moral causes were decisive. Achilles heels in climatic theory now opened up exciting possibilities. Why not compare a people at one period of its history with another period? When such comparisons were made, peoples living in similar environments turned out to be brave and weak, creative and indolent. Climatic theories also stimulated inquiry, as had the abbé du Bos, into the unequal distribution of talent and the clustering of genius in different eras, a fact already noticed in the ancient world. Historical study became a direct challenge to generalizations derived from physical causes.

Chapter 13

Environment, Population, and the Perfectibility of Man

1. Introduction

In the eighteenth century another idea, distinct from older orthodox theories of environmental influence, commanded attention: the earth itself sets limits to population growth and to human well-being and hence to human aspirations and achievement. One might call it the idea of closed space, a much-discussed subject since the end of World War II. The best of the vast new tracts that opened up after the age of discovery, it is so argued, have now been taken up, and mankind once again is faced with the limiting factors of the physical environment regardless of ameliorations possible through social institutions, applied science, and the like.

What are the roots of this idea? It is hard to say. In my opinion it can be traced to the principle of plenitude.[1] The principle emphasized, as we have

[1] See above, pp. 5–6, and Lovejoy, *The Great Chain of Being*, p. 52.

seen, the richness, fullness, and variety of being, and thus indirectly the fecundity of nature. Basically this principle may have originated in nothing more complicated than observations that a piece of ground which has been cleared will soon, unless closely attended, have fresh and vigorous plant life, that some animals like the rabbits, and insects have great reproductive power, that there are few vacant places in nature, and if there are some, they are soon filled up. Linnaeus remarked that three flies will consume the carcass of a horse as quickly as a lion can.[2] Life has the capacity to swell out to its limits, and the multiplication of individual organisms will be arrested only by the competition of other organisms or by the limitations on life imposed by the physical environment; these general ideas too could have originated in common observation such as the consumption of plants by animals, the preying and the preyed upon in the animal world, the destruction of both by violent storms or other forms of natural catastrophe.

In Western civilization one of the distinctive characteristics of the history of thought regarding animate nature is its emphasis on fecundity, the potentiality of life for expansion and multiplication both of individuals and in bulk. Buffon often mentioned this characteristic of life: nature had a greater bias toward life than toward death. Such was life's power of procreation that the whole earth could easily be covered with a single species, and nature would know no limits to the production of organized bodies if her progress were not obstructed by matter not susceptible of organization.[3] Franklin had said that such was the reproductive power of plants and animals that had the face of the earth no plants, it could easily be "overspread" with one kind only, like fennel, or had it no inhabitants, it could easily in a few ages be replenished from one nation only, the English.[4] And Malthus, in a dramatic illustration which drew the anger and ridicule of his critics, said that the human race, if its growth were unimpeded by checks, could fill not only the earth "so that four should stand in every square yard" but all the planets of the solar system and the planets revolving around the visible stars.[5] Darwin, following Malthus in an enthusiastic tribute to fecundity, said that even the elephant, "the slowest breeder of all known animals," could, if unchecked, stock the world in a few thousand years.[6] These patently absurd extravagances (how could one species alone fill up the earth, existing to the exclusion of

[2] Cited by J. Arthur Thomson, *The System of Animate Nature*, Vol. 1, pp. 53–54. I have been unable to find this statement in Linnaeus' writings.

[3] See Count Buffon, "De la reproduction en général," being chap. 2 of the "Histoire Générale des Animaux," in *HN*, Vol. 2 (1749), pp. 37–41.

[4] "Observations concerning the Increase of Mankind and the Peopling of Countries," [1751], in *The Writings of Benjamin Franklin*, ed. Smyth, Vol. 3, pp. 63–73, par. 22, p. 71.

[5] *Principles of Political Economy*, pp. 227–228.

[6] See *The Descent of Man*, Modern Library ed., chap. 2, p. 430; the discussion of "Rate of Increase" is based almost entirely on Malthus, as is chap. 2 of the *Origin of Species*, "Geometrical Ratio of Increase," *ibid.*, pp. 53–54.

all others? how could elephants feed except on other elephants?) were clearly meant to dramatize two general observations: the prodigious capacity of populations to increase their numbers, and the fact that they do not. Barriers, perhaps physical, perhaps of other forms of life, prevent any single species from realizing its potential.

The idea that the environment sets limits to the expansion of life seems to appear after the age of discovery.[7] As we have seen, Botero compared the virtue generative of men to virtue nutritive of cities (see p. 373). Sir Walter Raleigh, whose account of the increase and dispersion of the human race was inspired by Old Testament history, who saw the "sun's travaille" from tropic to tropic as an evidence of design, observed,

> For let us now reckon the date of our lives in the Age of the World [in contrast with the first age when lives lasted 800 or 900 years]: wherein if one exceed 50. yeeres, tenne for one are cut off in that passage, and yet wee find no want of people; nay, wee know the multitude such, as if by warres or pestilence they were not sometimes taken off by many thousands, the earth with all the industrie of man could not give them food. What strange heapes then of soules had the first Ages, who enjoyed 800. or 900. yeeres, as aforesaid?[8]

Sir Matthew Hale also made exhaustive lists of the checks to the multiplication of many kinds of life (pp. 403–405). The checks mentioned in these and similar statements attain the dignity of being necessary parts of the Creator's design.

It was clear, therefore, that the fecundity of life had overcome the decimations of war, plague, and unhealthful environments. Otherwise mankind would be extinct. Nature could not produce enough food for all the life it was capable of creating, and checks to growth were part of the natural order. Hunger, misery, predation, among all forms of life, were proof of this insufficiency.

2. On the Populousness of Ancient and Modern Nations

Furthermore, the controversy over the populousness of the ancient and modern worlds, part of the broader controversies over senescence in nature and the relative superiority of the ancients and the moderns, showed the necessity of critically examining the evidence in order to unravel the history of population. If there were in fact a senescence of nature, one would expect smaller populations with the aging of the earth, and if classical civilization

[7] What follows is in no sense even a summary of population theories. On these see Bonar, *Theories of Population from Raleigh to Arthur Young*; Fage, "La Révolution Française et la Population," *Population*, 8 (1953), pp. 311–338; Mombert, *Bevölkerungslehre*; Spengler, *French Predecessors of Malthus*; and Stangeland, "Pre-Malthusian Doctrines of Population: a Study in the History of Economic Theory," in *Columbia University Studies in History, Economics, and Public Law*, Vol. 21, No. 3, 1904.

[8] *The History of the World*, Bk. I, chap. 8, sec. 11, 5, pp. 158–159.

a friend about it that stimulated him to write his 1798 *Essay*.[40] Indignant with Wallace for abruptly abandoning belief in the perfectibility of man in favor of a pessimism which saw in continued progress in government and in civilization only misery for the human race, Godwin reached, from different premises, conclusions similar to Condorcet's regarding progress and environmental limitations which might impede or prevent it. With deep faith in the existence of a natural harmony and equilibrium in all nature, Godwin abhorred governmental interference; he also was suspicious of social institutions.[41]

To Godwin the earth's resources offered no obstacles to the perfectibility of man; the idea of progress could be believed in with confidence.

> Three-fourths of the habitable globe, are now uncultivated. The improvements to be made in cultivation, and the augmentations the earth is capable of receiving in the article of productiveness, cannot, as yet, be reduced to any limits of calculation. Myriads of centuries of still increasing population may pass away, and the earth be yet found sufficient for the support of its inhabitants. It were idle therefore to conceive discouragement from so distant a contingency. The rational anticipations of human improvement, are unlimited, not eternal. The very globe that we inhabit, and the solar system, may, for anything we know, be subject to decay. Physical casualties of different denominations, may interfere with the progressive nature of intellect. But, putting these out of the question, it is certainly most reasonable, to commit so remote a danger to the chance of such remedies, (remedies, of which perhaps we may, at this time, not have the smallest idea) as shall suggest themselves, at a period sufficiently early for their practical application.[42]

On the other hand, the Malthusian theory, considered as a theory of resource use, denied that solutions to economic and social well-being can be found in the social world alone, ignoring the limitations of an environment which can and does set limits to human achievement.

The idea of progress had opened up new perspectives in interpreting the nature of the physical environment. These perspectives had been seen by Leibniz, who found progress in the cultivation of the earth accompanying progress in human affairs as well (see p. 377). Even to the lukewarmly religious it must have seemed that it was the Creator's purpose that men and their institutions improve in time; that a deity with such a purpose would be niggardly neither with the food nor with the pleasures He set before the human race. Man's progress was clear in the many beneficial changes already made on the earth's surface, in his control of nature, in his adaptation of the entire planet to his needs and desires, and in his thirst for knowledge and wisdom. Such ideas were held also by men hostile to organized religion. This humane spirit, this faith

[40] See Malthus's preface to the 1798 *Essay*.
[41] *Enquiry Concerning Political Justice*, Bk. 8, chap. 9, Priestly ed., Vol. 2, pp. 515–516.
[42] *Ibid.*, pp. 518–519.

in man and his ability to achieve goals and improve himself, suffuse the work of Condorcet, whose "Sketch" make poignant reading today because the technical mastery that Condorcet had hoped for has been achieved to a degree undreamed of by him, indeed, undreamed of by hundreds of millions less than twenty-five years ago, without that parallel progress in other phases of human existence he also assumed would occur. The idea of progress implied concomitant improvement in agriculture, soil fertility, drainage, and health measures. It did not envisage permanent deterioration of soil and forest; it supplied the all-enveloping optimism regarding the capacity of the earth to support its peoples. In its emphasis on human amelioration, the environment often seemed to become more and more abstract. It is a situation not unknown in the social sciences today.

4. On the Malthusian Principle of Population in General

Seventeenth and eighteenth century writers on population had shown the historical relationship of population theory to the Christian religion, to the idea of progress, and to the physical environment; in Malthus these threads were woven into a cohesive whole which neither defenders nor detractors forgot. Malthus easily excelled his predecessors in this fresh attempt to show the environmental limitations which men must understand and accept. He was not interested in showing how environments mold culture (ideas of this kind gleaned perhaps from Humboldt and others do occasionally appear in his writings) nor to any extent in how human cultures have modified the environment. Few men in the history of Western thought have exerted an influence comparable to his; this was based on his own ideas and the researches he undertook for editions following the first essay, and on the skill with which, in his forceful writings, he combined ideas which individually by now had become quite familiar. His ideas, brought into biology by Darwin and Wallace, reentered the world of men through the social Darwinism of the late nineteenth century. Towering figures of nineteenth century thought, like August Comte and Herbert Spencer, have become indistinct in the twentieth century; they lack the freshness and interest of Malthus, although it must be acknowledged that the revival of interest in his writings is due to widespread alarm over population growth, even if what Malthus had to say on these subjects is of little relevance to the present.

Malthus's doctrine is based on two general ideas: the fecundity and plenitude of life, and the forces in nature (in life and in the inanimate world) which constantly are at work controlling this relentless expansiveness. All living things have a tendency to increase geometrically if their multiplication is uninterfered with and if there is sufficient food for them. They do not increase

in this manner either under natural conditions or under man's control because other forms of life or environmental controls prevent it. Living things under man's control are subject to the hazards of man's neglect or his inability to provide good soils or pasture. The same principles apply to man, but owing to long settlement in populated areas, their operation is not clearly apparent. A relatively unoccupied country like the United States provides the example of what can be expected of a small population in a large area of plentiful food, despite the fact that it is not an ideal example because of disease and hardships common there. In no country, in no state of society known, "has the power of population been left to exert itself with perfect freedom."[43] The amount of food for human populations is subject to unavoidable limitations; good lands are not available in abundance, and when all are occupied, providing the world's food will become increasingly difficult. Furthermore, machinery and invention are less likely to produce spectacular improvements in agriculture than in industry and manufacturing. With the exception of famine conditions, food is never an immediate check to population; customs, which Malthus apparently thinks are fears transformed into folk tradition, disease, and all causes "of a moral or physical nature, which tend prematurely to weaken and destroy the human frame" are the immediate checks.[44] Since the principle of population is a law of nature, it is constant in its operation; it is wrong to think it a theory of overpopulation, to represent the difficulties as arising "at a great and almost immeasurable distance," to think that it operates geographically, with more intensity, for example, in India or China than in Europe.[45]

Human institutions, customs, ideals, may alleviate conditions somewhat but they too must bow to natural law. This insistence on the principle being a natural law earned Malthus the enmity of men who saw in human institutions, economic systems, fossilized custom, sufficient causes of the miseries of mankind. Human institutions, Malthus wrote in answer to Godwin, "appear to be, and indeed often are, the obvious and obtrusive causes of much mischief to society, they are, in reality, light and superficial in comparison with those deeper-seated causes of evil which result from the laws of nature and the passions of mankind."[46] Permanent improvement is possible only from a lowered birthrate. Malthus opposed artificial birth control as an unwarranted and perhaps dangerous interference in natural processes. In Condorcet's allusions "either to a promiscuous concubinage, which would prevent breeding, or to something else as unnatural," Malthus saw destruction of "that virtue and

[43] Vol. 1, p. 7.
[44] Vol. 1, p. 12.
[45] Vol. 2, p. 1. Many variants—among them, that the principle of population acted in the past; that it applies only to certain geographical areas; that it will operate only in the future—are foreign to Malthus's thought. On this point, see Mombert, *Bevölkerungslehre*, pp. 199–200, 204.
[46] Vol. 2, p. 12.

purity of manners which the advocates of equality and of the perfectibility of man profess to be the end and object of their views."[47]

National or even local conditions might show the principle erroneous, but Malthus thought such a conclusion to be based on a partial view. The whole earth is the proper unit for study: It could not have been peopled nor could its population have been replenished when decimated by war, natural catastrophe, disease, without that spur of necessity caused by the constant tendency of a population to increase up to the limits of the food available to it. The principle of population is responsible for the geographic distribution of mankind on earth. The spur of necessity had prevented a concentration of population on the world's best lands, while the rest remained deserted.[48]

Malthus likened the earth variously to a closed room, to an island, and to a reservoir. The closed-room metaphor was intended to show the irrelevancy to the principle of population of the argument that there was no population problem as long as large areas of the world were still uninhabited and great tracts of land in the inhabited areas were still available for use: "A man who is locked up in a room may be fairly said to be confined by the walls of it, though he may never touch them; and with regard to the principle of population, it is never the question whether a country will produce *any more*, but whether it may be made to produce a sufficiency to keep pace with a nearly unchecked increase of people."[49] The moral of the reservoir comparison is that human beings are more skilled in the utilization than in the creation of resources.

> Where there are few people, and a great quantity of fertile land, the power of the earth to afford a yearly increase of food may be compared to a great reservoir of water supplied by a moderate stream. The faster population increases, the more help will be got to draw off the water, and consequently an increasing quantity will be taken every year. But the sooner, undoubtedly, will the reservoir be exhausted, and the streams only remain.[50]

This revealing comparison shows how narrowly Malthus regarded land as merely the container of agriculture; land was abstract, static, with no hint of destructive land use; a modern student of natural resources would say that

[47] Vol. 2, p. 5. This does not pretend to be a general exposition of the Malthusian theory. My purpose here is to discuss his ideas as a form of environmental theory. See Penrose, *Population Theories and Their Application*; Keynes's essay on Malthus in his *Essays in Biography*; Spengler, "Malthus's Total Population Theory: a Restatement and Reappraisal," *Canadian Journal of Economics*, Vol. XI (1945), pp. 83–110, 234–264; Mombert, *Bevölkerungslehre*, pp. 159–170; Bonar's discussion of Malthus's theses, *Malthus and His Work*, pp. 60–84; Smith, *The Malthusian Controversy*; and Boulding's foreword to *Population: The First Essay*. Peterson, *Population*, pp. 507–535. The already large literature on Malthus has increased considerably in the last fifteen years or so, coinciding with the revival of interest in him.
[48] 1798 *Essay*, pp. 363–365; 7th ed., Vol. 1, p. 59.
[49] Vol. 2, p. 149.
[50] 1798 *Essay*, pp. 106–107, footnote.

when the reservoir was exhausted, the help would go to the stream and continue upward. Comparing the world to an island disposed of those who saw in emigration a permanent cure for distress caused by local or temporary overcrowding. "There is probably no island yet known, the produce of which could not be further increased. This is all that can be said of the whole earth. Both are peopled up to their actual produce. And the whole earth is in this respect like an island."[81]

Malthus's insistence that the whole earth should be regarded as a unit presents difficulties which are realized more poignantly today than in his time. Despite the obvious barriers to the free movement of peoples, such as national boundaries, customs, law, and regulation, population is often considered with relation to the whole earth because it is the ultimate finite limit to the support of human life. There is a polarity of views, those who say that it is unrealistic to think of population and food in relation to the world as a whole because of the existence of national states, and those who say that it is meaningful to calculate the potential population of the earth by some formula that indicates the carrying capacity of the earth, because the condition of the total population ultimately will affect its national component parts. Malthus realized that the earth, in his time, was only partially populated, that many areas were still open to settlement, but it is an error, he said in reply to Godwin, to suppose "that no distress or difficulty would arise from a redundant population before the earth absolutely refused to produce any more."[83] Certainly the world could be more densely populated than it is; but there are difficulties in colonization and emigration: Indigenous peoples could not be starved out; if they were taught and their minds improved, their population would increase and "it would rarely happen that a great degree of knowledge and industry would have to operate at once upon rich unappropriated soil."[83] These interesting arguments, including Malthus's sensitivity to the treatment of native peoples, are really cultural arguments that modify the principle of population. Since indigenous peoples, with education and new techniques, would quickly fill up their sparsely settled lands, these no longer are open to others. When all fertile lands are occupied, further increases must come from improvements in land already being cultivated. "When acre has been added to acre till all the fertile land is occupied, the yearly increase of food must depend upon the melioration of the land already in possession. This is a fund, which, from the nature of all soils, instead of increasing must be gradually diminishing."[84]

In the following passage that aroused the contemptuous anger of Godwin, Malthus reveals how impressed he is with the fecundity of nature, how he tries, as a Christian, to make his principle conform to his belief in a benevolent Creator, how at the same time he turns aside objections from defenders of the

[81] 7th ed., Vol. 1, p. 44.
[82] *Ibid.*, Vol. 2, p. 13.
[83] *Ibid.*, Vol. 1, p. 9.
[84] *Ibid.*, p. 3.

design argument who saw in his principle a contradiction to the commands of Genesis to increase and multiply:

> But, if any person will take the trouble to make the calculation, he will see that if the necessaries of life could be obtained and distributed without limit, and the number of people could be doubled every twenty-five years, the population which might have been produced from a single pair since the Christian æra, would have been sufficient, not only to fill the earth quite full of people, so that four should stand in every square yard, but to fill all the planets of our solar system in the same way, and not only them, but all the planets revolving around the stars which are visible to the naked eye, supposing each of them to be a sun, and to have as many planets belonging to it as our sun has. Under the law of population, which, excessive as it may appear when stated in this way, is, I firmly believe, best suited to the nature and situation of man, it is quite obvious that some limit to the production of food, or some other of the necessaries of life, must exist. . . . It is not easy to conceive a more disastrous present—one more likely to plunge the human race in irrecoverable misery, than an unlimited facility of producing food in a limited space. A benevolent Creator then, knowing the wants and necessities of his creatures, under the laws to which he had subjected them, could not, in mercy, have furnished the whole of the necessaries of life in the same plenty as air and water. This shews at once the reason why the former are limited in quantity, and the latter poured out in profusion.[85]

How will the earth become fully peopled? Assuming in the beginning a small population in a large area, the population would increase and would press upon food supply until poverty and misery intervened; these would cause a cheapness of labor and provide the incentive for increased industry. (Malthus's use of contemporary English situations is jarring in this description of an historical process seemingly of great antiquity.) Cultivators would employ more men by whose efforts lands already in use would be improved and the area of cultivation simultaneously extended, thus increasing the means of subsistence and permitting the population to increase. The cycle could then begin anew until the whole earth would fill up and become the final limiting factor; the amplitude of the oscillations would progressively decrease until there would be only minor ones in a state approaching but not reaching equilibrium. Ironically, one byproduct of this theory was Malthus's insistence on the importance of cultural history. The oscillations will not be noticed by superficial observers and even the most penetrating may find it difficult to calculate its periods. Why has it been so little noticed? One reason is that histories are largely those of the upper classes. "We have but few accounts that can be depended upon of the manners and customs of that part of mankind, where these retrograde and progressive movements chiefly take place."[86]

Although Malthus does not discuss the possible destructive effects of increasing population pressure on the land (he should not be chided for this, because few in his day did), he thought that population increase would

[85] Godwin, *Of Population*, pp. 500–501; Malthus, *Principles of Political Economy* (London, 1820), pp. 227–228.
[86] 1798 *Essay*, p. 32, substantially repeated in 7th ed., Vol. 1, pp. 16–17.

"force" good lands and require the cultivation of poor ones; the costs, however, apparently are seen only in terms of capital and labor required. He does, however, mention accusations of ill-considered deforestation by the Swedes and Norwegians. The deeply pessimistic implications of Malthus's doctrine do not come, as many seem to believe, from the ratios but from the doctrine—advanced by Malthus in his *Political Economy* and other writings, as well as by James West and David Ricardo—that in the history of civilization, the best lands are taken up first; thus as civilization advances and mankind increases in numbers, it expands onto poorer and poorer lands. The question of the historical sequence in the occupation of land received considerable attention in the nineteenth century (to Mill, for example, it is crucial) because of its effect on the idea of progress. If civilization has within it the seeds of inevitable progress, heavy blocks are in its path if it is forced to rely on poorer and poorer lands. Malthus, West, and Ricardo all had their eyes on England and they were generalizing from it.[57] In 1848 the American social scientist, H. C. Carey, complained that "Mr. Ricardo places his settler on the best lands, and the children of that settler on those which are inferior. He makes man the victim of a sad *necessity*, increasing with his numbers," whereas he is "exercising constantly increasing *power*, derived from combined exertion by those numbers." Carey, whose eye was on American history, applies the idea of progress to agriculture as well. The historical progression, in his view, has been from the poor to the best soils because he assumes the best soils to be the most inaccessible to a primitive technology, the most luxuriantly covered with vegetation, and the most unhealthful. Poor soils of uplands are used first because man's control of nature is feeble; the progression to the best soils is related to the history of technology, to the increasing control over nature.[58]

The illuminating comparisons which Malthus made between the soils and the machines of factories and manufacturing plants show the source of his pessimism to be partly in his appraisal of soils: "The earth has sometimes been compared to a vast machine, presented by nature to man for the production of food and raw materials," but the soil is really a great number of machines, "of very different original qualities and powers." Unlike the machinery employed in manufacturing—where constant improvements are made and production can increase after patents have expired—soils as the machines of food production vary from very poor to the very good.[59]

[57] Malthus, *An Inquiry into the Nature and Progress of Rent* [1815], pp. 15–17, 20–21, 33–34; West, *The Application of Capital to Land*, pp. 9–16; Ricardo, *The Principles of Political Economy and Taxation* (Everyman's Library ed.), p. 35. On the history of this idea, see Cannan, *A History of the Theories of Production and Distribution in English Political Economy from 1776 to 1848*, 3rd ed., pp. 155–181. On the Scandinavian deforestation, 7th ed., Vol. 1, pp. 169–170.

[58] H. C. Carey, *The Past, The Present, and the Future*, pp. 17–24; quote on p. 24; *Principles of Social Science*, Vol. I, pp. 94–146, on the occupation of the earth.

[59] Malthus, *Principles of Political Economy*, pp. 184–186.

Since the best soils cannot alone provide for an increased population, the poorer ones must be cultivated, with more and more labor being applied less and less efficiently. Agriculture and manufacturing thus are at opposite extremes. The conclusion is inescapable that, with advancing civilization and population increase, it becomes more and more costly in money and human effort to obtain a subsistence.

Soils alone, however, do not determine agricultural progress; one must also take into account the moral and physical qualities of those who till them. If soil fertility alone were an adequate stimulus to wealth, the human race would not have the stimulus to work which is the secret of progress. Malthus quotes Humboldt in support of this argument.

He was impressed with Humboldt's account of the various foods of New Spain, among them the banana, manioc, and maize, and the manner of their cultivation. Humboldt singled out the banana for special praise ("Je doute qu'il existe une autre plante sur le globe qui, sur un si petit espace de terrain, puisse produire une masse de substance nourrissante aussi considérable"), a wonderful food grown with ridiculous ease on fertile soils. It is repeatedly said in the Spanish Colonies that the inhabitants of the *tierra caliente* will only emerge from their centuries-long apathy when a royal decree orders the destruction of the banana trees, adding that those who so zealously propose this violent remedy display generally no more activity than the lower classes they wish to force to serve their growing needs. He hopes the Mexicans will become more industrious without the necessity of destroying the trees. In considering, however, the ease with which man can sustain himself in such a climate, it is not surprising that, in the equinoctial region of the New World, civilization arose in the mountains on a less fertile soil and in an environment less favorable for the development of organic life and in which need is the spur to industry. Malthus concluded that tropical luxuriance induced lethargy among people; nature is generous, not niggardly, and this generosity is favorable to continual poverty, thinly peopled lands, and to unprogressive civilizations. Malthus quoted Humboldt with approval; he was not going to let anyone progress without hard work.[60]

It is land that is suited for agriculture, especially cereal farming, that seems to interest Malthus most. Moreover, when he discusses Chinese agriculture, he is interested in the cultural milieu; it is not depicted solely as a function of environment. Agriculture there can produce a large population because social tradition is behind it. China's deep and excellent soils and the way in which they are manured, cultivated, and watered; its situation in favored areas of the temperate zone; the industry of its inhabitants; its lakes, rivers, brooks, and canals; and its long tradition of respect for agriculture and governmental encouragement of it—these are responsible for supporting the Chinese popula-

[60] *Ibid.*, pp. 382–384; Humboldt, *Essai Politique sur le Royaume de la Nouvelle-Espagne*, Vol. 3, pp. 37–39; quote on p. 28.

tion. Here, as in so many eighteenth century discussions of China, is the fine hand of Father du Halde.[61]

Elsewhere he clearly sees that ways of life ask cultural questions, not simply environmental ones. The prolific power of nature seems ready to exert its full force in every country, he says; but can governments suppose they could induce their peoples to produce the maximum amount the earth was capable of? Such action would violate the law of property,

> from which everything that is valuable to man has hitherto arisen. . . . But what statesman or rational government could propose that all animal food should be prohibited, that no horses should be used for business or pleasure, that all the people should live upon potatoes, and that the whole industry of the nation should be exerted in the production of them, except what was required for the mere necessaries of clothing and houses? Could such a revolution be effected, would it be desirable? particularly as in a few years, notwithstanding all these exertions, want, with less resource than ever, would inevitably recur.[62]

Although he thought agriculture the basic factor in population growth, he saw in the combination of agriculture, commerce, and industry the key to economic progress, and his ideas here are closer to those of twentieth century economists than to the physiocrats writing a generation before him.

Malthus wrote before the beginning of modern soil science. Theories of soils were not scientific; they could only be judged empirically. When Malthus was comparing soils with machines, the agricultural chemists of the period were for the most part committed to the humus theory.[63]

With his soil theory and his belief that historically the best lands were taken up first, the pessimism regarding the food-producing capacities of the earth for future populations becomes deeper, environmental limitations more unyielding and less subject to human intervention.

5. Conceptions of Progress, Theology, and the Nature of Man in the Malthusian Doctrine

Malthus did not believe that any improvement in human nature could be expected, or that reform in government and institutions could—or should—alter the operations of the principle of population. That they helped could not be denied, but the hopes of those who relied on institutional reform would be dissolved in sterner and deeper realities of nature.

Moreover, he had views of his own on progress. In the second and following editions of his work, Malthus does not begin with a discussion of population at all but with the method of inquiring into the improvement of society; the way "which naturally presents itself, is, 1. To investigate the causes that have hitherto impeded the progress of mankind towards happiness; and, 2. To examine the probability of the total or partial removal of these causes in future."[64]

This is not the program of a man biased in favor of inevitable social change. Quite the contrary, it is the statement of one who assumes a resistance to change among men and in society, of a believer in progress through human effort. In several places in his works Malthus mentions the slothful nature of man. This conception of man's nature is fundamental in his philosophy because it is the constant spur of necessity that goads him on. Niggardly nature and slothful man are the ingredients of the principle of population.[65]

The principle of population is the motive force of progress; because of it, the earth was peopled and its habitability maintained by cultivation. He had no plan, he said, to improve society; he was content with understanding the obstacles in the way of improvement.[66] In place of a law of progress which applied to every aspect of human life, he offered a conception much less comprehensive. "I have endeavoured to expose the fallacy of that argument which infers an unlimited progress from a partial improvement, the limits of which cannot be exactly ascertained."[67]

He disagreed with Ricardo on unilinear progress, expressing his opinion that "the progress of society consists of irregular movements," that "we see in all the countries around us, and in our own particularly, periods of greater or less prosperity and sometimes adversity, but *never* the uniform progress which you seem alone to contemplate."[68] This he wrote in 1817, but it expressed sentiments similar to those of 1798:

> The present rage for wide and unrestrained speculation seems to be a kind of mental intoxication, arising perhaps, from the great and unexpected discoveries which have been made of late years, in various branches of science. To men elate, and giddy with such successes, everything appeared to be within the grasp of human powers; and, under this illusion, they confounded subjects where no real progress could be proved, with those, where the progress had been marked, certain, and acknowledged.[69]

Malthus was more optimistic, however, than many of his interpreters have represented him to be:

> From a review of the state of society in former periods compared with the present, I should certainly say that the evils resulting from the principle of population

[61] 7th ed., Vol. 1, p. 126; Du Halde, *Description Géographique, Historique, Chronologique, Politique, et Physique de l'Empire de la Chine et de la Tartarie Chinoise*, Vol. 2, esp. pp. 163–186, "De l'abondance qui régne à la Chine." This volume also has discussions of Chinese agriculture, artisans, climate, canals and lakes, etc., which M. read.

[62] 7th ed., Vol. 2, p. 52.

[63] Charles A. Browne, *A Source Book of Agricultural Chemistry*. See excerpts from Wallerius, Lavoisier, Thaer, and Einhoff.

[64] 7th ed., Vol. 1, p. 5.

[65] For a typical statement regarding slothful man, see *ibid.*, p. 59.

[66] *Ibid.*, Vol. 2, p. 258.

[67] 1798 *Essay*, p. 216.

[68] Quoted in John Maynard Keynes, *Essays in Biography*, pp. 139–140.

[69] 1798 *Essay*, p. 31; 7th ed., Vol. 2, p. 26.

have rather diminished than increased, even under the disadvantage of almost total ignorance of the real cause. And if we can indulge the hope that this ignorance will be gradually dissipated, it does not seem unreasonable to expect that they will be still further diminished. The increase of absolute population, which will of course take place, will evidently tend but little to weaken this expectation, as everything depends upon the relative proportion between population and food, and not on the absolute number of people.[70]

The 1798 essay appeared at a time when little was known either about the population of the world or the details of its distribution. In Europe, the estimate of a world population of about a billion had become somewhat of a convention, Süssmilch's estimate of 1761 being accepted throughout the latter part of the eighteenth century. From 1781 to 1815 the *Almanach de Gotha* had repeated the 1761 Süssmilch estimate of one billion.[71]

Because the great mass of criticism directed at Malthus has come from those who have opposed the social and political implications of his principle—utopian and Marxist socialists, and reformists within the capitalistic system among them—it is necessary to add that Malthus, like Lyell and Darwin later, had to meet the criticism from religion and physico-theology, typically inherent in the thought of Süssmilch and in Luther's famous saying, "Gott macht die Kinder und will sie ernähren." The biblical injunction to increase and multiply, Malthus realizes, might seem to oppose the principle. One of the principal reasons, he says, preventing agreement with his principle "is a great unwillingness to believe that the Deity would by the laws of nature bring beings into existence, which by the laws of nature could not be supported in that existence."[72] In reply Malthus appeals to natural laws to which human beings are subject, rejecting by implication any anthropocentrism which would involve the personal and active concern of the Deity. The Deity operates through these laws, and the incidental evils arising from them constantly direct attention to the need for moral restraint as the "proper check to population." It is natural law that must be understood. Our duties are pointed out to us by the light of nature and reason; they are confirmed and sanctioned by revelation.[73]

Taking his cue from St. Paul, he thinks marriage is right if it does not interfere with one's higher duties, wrong if it does. We learn the will of God from the light of nature, he says, quoting Paley approvingly, by inquiring into the tendency of an action to promote or diminish general happiness. Malthus argues for restraint, maintaining that one of the worst acts diminishing happiness is to marry without the means to support children. Such acts are against the will of God, a burden on society, and they make it difficult to

[70] 7th ed., Vol. 2, p. 26.
[71] Behm and Wagner, "Die Bevölkerung der Erde, II," *Petermanns Mitteilungen Ergänzungsband* 8, No. 35, p. 5 (1873–74).
[72] Vol. 2, p. 160.
[73] *Ibid.*

preserve virtuous habits in the family. Moral restraint exercised by individuals therefore has a key position in the doctrine, because Malthus believes the problem of population is closely related to "internal tyranny and internal tumult" and to war.[74] Virtue in observance of natural law avoids evil consequences to the individual and to society, and there is therefore no reason to impeach divine justice. "It is the apparent object of the Creator to deter us from vice by the pains which accompany it, and to lead us to virtue by the happiness that it produces. This object appears to our conceptions to be worthy of a benevolent Creator."[75]

Malthus's discussion of disease is also consistent with this concept of a Deity acting through the laws of nature. If they are intermediate between God and nature including man, natural and moral evil become instruments of admonishment—not direct and personal, of course, but through the lessons they teach, the knowledge they impart, the experience they give. Diseases should be regarded not as inevitable inflictions of Providence but more "as indications that we have offended against some of the laws of nature." Plagues are such admonitions; properly heeded, they enable man to improve his condition. The lessons of the plague prevalent in London until 1666 were not lost on our ancestors. They removed nuisances, constructed drains, widened streets, permitted more room and air in their houses, measures which had "the effect of eradicating completely this dreadful disorder, and of adding greatly to the health and happiness of the inhabitants."[76] Thus to Malthus, mankind is subject to the general laws of nature, not to specific intercessions of the Deity; these laws are benevolent if men know their operations and abide by their teachings. There is therefore, in his opinion, no conflict between the biblical injunction to increase and multiply and the principle of population. "A common man, who has read his Bible, must be convinced that a command given to a rational being by a merciful God cannot be intended so to be interpreted as to produce only disease and death instead of multiplication. . . ."[77]

Thus in a period when there was still much conjecture about the true state of population, of war and economic uncertainty, of migration to cities, of the beginning of a new kind of industrialization, one of the most influential ideas of modern times was formulated and disseminated, its simplicity permitting quick popularization, easy quotation, and both accurate and inaccurate paraphrasing. Western thought has never been the same since Malthus; over 150 years of controversy is sufficient proof of his place in Western thought. He created a new view of the world out of old materials, a synthesis coming from notions of fecundity, from theology, from known or suspected statistical regularities, from the social conditions of Europe, from travelers' accounts of widely scattered regions, from reports of great population growth

[74] *Ibid.*, pp. 165–166.
[75] *Ibid.*, p. 167.
[76] *Ibid.*, pp. 152–153.
[77] *Ibid.*, p. 67.

in the newly settled regions of America. In Malthus's forceful prose, the environment had become a perpetual challenge to mankind. If however we probe deeper, beyond the principle of population and the ratios, what is the philosophy of God, man, and nature that is expounded? I do not think it is an error to base the reply mainly on the first essay, for the fundamental philosophical ideas of Malthus did not change, although there are great differences between the first essay and the thoroughly documented treatises that followed it.

In Malthus's writings there is a strong emphasis on emotion and passion, no doubt in part stimulated by the irrationality and brutality of the Reign of Terror. But there is no denigration of sensual pleasure.[78] Men have deep and violent passions, but they are also indolent and averse to labor, constantly needing something or someone to prod them along. Malthus is no ranter about sin. "Life is, generally speaking, a blessing independent of a future state."[79] In the book of nature we alone can read God as he is. The world and this life are a "mighty process of God, not for the trial but for the creation and formation of mind."[80]

Neither does he deny the force and vigor of the sexual drives. In fact, any diminution of them might make it difficult to attain the great end of the creation, the peopling of the earth. The emphasis therefore is on control. Commenting on Godwin's remark, "Strip the commerce of the sexes of all its attendant circumstances, and it would be generally despised," Malthus says, "He might as well say to a man who admires trees, strip them of their spreading branches and lovely foliage, and what beauty can you see in a bare pole? But it was the tree with the branches and foliage and not without them, that excited admiration."[81]

He was dazzled by the fullness and luxuriance of nature, with an awe so characteristic of Western thought, and by the profligate extravagance of life despite all checks. Like Humboldt, he saw the infinite variety of form and operations of nature, awakening and improving the mind "by the variety of impressions that it creates," opening also new avenues for investigation and research.[82] The middle regions of society between riches and poverty seem most favorable to intellectual improvement, but one cannot expect all society to be a middle region. Similarly, "The temperate zones of the earth, seem to be the most favourable to the mental, and corporeal energies of man; but all cannot be temperate zones."[83]

Malthus's contribution to the ideas we are discussing was that he related population theory to philosophy, history, and ethnology; on the whole, the

[78] 1798 *Essay*, pp. 210–212.
[79] *Ibid.*, p. 391.
[80] *Ibid.*, p. 353.
[81] Vol. 2, p. 155, citing *Political Justice*, Vol. 1, Bk. 1, chap. 5.
[82] 1798 *Essay*, p. 378.
[83] *Ibid.*, p. 367.

principle is not yoked up enthusiastically with a philosophy of design and final causes. Malthus did not accept, as Süssmilch did, a close connection between Genesis and population theory; he ignored the cheerful optimism of writers steeped in physico-theology. His emphasis is on natural law, on the study of mankind in human terms, in history, ethnology, and statistics. If he was an innovator in none of these, his writings gave them new significance and new incentives for study. Malthus's essay also is one of the early challenges to the assumption of inevitable progress; he advises men to study social and cultural history with a look to backslidings as well; in essence he called for a more profound kind of historiography than then existed.

Man modifies the earth, and it is by the design of Providence that he does so because only by the principle of population would the earth be fully cultivated. The principle of population thus accounts for the peopling of the world, the distribution of mankind and its settlement in less desirable places and repopulation after catastrophe, and indirectly for modifications of the earth by man. "The processes of ploughing and clearing the ground, of collecting and sowing seeds, are not surely for the assistance of God in his creation; but are made previously necessary to the enjoyment of the blessings of life, in order to rouse man into action, and form his mind to reason."[84]

Thus there are in Malthus's writings evidences of the ideas whose history we have been discussing. The physico-theology is restrained and in the English tradition of Ray and Derham. The religion of nature is inspired by Romans 1:20. Environmental influences, however, are subordinated to the more fundamental and abstract influence of a limited total environment. And man modifies his environment in order to live, to act, to use his mind.

Finally, Malthus put in forceful, strikingly metaphorical language, and particularly in the first essay, the choice between environmental and social causation. Much of the subsequent history of population theory can be written in terms of the choices posed by Malthus; the Marxian hostility in the U.S.S.R. (which later extended even to Darwin) to Malthusian theory is a well-known example because to Marxists population questions are meshed with a teleology of economic and social development, and are not matters of natural law against which human beings strive in vain. Malthus had stated the case for the limitations of the environment; he had also shown that the assumptions of those who believed in the inevitability of progress in all phases of human activity were in need of reexamination.

6. A Final Answer to Malthus

Twenty-two years after the appearance of Malthus's essay, William Godwin published *Of Population*, a book over six hundred pages long; it is largely concerned with Malthus. One of the men responsible for Malthus's first essay

[84] *Ibid.*, p. 361.

now returned to combat in the hope of finishing off the Malthusian theory once and for all.[85]

Of Population is a neglected work; no one, not even Godwin's admirers, seems to have taken it seriously. It is poorly organized and it lacks intellectual distinction. Though he repeatedly says he bears Malthus no personal resentment, the frequently declamatory and intolerant tone is inconsistent with Godwin's claim of objective and dispassionate refutation. Nevertheless Godwin, who looks forward to the dawn of a brighter age, made some telling objections to the Malthus doctrine. It was a fallacy to base a doctrine (a "system that has gained a success in the world wholly unprecedented") on one example. Malthus had discovered the principle of population in the northeastern part of the United States. "If America had never been discovered, the geometrical ratio, as applied to the multiplication of mankind, would never have been known. If the British colonies had never been planted, Mr. Malthus would never have written."[86] There was no proof, Godwin said, that the increased population of the United States had come from procreation only. The United States, a free government with liberal institutions, wished "greater multitudes to partake [of] these blessings." The entire lower classes of Europe would migrate in a body were it not for the love men have for their birthplace and for their poverty. It was emigration from the Old World, and emigrants in the "flower of their lives," that caused the American increase. Godwin denied there was a greater number of children and that there were fewer premature deaths from disease and other causes in America than in Europe. America, like all newly settled countries, is unhealthful and North America abounds in swamps. Relying largely on Count Volney's *View of the Climate and Soil of the United States*, Godwin stressed the toll taken in America by tuberculosis, dysentery, and yellow fever. The widespread premature tooth decay, observed by Volney, was also evidence of unhealthful American conditions.[87]

(One could write an interesting essay concerning the influence of American settlement history on social and political thought in the nineteenth and twentieth centuries. Its early population growth in a thinly populated region proved, so Malthus thought, the truth of the geometrical ratio. Its further settlement, cultivation, and exploitation, and the wheat surpluses, especially those of the seventies and eighties of the nineteenth century, revealed the fallacy of the principle. Henry George said as much in *Progress and Poverty* in denouncing the Malthusian theory, and many others agreed with him. Finally, interpretations of the frontier by Turner and others opened up a new phase in the history of ideas of closed space.)

Since Malthus's discovery is based on the American increase, once "this

[85] *Of Population*, pp. iv–vii.
[86] *Ibid.*, pp. 142, 139–140.
[87] *Ibid.*, pp. 374–380, 403–404, 418, 430–443. See Volney, *View of the Climate and Soil of the United States*, pp. 278–332.

idle and extravagant hypothesis" is removed, "the whole science stands just as it did before Mr. Malthus wrote. . . ."[88] Godwin repeatedly says we live in an "unpeopled world."[89] Would it not have been fairer to have deduced a principle of population by surveying the entire globe? Any such survey would reveal the thinness and scattering of the world's population, how to make better use of the uninhabited regions, and how they might be "replenished with a numerous and happy race."[90]

Godwin would not allow Malthus to enact laws of nature. His principle "is not *the Law of Nature*. It is *the Law of very artificial life*."[91] If Malthus is right, why is not the globe fully peopled? If such strenuous measures are necessary to restrain the tendency of population to increase, how is it that "the world is a wilderness, a wide and desolate place, where men crawl about in little herds, comfortless, unable from the dangers of freebooters, and the dangers of wild beasts to wander from climate to climate, and without that mutual support and cheerfulness which a populous earth would most naturally afford?"[92]

Godwin's rebuttal of the natural law is based on the evidence from the history of human settlement and on the actual distribution of mankind on earth. Godwin was right! Why should population theory be considered independently of the history of human settlement? To Godwin, problems of population growth are basically historical ones. What of depopulation? Why are European and Asiatic Turkey, Persia, Egypt, and a multitude of other countries so thinly inhabited now compared "to what they were in the renowned periods of their ancient history?" Godwin answers that soil exhaustion is not the cause. "Certainly it is not because another blade of corn refuses to grow on their surface." The cause is to be found "in the government and political administration of these countries."[93] He is sympathetic with the complaints of depopulation which Montesquieu voiced in the *Persian Letters*; and he felt that Hume's essay had done little more than "to throw some portion of uncertainty on the subject."[94]

Why had not the geometrical ratio been tested by the experience of an Old World country like China?[95] It would be an ideal example, since marriage is encouraged, celibacy discouraged; it has no manufacturing cities to produce waste; and the quiet life of women makes them more prolific, safeguarding them from untimely births. Neither he nor Malthus, he says, knows anything about the population of China, but on the basis of statements made

[88] *Ibid.*, p. 141.
[89] *Ibid.*, pp. 485–486.
[90] *Ibid.*, pp. 15–16.
[91] *Ibid.*, p. 20.
[92] *Ibid.*, pp. 20–21.
[93] *Ibid.*, pp. 309–310.
[94] *Ibid.*, p. 40. Godwin is referring to *Persian Letters*, No. 108, and to Hume's essay, "Of the Populousness of Ancient Nations."
[95] *Ibid.*, chap. 6.

by Malthus himself, Godwin thinks that "the statesmen and legislators of China, who have proceeded with a steady, and perhaps I may add an enlightened, attention to the subject for centuries, not only have no suspicion of the main principles taught in the Essay on Population, but are deeply impressed with the persuasion that, without encouragement and care to prevent it, the numbers of the human species have a perpetual tendency to decline."[96]

Racial and cultural intermingling and migrations seem to affect population growth. Could not population increase be ascribed to such mixing, decline to isolation and inbreeding? Crossing seems to improve the breed in both men and animals. "May not the qualities of the present race of Europeans . . . be materially owing to the invasions of the Celts and the Cimbri, the Goths and Vandals, the Danes, the Saxons, and the Normans?"[97]

In denying that the principle of population is a law of nature, Goodwin in effect said that the numbers and distribution of the world's peoples are basically problems of history and geography.

"Population, if we consider it historically, appears to be a fitful principle, operating intermittedly [*sic*] and by starts. This is the great mystery of the subject; and patiently to investigate the causes of its irregular progress seems to be a business highly worthy of the philosopher."[98]

Furthermore Godwin, like Malthus, viewed the earth and its resources as a whole, making one of the earliest estimates known to me of its carrying capacity—which he computed to be nine billion people.[99]

The productivity of the earth can be endlessly improved, substituting the plough for the pasture, and then the spade for the plough. "The productiveness of garden-cultivation over field-cultivation, for the purposes of human subsistence, is astonishingly great."[100] The only objection is that less manual labor is desirable in an improved society but there must be a "probation of extensive labor," for the greater part of mankind is as yet unprepared for leisure. Use the resources of the sea, see how many more people can be fed on a vegetable rather than an animal diet, become a world of gardeners! "Nature has presented to us the earth, the *alma magna parens*, whose bosom, to all but the wild and incongruous ratios of Mr. Malthus, may be said to be inexhaustible. Human science and ingenuity have presented to us the means of turning this resource to the utmost account."[101]

[96] *Ibid.*, p. 52.
[97] *Ibid.*, pp. 365–366.
[98] *Ibid.*, pp. 327–328.
[99] He estimates that 39 million square miles of the earth are habitable, of which 1.3 million are in China with an estimated population of 300 million. Using the cultivation of China as the standard for possible cultivation and its population as the standard of possible population density, the result is 9 billion: 39 million divided by 1.3 and multiplied by 300 million. *Ibid.*, pp. 448–449.
[100] *Ibid.*, p. 495.
[101] *Ibid.*, p. 498.

In Godwin's writings as in those of Malthus there is the conviction that man bestows dignity on the order of nature, that in the continual peopling of the world the changes that man effects will be beautiful and useful. The earth is a better place because of man:

> Man is an admirable creature, the beauty of the world, which, if he did not exist in it, would be a "habitation of dragons, and a court for owls; the wild beast of the desert would cry to the wild beast of the islands; baboons would dance there; and its pleasant places be filled with all doleful creatures." How delightful a speculation then is it, that man is endowed by all-bountiful nature with an unlimited power of multiplying his species? I would look out upon the cheerless and melancholy world which has just been described, and imagine it all cultivated, all improved, all variegated with a multitude of human beings, in a state of illumination, of innocence, and of active benevolence, to which the progress of thought, and the enlargement of mind seem naturally to lead, beyond any thing that has yet any where been realised.[102]

Both Godwin's idea of progress and Malthus's principle of population apparently led to a future world of gardeners.

Malthus neither ignored this work nor replied to it, contenting himself with a few unflattering sentences about it.[103] Behind Godwin's appraisal of the earth is the idea of progress. The physical environment will not be a limiting factor in human advance in the foreseeable future, and there are new hopes in the dawning technological and chemical age.

Godwin does not suggest—and neither does Malthus—that these advances will create problems nor that man's relationship to the world of nature by the growth of his numbers and the persistence of his settlement in favored places, might change rapidly. On the contrary, he is full of hope and cheer as he envisions the forward march of mankind to a complete and permanent occupation of all the earth's lands.

7. Conclusion

By his advocacy of climatic influences, Montesquieu in the *Esprit des Lois* had provoked some of the most searching thought on social and environmental questions that had yet appeared in Western civilization; he did this by his learning, wit, humanity, dogmatism. In the *Lettres Persanes* he had a similar effect on population questions and here he had given great weight to moral causes as reasons for modern depopulation. When he pursued these inquiries in the *Esprit des Lois*, again cultural not environmental causation interested him and he saw clearly the uniqueness of human populations, and he had his own causal population theory; it might even be Malthus without fanfare.

[102] *Ibid.*, pp. 450–451.
[103] See the last paragraph of the appendix to the 6th ed. of *A Principle of Population*.

"Wherever a place is found in which two persons can live commodiously, there they enter into marriage. Nature has a sufficient propensity to it, when unrestrained by the difficulty of subsistence."[104]

If Montesquieu's data were poor, if his conclusions about modern depopulation were misguided and provincial, the matters he and his Persians discussed with such earthiness and practicality were indeed important. The dispute over the populousness of ancient nations, fatuous as were some of the arguments, had its rewards; like the more important quarrel over the ancients and moderns of which it was a part, it induced comparisons with the ancient world, it gave prominence to the moral and social consequences of modern slavery, European colonial expansion after the age of discovery, of religion, disease, and morality.

It is thus no exaggeration to say that this comparison between the ancients and the moderns, whether in the form of culture, arts, population, morality, and the idea of progress which emerged as a higher generalization from the quarrel set the stage for the debates on social and environmental causation culminating in Malthus and in Godwin's final reply to him. Upon what does one base his thought, on the force of human institutions or the omnipotence of natural law? Godwin's belligerent words, already quoted, state the alternatives clearly and fairly. Malthus's principle "is not *the Law of Nature*. It is *the Law of very artificial life*."

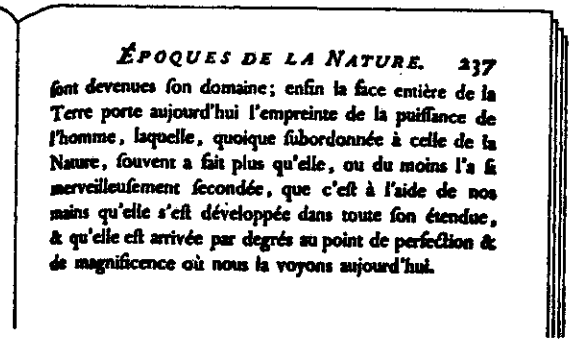
One sees repeatedly the powerful influence of the idea of progress—as one now sees its modern substitute, faith in science—on population questions. Condorcet and Godwin accept it as a basic principle which gives meaning to civilization, and Malthus denies its inevitability and the perfectibility of man, arguing that progress is uneven and uncertan.

Most important was the association of the idea of progress with the environmental limitations of the earth. Malthus and Godwin had extended the argument to include the whole earth, and it was a welcome development despite the obvious pitfalls in considering as a unit an earth so politically, culturally, and religiously divided.

Neither thinker was concerned to any degree with environmental change by man. They recognized it but gave little thought to its implications. For Malthus, to be sure, the environment was limiting, but to Godwin it posed few problems crucial to the human race. For their purposes they assumed a stable physical environment. Both men saw that ultimately the earth might be cultivated like a garden, but neither thought that an environment, deteriorating as a result of long human settlement, might offer hard choices in the future. Nor did Count Buffon, but he did see the great influence of man on the land and on all life, and it is to this subject—and to him—that we now in the last chapter turn.

[104] *EL*, Bk. 23, chap. 10.

Chapter 14



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ſont devenues ſon domaine; enfin la face entière de la Terre porte aujourd'hui l'empreinte de la puiſſance de l'homme, laquelle, quoique ſubordonnée à celle de la Nature, ſouvent a fait plus qu'elle, ou du moins l'a ſi merveilleuſement ſecondée, que c'eſt à l'aide de nos mains qu'elle s'eſt développée dans toute ſon étendue, & qu'elle eſt arrivée par degrés au point de perfection & de magnificence où nous la voyons aujourd'hui.

The Epoch of Man in the History of Nature

1. Introduction

In *Des Epoques de la Nature*, Count Buffon had named the seventh and last as the age when man assumes an active role, "seconding," to use his phrase, the operations of nature. From a secular point of view man was in control of nature; from a religious, he was completing the creation with unexpected speed. Most of those who held such views were optimistic and believers in the idea of progress, the growth of knowledge enabling man to enlarge his horizons and to refashion his surroundings more to his taste. What pessimism there was, was not organized around a general principle, but there were observations that man must interfere with caution in the economy or equilibrium of nature. Isolated works, however, like Jean Antoine Fabre's *Essai sur la Théorie des Torrents*, foreshadow new and delicate sensitivities to cultural geography and history, to the longevity of customs and usages which continually—and cumulatively—affect the land.