging permanence of form, outline, and proportion, except when shattered by geologic convulsions. . . . But man is everywhere a disturbing agent . . . man alone is to be regarded as essentially a destructive power, [wielding] his energies to resist which Nature is wholly impotent . . . and as he advances in civilization, he gradually eradicates or transforms every spontaneous product of the soil he occupies.”

These are strong words, but even a century ago it was possible to assemble evidence that gave every warrant for their use. The physical decay of the Roman Empire is shown to have been closely linked with soil depletion and soil erosion. The devastation of the once fertile lands of Persia is well documented and the decadence of Spain is attributed to the destruction of her forests with consequent economic distress, this view being supported by a significant quotation from Rentzsch, a German authority of the time. The depletion and necessary protection of forests is the major topic of the volume, “*The Woods*”, the third of six chapters, being 249 pages long. Depletion of groundwater also receives lengthy attention, and “*The Sands*”, the third longest chapter, is a

treatment of the encroachment of sand dunes and their control in many parts of the world. Following the short introductory chapter is a singularly interesting and disturbing discussion of the "*Transfer, Modification and Extirpation of Vegetable and Animal Species*". That it was possible a century ago to describe the extinction of natural species as a result of man's actions may be today surprising. What is far more disturbing is the number of species that have become extinct since this book was published, and this despite its clear warnings. A final short chapter deals with "*Great Projects Proposed and Accomplished*", a tribute to the ingenuity of man and a visionary statement about possibilities for great engineering works that the author even then fore-saw, such as the use of the great Libyan depression, a project now under discussion once again. On the other hand, in one of the very few blind spots that cloud the author's vision, the idea of constructing a canal across the Isthmus of Panama is dismissed as quite impossible.

The volume contains a list of about two hundred references, almost all being to books, and the list includes publications from ten different countries. There are frequent references in the text to practices and historical events in twenty-five countries around the globe. These references give the impression that the author has visited many of the countries, and certainly all the Western lands, that he mentions. Such an indication of wide travel would be unusual even today; a century ago it pointed clearly to a most remarkable man as the author of this fascinating volume. George Perkins Marsh was indeed a remarkable man.

Marsh was born in Woodstock, Vermont, on March 15, 1801, and lived to be 85. He graduated from Dartmouth College in 1820, and was called to the bar in 1825. He practised law in Burlington, Vermont, but felt the call to politics, serving as a Whig representative to Congress from 1843 to 1849, having previously been a member of the Supreme Executive Council of the State of Vermont. He was then appointed United States Minister resident in Turkey. In 1854 he returned to Vermont and his law practice, but in 1861 he went back to diplomatic life, being appointed in that year as the first United States Minister to the Kingdom of Italy. In these days of two- and three-year postings, it is remarkable to find that Marsh remained as Minister in Italy until his death on July 23, 1882. He passed away at Vallombrosa in the country to which he had become so greatly attached.

Marsh can well be described as an American version of the universal man. He was an able linguist and a remarkable philologist for his time, speaking German "like a brick" (so it was reported) and publishing an Ice-

landic grammar in 1838. His philological studies are reflected in the elegance and delights of the language he used in the volume under review. His vocabulary is wide-ranging but singularly modern to a reader of the nineteenth-sixties. "Enginery" is one of the very few unfamiliar words to be found in it, a slightly derogatory term used to embrace the various works of the engineer. His interests, however, ranged far and wide, one of his several books being *The Camel; his Organization, Habits and Uses, with Reference to his Introduction into the United States* (1856). That word "Organization" is attractive.

He was a prodigious worker, always rising to write at five in the morning, winter and summer, and always keeping six books on his table at once, never reading in any one of them for more than an hour at a time. It is recorded that in Congress he and John Quincy Adams developed the art of sleeping through uninteresting speeches but of being able to wake immediately on hearing the Speaker's gavel, in this way being able still to rise early every morning. He met Agassiz, and—when once in Venice—the Brownings. He assembled a collection of unusually good engravings, presenting them eventually to the Smithsonian Museum. It is, however, his great work on the conservation of renewable resources that demonstrates so fully his wide knowledge and scholarship, even as it so clearly shows the clarity of his vision.

He must have been a most astute observer; indeed, his book suggests on many pages that his deep-seated concern for man's despoiling of the surface of the earth was derived in no theoretical manner but as a direct result of his own observations during his many travels. "The power most important to cultivate, and, at the same time, hardest to acquire (for the natural philosopher)", he says near the beginning of the book, "is that of seeing what is before him. Sight is a faculty; seeing, an art." Such happy phrases make the reading of the book a delight as well as an inspiration. "Self is the schoolmaster whose lessons are best worth his wages" is another typical example from a neighbouring page. But it is emphasis upon accurate observation that runs like a refrain throughout the entire volume and which gives it such an eminently practical tone.

In discussing, for example, the minute organisms to be found in soil, the importance of which Marsh fully realized, he has this to say: "The soil on which the city of Berlin stands, contains, at the depth of ten or fifteen feet below the surface, living elaborators of silex; and a microscopic examination of a handful of earth connected with the material evidence of guilt has enabled the naturalist to point out the very spot where a crime was committed." And this was fifty years before Sir Arthur Conan Doyle fascinated his readers, in

like vein, with the exploits of Sherlock Holmes. This is but one of many of Marsh's ideas that are so far ahead of their time as to be almost visionary. The use of groundwater for air conditioning is another example. "An equally bold speculation", he says—and how bold a speculation it then was—"founded on the well-known fact that the temperature of the earth and of its internal waters increases as we descend beneath the surface, has suggested that artesian wells might supply heat for industrial and domestic purposes, for hothouse cultivation, and even for the local amelioration of climate." Strangely, he was unable to understand the action of true artesian wells, his use of the term in the passage quoted being not literally correct. But the fertility of his thinking is shown by such pithy comments as he makes, for example (in his discussion of the flooding due to rivers), on the possibility of reducing floods on the Mississippi River by cutting through major bends with new channels, a solution to the Mississippi problem that was not to be adopted for another sixty years.

It is not improbable that, were this rugged gentleman of Vermont alive today, he would be among the supporters of those who wish to see action result from the recently published Report of the Surgeon General of the United States on the dangers of smoking; for, in discussing the interchange of plants between Europe and America, he says that he wishes he "could believe, with some, that America is not alone responsible for the introduction of the filthy weed, tobacco, the use of which is the most vulgar and pernicious habit engrafted by the semi-barbarism of modern civilization upon the less multifarious sensualism of ancient life; but the alleged occurrence of pipe-like objects in old Sclavonic, and, it has been said, in Hungarian sepulchres, is hardly sufficient evidence to convict those races of complicity in this grave offence against the temperance and refinement of modern society."

It is, however, in relation to the measures to be followed in conserving renewable natural resources that Marsh's words have their most modern ring. He stresses the vital importance of forests: "in well-wooded regions, and in inhabited countries where a due proportion of soil is devoted to the growth of judiciously distributed forests, natural destructive tendencies of all sorts are arrested or compensated, and man, bird, beast, fish, and vegetable alike find a constant uniformity of condition most favourable to the regular and harmonious coexistence of them all. . . . But the vengeance of nature for the violation of her harmonies, though slow, is sure, and the gradual deterioration of soil and climate in such exceptional regions is as certain to result from the destruction of the woods as is any natural effect to follow its cause."

He knew well the importance of keeping cattle out of woodlots, a con-

servation measure that has still to be urged ceaselessly, despite such inducements as tax concessions for enclosed woods. Here is what Marsh said, a century ago: "But probably the most important of all rules for the government of the forest, whether natural or artificial, is that which prescribes the absolute exclusion of all domestic quadrupeds, except swine, from every wood that is not destined to be cleared. No growth of young trees is possible where horned cattle, sheep, or goats, or even horses, are permitted to pasture at any season of the year, though they are doubtless most destructive when trees are in leaf." Tree belts? These, too, he extols, remarking that they were just being introduced in western railroad construction. And limiting land clearing? "It is evidently a matter of the utmost importance that the public, and especially landowners, be roused to a sense of the dangers to which the indiscriminate clearing of the woods may expose not only future generations, but the very soil itself."

There is no major phase of modern conservation measures that is not dealt with lucidly and emphatically in this remarkable book. To detail all of them would be tedious, but contour plowing and terracing on sloping land may be briefly mentioned, since Marsh knew the value of both. He refers to French conservation practices and notes that "among them is one which has long been favourably known in our Southern States under the name of 'circling'; and the adoption of which in hilly regions in other States is to be strongly recommended." Referring to what he had seen on the Swiss as well as the Piedmontese slopes of the Alps, he says that "in dry climates, ploughland and gardens, on hilly grounds require terracing, both for supporting the soil and for administering water by irrigation . . ." In Palestine, he had observed what happens when terracing is not properly maintained and seen that when "the terrace walls had fallen down there was no longer water for irrigation in summer, the rains of winter soon washed away most of the thin layer of earth upon the rocks, and Palestine was reduced almost to the condition of a desert." How happy Marsh would be to see what the Israeli people are doing today to restore their terraced slopes, especially in the vicinity of Jerusalem, even though it is a century after he wrote.

These references to other lands are an indication of the breadth of Marsh's interests. He has, for example, several references to the complex physical problem of thermal transfer at ground surface under varying conditions of cover, a matter that even today is still under active study by physicists. He knew the potential of what he calls "pisciculture" and could appreciate the harvest that would eventually be won from the sea, hoping that it will one day become a "regular branch of rural industry." It is of more than passing interest

to find that Marsh had read *The Origin of Species* by the time his own third edition was published (1874), including in it several references to Darwin's book and also to Lyell's *The Antiquity of Man*, so closely allied to Darwin's better-known work. In one of the most interesting of his many footnotes Marsh gives a quotation from Pliny (*Nat. Hist.*, Bk. xix, c. 5) which, he says, may not have been cited in connection with the Darwinian theory but which is certainly relevant. But he wears all his learning lightly, never pretending to be more than a good observer—and advocate! Indeed, he says that "Natural science has become so vastly extended, its recorded facts and its unanswered questions so immensely multiplied, that every strictly scientific man must be a specialist, and confine the researches of a whole life within a comparatively narrow circle." And that was written one hundred years ago.

It is in the footnotes to the later editions of *Man and Nature* that one can almost see this mercurial and brilliant mind at work. Not only did he read voraciously, his list of references extending to almost four hundred in the final edition, but he must have been a note-taker extraordinary. As he re-read his own book, a mere word would be enough to set him off recording fresh ideas and citing new facts, sometimes to the extent of a full page of small type. As one starts to read, say, the third edition of the old book, one is at first irritated by the regular distraction caused by the footnotes that appear on almost every page. Gradually, however, their fascination takes over and one joins in spirit this inspired author who was so desperately anxious to show that the whole world, and innumerable authorities, supported his plea for the conservation of natural resources. By the time one has reached the end, it is hard to realize that of the 644 pages of text the equivalent of at least 200 pages consists of footnotes; taking the size of type into consideration, one can say that the footnotes almost equal the text itself.

The temptation to dip into this fund of miscellaneous information is great. He refers to such modern ideas as the use of solar radiation for heating and to the artificial production of rain, generally thought of as developments of this century. He quotes from Christopher Columbus on trees, implying that, in addition to all else, Columbus was the first to suggest that forests promote precipitation. He endorses the metric system, quite naturally, saying that the "French metrical system seems destined to be adopted throughout the civilized world." But he then proceeds to point out that a slight variation in the original concept of the system would have given a unit of about sixteen inches which "would have been much better adapted to universal use than so large a unit as the metre." He even manages to work in, quite appropriately,

the fact that one of his authorities had "seen an Egyptian barber shave the head of an Arab with a flint razor."

Small wonder that such an encyclopaedic work would attract the attention of other writers not as industrious as George Marsh, presenting to them the temptation to use some of Marsh's material. On this, too, there is a characteristic comment, the plagiarist being a German author who, even at this date, may be left in anonymity. After giving the reference to an exposition on the way in which rock weathers to soil, the footnote concludes: "I take this occasion to acknowledge my obligations to this author for assuming the responsibility of many of the errors I may have committed in this chapter by translating a large part of it from a former edition of the present work and publishing it as his own." In those days one had to be philosophical about plagiarism. Marsh has earlier consoled himself with an interesting quotation from Babinet accusing the great Bernard de Palissy of plagiarizing him! Palissy is yet another of the authors with whose works Marsh shows himself to be quite familiar. This is the more remarkable since until quite recently Palissy has been regarded as one of the early scientific writers whose works had been lost to sight since shortly after their deaths, in this case since about 1600.

The tragic aspect of all this is that although other writers were anxious to copy Marsh's words and adapt them as their own, nobody was willing to emulate his enthusiasm and his ideas concerning the conservation of the natural resources of North America, with results with which all readers will be familiar. What might have been the situation today, in Canada as well as in the United States, if only these words had been given heed? "But the comparative exemption of the American people from the terrible calamities which the overflow of rivers has brought on some of the fairest portions of the Old World, is, in a still greater degree, to be ascribed to the fact that, with all our thoughtless improvidence, we have not yet bared all the sources of our streams, not yet overthrown all the barriers which nature has erected to restrain her own destructive energies. Let us be wise in time, and profit by the errors of our older brethren!"

Although he was an idealist, not starry-eyed but with his feet well planted on the soil which he tried so hard to conserve, George Perkins Marsh never lost sight of the strictly economic aspect of the measures he advocated so eloquently. This is well shown in one last quotation which must bring this review to an end, words which could well be remembered a century after they were written by all who have the future well-being of this land at heart: "The

cost of one year's warfare—or in some countries of that armed peace which has been called 'Platonic war'—if judiciously expended . . . would secure, to almost every country that man has exhausted, an amelioration of climate, a renovated fertility of soil, and a general physical improvement which might almost be characterized as a new creation."

GARDENER

John Savio, Jr.

His slim brown hands
Clipped the roses.
A curve of thorns grabbed
And held a red petal he fingered,
While mind moulded it to memory:
A sunset, grim as granite, hanging
Ripe as apples from a Philippine skyline.

This earth: brown as autumn,
The colour of Maria's eyes;
Brown as fresh graves holding down
Once restless loving hands.
He flipped a leaf and listened
As his god consoled him in tones of green.

The woman looked from the window.
She wriggled a fur-draped shoulder.
"I just hired him a week ago; look.
He's just like a machine, with never
A thought of love or beauty—
I simply can't understand how
He does such a marvellous job."