

Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon

Alfred W. Crosby

Industrial man may in many respects be considered an aggressive and successful weed strangling other species and even the weaker members of its own.

Stafford Lightman, "The Responsibilities of Intervention in Isolated Societies,"
Health and Disease in Tribal Societies

Europeans in North America, especially those with an interest in gardening and botany, are often stricken with fits of homesickness at the sight of certain plants which, like themselves, have somehow strayed thousands of miles eastward across the Atlantic. Vladimir Nabokov, the Russian exile, had such an experience on the mountain slopes of Oregon:

Do you recognize that clover?
Dandelions, *l'or du pauvre*?
(Europe, nonetheless, is over.)

A century earlier the success of European weeds in America inspired Charles Darwin to goad the American botanist Asa Gray: "Does it not hurt your Yankee pride that we thrash you so confoundly? I am sure Mrs. Gray will stick up for your own weeds. Ask her whether they are not more honest, downright good sort of weeds."¹

The common dandelion, *l'or du pauvre*, despite its ubiquity and its bright yellow flower, is not at all the most visible of the Old World immigrants in North America. Vladimir Nabokov was a prime example of the most visible kind: the *Homo sapiens* of European origin. Europeans and their descendants, who comprise the majority of human beings in North America and in a number of other lands outside of Europe, are the most spectacularly successful overseas migrants of all time. How strange it is to find Englishmen, Germans, Frenchmen, Italians, and Spaniards comfortably ensconced in places with names like Wollongong (Australia), Rotorua (New Zealand), and Saskatoon (Canada), where obviously other peoples should dominate, as they must have at one time.

None of the major genetic groupings of humankind is as oddly distributed about the world as European, especially western European, whites. Almost all the peoples we call Mongoloids live in the single contiguous land mass of Asia. Black Africans are divided between three continents — their homeland and North and South America — but most of them are concentrated in their original latitudes, the tropics, facing each other across one ocean. European whites were all recently concentrated in Europe, but in the last few centuries have burst out, as energetically as if from a burning building, and have created vast settlements of their kind in the South Temperate Zone and North Temperate Zone (excepting Asia, a continent already thoroughly and irreversibly tenanted). In Canada and the United States together they amount to nearly 90 percent

¹ Page Stegner, ed., *The Portable Nabokov* (New York: Viking, 1968), p. 527; Francis Darwin, ed., *Life and Letters of Charles Darwin* (London: Murray, 1887), vol. 2, p. 391.

of the population; in Argentina and Uruguay together to over 95 percent; in Australia to 98 percent; and in New Zealand to 90 percent. The only nations in the Temperate Zones outside of Asia which do not have enormous majorities of European whites are Chile, with a population of two-thirds mixed Spanish and Indian stock, and South Africa, where blacks outnumber whites six to one. How odd that these two, so many thousands of miles from Europe, should be exceptions in *not* being predominantly pure European.²

Europeans have conquered Canada, the United States, Argentina, Uruguay, Australia, and New Zealand not just militarily and economically and technologically — as they did India, Nigeria, Mexico, Peru, and other tropical lands, whose native people have long since expelled or interbred with and even absorbed the invaders. In the Temperate Zone lands listed above Europeans conquered and triumphed demographically. These, for the sake of convenience, we will call the Lands of the Demographic Takeover.

There is a long tradition of emphasizing the contrasts between Europeans and Americans — a tradition honored by such names as Henry James and Frederick Jackson Turner — but the vital question is really why Americans are so European. And why the Argentinians, the Uruguayans, the Australians, and the New Zealanders are so European in the obvious genetic sense.

The reasons for the relative failure of the European demographic takeover in the tropics are clear. In tropical Africa, until recently, Europeans died in droves of the fevers; in tropical America they died almost as fast of the same diseases, plus a few native American additions. Furthermore, in neither region did European agricultural techniques, crops, and animals prosper. Europeans did try to found colonies for settlement, rather than merely exploitation, but they failed or achieved only partial success in the hot lands. The Scots left their bones as monument to their short-lived colony at Darien at the turn of the eighteenth century. The English Puritans who skipped Massachusetts Bay Colony to go to Providence Island in the Caribbean Sea did not even achieve a permanent settlement, much less a Commonwealth of God. The Portuguese who went to northeastern Brazil created viable settlements, but only by perching themselves on top of first a population of native Indian laborers and then, when these faded away, a population of laborers imported from Africa. They did achieve a demographic takeover, but only by interbreeding with their servants. The Portuguese in Angola, who helped supply those servants, never had a breath of a chance to achieve a demographic takeover.³ There was much to repel and little to attract the mass of Europeans to the tropics, and so they stayed home or went to the lands where life was healthier, labor more rewarding, and where white immigrants, by their very number, encouraged more immigration.

In the cooler lands, the colonies of the Demographic Takeover, Europeans achieved very rapid population growth by means of immigration, by increased life span, and by maintaining very high birthrates. Rarely has population expanded more rapidly than it did in the eighteenth and nineteenth centuries in these lands. It is these lands, especially the United States, that enabled Europeans and their overseas offspring to expand from something like 18 percent of the human species in 1650 to well over 30 percent in 1900. Today 670 million Europeans live in

² *The World Almanac and Book of Facts 1978* (New York: Newspaper Enterprise Association, 1978), passim.

³ Philip D. Curtin, "Epidemiology and the Slave Trade," *Political Science Quarterly* 83 (June 1968), 190-216 passim; John Prebble, *The Darien Disaster* (New York: Holt, Rinehart & Winston, 1968), pp. 296, 300; Charles M. Andrews, *The Colonial Period of American History* (New Haven, Conn.: Yale University Press, 1934), vol. 1, n. 497; Gilberto Freyre, *The Masters and the Slaves*, trans. Samuel Putnam (New York: Knopf, 1946), passim; Donald L. Wiedner, *A History of Africa South of the Sahara* (New York: Vintage Books, 1964), 49-51; Stuart B. Schwartz, "Indian Labor and New World Plantations: European Demands and Indian Responses in Northeastern Brazil," *American Historical Review* 83 (February 1978): 43-79 passim.

Europe, and 250 million or so other Europeans — genetically as European as any left behind in the Old World — live in the Lands of the Demographic Takeover, an ocean or so from home.⁴ What the Europeans have done with unprecedented success in the past few centuries can accurately be described by a term from apiculture: They have swarmed.

They swarmed to lands which were populated at the time of European arrival by peoples as physically capable of rapid increase as the Europeans, and yet who are now small minorities in their homelands and sometimes no more than relict populations. These population explosions among colonial Europeans of the past few centuries coincided with population crashes among the aborigines. If overseas Europeans have historically been less fatalistic and grim than their relatives in Europe, it is because they have viewed the histories of their nations very selectively. When he returned from his world voyage on the *Beagle* in the 1830s, Charles Darwin, as a biologist rather than a historian, wrote, “Wherever the European has trod, death seems to pursue the aboriginal.”⁵

Any respectable theory which attempts to explain the Europeans’ demographic triumphs has to provide explanations for at least two phenomena. The first is the decimation and demoralization of the aboriginal populations of Canada, the United States, Argentina, and others. The obliterating defeat of these populations was not simply due to European technological superiority. The Europeans who settled in temperate South Africa seemingly had the same advantages as those who settled in Virginia and New South Wales, and yet how different was their fate. The Bantu-speaking peoples, who now overwhelmingly outnumber the whites in South Africa, were superior to their American, Australian, and New Zealand counterparts in that they possessed iron weapons, but how much more inferior to a musket or a rifle is a stone-pointed spear than an iron-pointed spear? The Bantu have prospered demographically not because of their numbers at the time of first contact with whites, which were probably not greater per square mile than those of, the Indians east of the Mississippi River. Rather, the Bantu have prospered because they survived military conquest, avoided the conquerors, or became their indispensable servants — and in the long run because they reproduced faster than the whites. In contrast, why did so few of the natives of the Lands of the Demographic Takeover survive?

Second, we must explain the stunning, even awesome success of European agriculture, that is, the European way of manipulating the environment in the Lands of the Demographic Takeover. The difficult progress of the European frontier in the Siberian *taiga* or the Brazilian *sertão* or the South African *veldt* contrasts sharply with its easy, almost fluid advance in North America. Of course, the pioneers of North America would never have characterized their progress as easy: Their lives were filled with danger, deprivation, and unremitting labor; but as a group they always succeeded in taming whatever portion of North America they wanted within a few decades and usually a good deal less time. Many individuals among them failed — they were driven mad by blizzards and dust storms, lost their crops to locusts and their flocks to cougars and wolves, or lost their scalps to understandably inhospitable Indians — but as a group they always succeeded — and in terms of human generations, very quickly.

In attempting to explain these two phenomena, let us examine four categories of organisms deeply involved in European expansion: (1) human beings; (2) animals closely associated with

⁴ Marcel R. Reinhard, *Histoire de la population mondiale de 1700 à 1948* (n.p.: Editions Domat-Montchrestien, n.d.), pp. 339-411, 428-31; G. F. McCleary, *Peopling the British Commonwealth* (London: Farber and Farber, n.d.), pp. 83, 94, 109-10; R. R. Palmer and Joel Colton, *A History of the Modern World* (New York: Knopf, 1965), p. 560; *World Almanac 1978*, pp. 34, 439, 497, 513, 590.

⁵ Charles Darwin, *The Voyage of the Beagle* (Garden City, N.Y.: Doubleday Anchor Books, 1962), pp. 433-4.

human beings — both the desirable animals like horses and cattle and undesirable varmints like rats and mice; (3) pathogens or microorganisms that cause disease in humans; and (4) weeds. Is there a pattern in the histories of these groups which suggests an overall explanation for the phenomenon of the Demographic Takeover or which at least suggests fresh paths of inquiry?

Europe has exported something in excess of sixty million people in the past few hundred years. Great Britain alone exported over twenty million. The great mass of these white emigrants went to the United States, Argentina, Canada, Australia, Uruguay, and New Zealand. (Other areas to absorb comparable quantities of Europeans were Brazil and Russia east of the Urals. These would qualify as Lands of the Demographic Takeover except that large fractions of their populations are non-European.)⁶

In stark contrast, very few aborigines of the Americas, Australia, or New Zealand ever went to Europe. Those who did often died not long after arrival.⁷ The fact that the flow of human migration was almost entirely from Europe to her colonies and not vice versa is not startling — or very enlightening. Europeans controlled overseas migration, and Europe needed to export, not import, labor. But this pattern of one-way migration is significant in that it reappears in other connections.

The vast expanses of forests, savannas, and steppes in the Lands of the Demographic Takeover were inundated by animals from the Old World, chiefly from Europe. Horses, cattle, sheep, goats, and pigs have for hundreds of years been among the most numerous of the quadrupeds of these lands, which were completely lacking in these species at the time of first contact with the Europeans. By 1600 enormous feral herds of horses and cattle surged over the pampas of the Rio de la Plata (today's Argentina and Uruguay) and over the plains of northern Mexico. By the beginning of the seventeenth century packs of Old World dogs gone wild were among the predators of these herds.⁸

In the forested country of British North America population explosions among imported animals were also spectacular, but only by European standards, not by those of Spanish America. In 1700 in Virginia feral hogs, said one witness, “swarm like vermaine upon the Earth,” and young gentlemen were entertaining themselves by hunting wild horses of the inland counties. In Carolina the herds of cattle were “incredible, being from one to two thousand head in one Man's Possession.” In the eighteenth and early nineteenth centuries the advancing European frontier from New England to the Gulf of Mexico was preceded into Indian territory by an avant-garde of semiwild herds of hogs and cattle tended, now and again, by semiwild herdsmen, white and black.⁹

The first English settlers landed in Botany Bay, Australia, in January of 1788 with livestock, most of it from the Cape of Good Hope. The pigs and poultry thrived; the cattle did well enough; the sheep, the future source of the colony's good fortune, died fast. Within a few months two bulls and four cows strayed away. By 1804 the wild herds they founded numbered from three to

⁶ William Woodruff, *Impact of Western Man* (New York: St. Martin's, 1967), 106-8.

⁷ Carolyn T. Foreman, *Indians Abroad* (Norman: University of Oklahoma Press, 1943), passim.

⁸ Alfred W. Crosby, *The Columbian Exchange* (Westport, Conn.: Greenwood, 1972), pp. 82-88; Alexander Gillespie, *Gleanings and Remarks Collected during Many Months of Residence at Buenos Aires* (Leeds: B. DeWhirst, 1818), p. 136; Oscar Schmieder, “Alterations of the Argentine Pampa in the Colonial Period,” *University of California Publications in Geography* 2 (27 September 1927): n. 311.

⁹ Robert Beverley, *The History and Present State of Virginia* (Chapel Hill: University of North Carolina Press, 1947), pp. 153, 312, 318; John Lawson, *A New Voyage to Carolina* (n.p.: Readex Microprint Corp., 1966), p. 4; Frank L. Owsley, “The Pattern of Migration and Settlement of the Southern Frontier,” *Journal of Southern History* II (May 1945): 147-75.

five thousand head and were in possession of much of the best land between the settlements and the Blue Mountains. If they had ever found their way through the mountains to the grasslands beyond, the history of Australia in the first decades of the nineteenth century might have been one dominated by cattle rather than sheep. As it is, the colonial government wanted the land the wild bulls so ferociously defended, and considered the growing practice of convicts running away to live off the herds as a threat to the whole colony; so the adult cattle were shot and salted down and the calves captured and tamed. The English settlers imported woolly sheep from Europe and sought out the interior pastures for them. The animals multiplied rapidly, and when Darwin made his visit to New South Wales in 1836, there were about a million sheep there for him to see.¹⁰

The arrival of Old World livestock probably affected New Zealand more radically than any other of the Lands of the Demographic Takeover. Cattle, horses, goats, pigs and — in this land of few or no large predators — even the usually timid sheep went wild. In New Zealand herds of feral farm animals were practicing the ways of their remote ancestors as late as the 1940s and no doubt still run free. Most of the sheep, though, stayed under human control, and within a decade of Great Britain's annexation of New Zealand in 1840, her new acquisition was home to a quarter million sheep. In 1974 New Zealand had over fifty-five million sheep, about twenty times more sheep than people.¹¹

In the Lands of the Demographic Takeover the European pioneers were accompanied and often preceded by their domesticated animals, walking sources of food, leather, fiber, power, and wealth, and these animals often adapted more rapidly to the new surroundings and reproduced much more rapidly than their masters. To a certain extent, the success of Europeans as colonists was automatic as soon as they put their tough, fast, fertile, and intelligent animals ashore. The latter were sources of capital that sought out their own sustenance, improvised their own protection against the weather, fought their own battles against predators and, if their masters were smart enough to allow calves, colts, and lambs to accumulate, could and often did show the world the amazing possibilities of compound interest.

The honey bee is the one insect of worldwide importance which human beings have domesticated, if we may use the word in a broad sense. Many species of bees and other insects produce honey, but the one which does so in greatest quantity and which is easiest to control is a native of the Mediterranean area and the Middle East, the honey bee (*Apis mellifera*). The European has probably taken this sweet and short-tempered servant to every colony he ever established, from Arctic to Antarctic Circle, and the honey bee has always been one of the first immigrants to set off on its own. Sometimes the advance of the bee frontier could be very rapid: The first hive in Tasmania swarmed sixteen times in the summer of 1832.¹²

Thomas Jefferson tells us that the Indians of North America called the honey bees “English flies,” and St. John de Crevecoeur, his contemporary, wrote that “The Indians look upon them with an evil eye, and consider their progress into the interior of the continent as an omen of the white man's approach: thus, as they discover the bees, the news of the event, passing from mouth

¹⁰ Commonwealth of Australia, *Historical Records of Australia* (Sydney: Library Committee of the Commonwealth Parliament, 1914), ser. 1, vol. 1, p. 550; vol. 7, pp. 379-80; vol. 8, pp. 150-1; vol. 9, pp. 349, 714, 831; vol. 10, pp. 92, 280, 682; vol. 20, p. 839.

¹¹ Andrew H. Clark, *The Invasion of New Zealand by People, Plants, and Animals* (New Brunswick, N.J.: Rutgers University Press, 1949), p. 190; David Wallechinsky, Irving Wallace, and A. Wallace, *The Book of Lists* (New York: Bantam, 1978), pp. 129-30.

¹² Remy Chauvin, *Traité de biologie de l'abeille* (Paris: Masson et Cie, 1968), vol. 1, pp. 38-9; James Backhouse, *A Narrative of a Visit to the Australian Colonies* (London: Hamilton, Adams and Co., 1834), p. 23.

to mouth, spreads sadness and consternation on all sides.”¹³ Domesticated creatures that traveled from the Lands of the Demographic Takeover to Europe are few. Australian aborigines and New Zealand Maoris had a few tame dogs, unimpressive by Old World standards and unwanted by the whites. Europe happily accepted the American Indians’ turkeys and guinea pigs, but had no need for their dogs, llamas, and alpacas. Again the explanation is simple: Europeans, who controlled the passage of large animals across the oceans, had no need to reverse the process.

It is interesting and perhaps significant, though, that the exchange was just as one-sided for varmints, the small mammals whose migrations Europeans often tried to stop. None of the American or Australian or New Zealand equivalents of rats have become established in Europe, but Old World varmints, especially rats, have colonized right alongside the Europeans in the Temperate Zones. Rats of assorted sizes, some of them almost surely European immigrants, were tormenting Spanish Americans by at least the end of the sixteenth century. European rats established a beachhead in Jamestown, Virginia, as early as 1609, when they almost starved out the colonists by eating their food stores. In Buenos Aires the increase in rats kept pace with that of cattle, according to an early nineteenth-century witness. European rats proved as aggressive as the Europeans in New Zealand, where they completely replaced the local rats in the North Islands as early as the 1840s. Those poor creatures are probably completely extinct today or exist only in tiny relict populations.¹⁴

The European rabbits are not usually thought of as varmints, but where there are neither diseases nor predators to hold down their numbers they can become the worst of pests. In 1859 a few members of the species *Orytolagus cuniculus* (the scientific name for the protagonists of all the Peter Rabbits of literature) were released in southeast Australia. Despite massive efforts to stop them, they reproduced — true to their reputation — and spread rapidly all the way across Australia’s southern half to the Indian Ocean. In 1950 the rabbit population of Australia was estimated at 500 million, and they were outcompeting the nation’s most important domesticated animals, sheep, for the grasses and herbs. They have been brought under control, but only by means of artificially fomenting an epidemic of myxomatosis, a lethal American rabbit disease. The story of rabbits and myxomatosis in New Zealand is similar.¹⁵ Europe, in return for her varmints, has received muskrats and gray squirrels and little else from America, and nothing at all of significance from Australia or New Zealand, and we might well wonder if muskrats and squirrels really qualify as varmints.¹⁶ As with other classes of organisms, the exchange has been a one-way street.

None of Europe’s emigrants were as immediately and colossally successful as its pathogens, the microorganisms that make human beings ill, cripple them, and kill them. Whenever and wherever Europeans crossed the oceans and settled, the pathogens they carried created prodigious epidemics of smallpox, measles, tuberculosis, influenza, and a number of other

¹³ Merrill D. Peterson, ed., *The Portable Thomas Jefferson* (New York: Viking, 1975), p. 111; Michel-Guillaume St. Jean de Crèvecoeur, *Journey into Northern Pennsylvania and the State of New York*, trans. Clarissa S. Bostelmann (Ann Arbor: University of Michigan Press, 1964), p. 166.

¹⁴ Bernabé Cobo, *Obras* (Madrid: Atlas Ediciones, 1964), vol. 1, pp. 350-1; Edward Arber, ed., *Travels and Works of Captain John Smith* (New York: Burt Franklin, n. d.), vol. 2, p. xciv; K. A. Wodzicki, *Introduced Mammals of New Zealand* (Wellington: Department of Scientific and Industrial Research, 1950), pp. 89-92.

¹⁵ Frank Fenner and F. N. Ratcliffe, *Myxomatosis* (Cambridge: Cambridge University Press, 1965), pp. 9, 11, 17, 22-23; Frank Fenner, “The Rabbit Plague,” *Scientific American* 190 (February 1954): 30-5; Wodzicki, *Introduced Mammals*, pp. 107-141.

¹⁶ Charles S. Elton, *The Ecology of Invasions* (Trowbridge and London: English Language Book Society, 1972), pp. 24-5, 28, 73, 123.

diseases. It was this factor, more than any other, that Darwin had in mind as he wrote of the Europeans' deadly tread.

The pathogens transmitted by the Europeans, unlike the Europeans themselves or most of their domesticated animals, did at least as well in the tropics as in the temperate Lands of the Demographic Takeover. Epidemics devastated Mexico, Peru, Brazil, Hawaii, and Tahiti soon after the Europeans made the first contact with aboriginal populations. Some of these populations were able to escape demographic defeat because their initial numbers were so large that a small fraction was still sufficient to maintain occupation of, if not title to, the land, and also because the mass of Europeans were never attracted to the tropical lands, not even if they were partially vacated. In the Lands of the Demographic Takeover the aboriginal populations were too sparse to rebound from the onslaught of disease or were inundated by European immigrants before they could recover.

The First Strike Force of the white immigrants to the Lands of the Demographic Takeover were epidemics. A few examples from scores of possible examples follow. Smallpox first arrived in the Rio de la Plata region in 1558 or 1560 and killed, according to one chronicler possibly more interested in effect than accuracy, "more than a hundred thousand Indians" of the heavy riverine population there. An epidemic of plague or typhus decimated the Indians of the New England coast immediately before the founding of Plymouth. Smallpox or something similar struck the aborigines of Australia's Botany Bay in 1789, killed half, and rolled on into the interior. Some unidentified disease or diseases spread through the Maori tribes of the North Island of New Zealand in the 1790s, killing so many in a number of villages that the survivors were not able to bury the dead.¹⁷

After a series of such lethal and rapidly moving epidemics, then came the slow, unspectacular but thorough cripplers and killers like venereal disease and tuberculosis. In conjunction with the large numbers of white settlers these diseases were enough to smother aboriginal chances of recovery. First the blitzkrieg, then the mopping up.

The greatest of the killers in these lands was probably smallpox. The exception is New Zealand, the last of these lands to attract permanent European settlers. They came to New Zealand after the spread of vaccination in Europe, and so were poor carriers. As of the 1850s smallpox still had not come ashore, and by that time two-thirds of the Maori had been vaccinated.¹⁸ The tardy arrival of smallpox in these islands may have much to do with the fact that the Maori today comprise a larger percentage (9 percent) of their country's population than that of any other aboriginal people in any European colony or former European colony in either Temperate Zone, save only South Africa.

American Indians bore the full brunt of smallpox, and its mark is on their history and folklore. The Kiowa of the southern plains of the United States have a legend in which a Kiowa man meets Smallpox on the plain, riding a horse. The man asks, "Where do you come from and

¹⁷ Juan López de Velasco, *Geografía y descripción universal de las Indias* (Madrid: Establecimiento Topográfico de Fortanet, 1894), p. 552; Oscar Schmieder, "The Pampa – A Natural and Culturally Induced Grassland?" *University of California, Publications in Geography* (27 September 1927): 266; Sherburne F. Cook, "The Significance of Disease in the Extinction of the New England Indians." *Human Biology* 14 (September 1975): 486-91; J. H. L. Cumpston, *The History of Smallpox in Australia, 1788-1908* (Melbourne: Albert J. Mullet, Government Printer, 1914), pp. 147-9; Harrison M. Wright, *New Zealand, 1769-1840* (Cambridge, Mass.: Harvard University Press, 1959), p. 62. For further discussion of this topic, see Crosby, *Columbia Exchange*, chaps. 1 and 2, and Henry F. Dobyns, *Native American Historical Demography: A Critical Bibliography* (Bloomington: Indiana University Press/Newberry Library, 1976).

¹⁸ Arthur C. Thomson, *The Story of New Zealand* (London: Murray, 1859), vol. 1, p. 212.

what do you do and why are you here?” Smallpox answers, “I am one with the white men — they are my people as the Kiowas are yours. Sometimes I travel ahead of them and sometimes behind. But I am always their companion and you will find me in their camps and their houses.” “What can you do,” the Kiowa asks. “I bring death,” Smallpox replies. “My breath causes children to wither like young plants in spring snow. I bring destruction. No matter how beautiful a woman is, once she has looked at me she becomes as ugly as death. And to men I bring not death alone, but the destruction of their children and the blighting of their wives. The strongest of warriors go down before me. No people who have looked on me will ever be the same.”¹⁹

In return for the barrage of diseases that Europeans directed overseas, they received little in return. Australia and New Zealand provided no new strains of pathogens to Europe — or none that attracted attention. And of America’s native diseases none had any real influence on the Old World — with the likely exception of venereal syphilis, which almost certainly existed in the New World before 1492 and probably did not occur in its present form in the Old World.²⁰

Weeds are rarely history makers, for they are not as spectacular in their effects as pathogens. But they, too, influence our lives and migrate over the world despite human wishes. As such, like varmints and germs, they are better indicators of certain realities than human beings or domesticated animals.

The term “weed” in modern botanical usage refers to any type of plant which — because of especially large numbers of seeds produced per plant, or especially effective means of distributing those seeds, or especially tough roots and rhizomes from which new plants can grow, or especially tough seeds that survive the alimentary canals of animals to be planted with their droppings — spreads rapidly and outcompetes others on disturbed, bare soil. Weeds are plants that tempt the botanist to use such anthropomorphic words as “aggressive” and “opportunistic.”

Many of the most successful weeds in the well-watered regions of the Lands of the Demographic Takeover are of European or Eurasian origin. French and Dutch and English farmers brought with them to North America their worst enemies, weeds, “to exhaust the land, hinder and damnify the Crop.”²¹ By the last third of the seventeenth century at least twenty different types were widespread enough in New England to attract the attention of the English visitor, John Josselyn, who identified couch grass, dandelion, nettles, mallows, knot grass, shepherd’s purse, sow thistle, and clot burr and others. One of the most aggressive was plantain, which the Indians called “English-Man’s Foot.”²²

European weeds rolled west with the pioneers, in some cases spreading almost explosively. As of 1823 corn chamomile and maywood had spread up to but not across the Muskingum River in Ohio. Eight years later they were over the river.²³ The most prodigiously imperialistic of the weeds in the eastern half of the United States and Canada were probably Kentucky bluegrass and white clover. They spread so fast after the entrance of Europeans into a given area that there is some suspicion that they may have been present in pre-Columbian America, although the earliest

¹⁹ Alice Marriott and Carol K. Rachlin, *American Indian Mythology* (New York: New American Library, 1968), pp. 174-5.

²⁰ Crosby, *Columbian Exchange*, pp. 122-64, passim.

²¹ Jared Eliot, “The Tilling of the Land, 1760,” in *Agriculture in the United States: A Documentary History*, ed. Wayne D. Rasmussen (New York: Random House, 1975), vol. 1, p. 192.

²² John Josselyn, *New Englands Rarities Discovered* (London: G. Widdowes at the Green Dragon in St. Paul’s Church-yard, 1672), pp. 85, 86; Edmund Berkeley and Dorothy S. Berkeley, eds., *The Reverend John Clayton* (Charlottesville: University of Virginia Press, 1965), p. 24.

²³ Lewis D. de Schweinitz, “Remarks on the Plants of Europe Which Have Become Naturalized in a More or Less Degree, in the United States,” *Annals Lyceum of Natural History of New York*, vol. 3 (1832) 1828-1836, 155.

European accounts do not mention them. Probably brought to the Appalachian area by the French, these two kinds of weeds preceded the English settlers there and kept up with the movement westward until reaching the plains across the Mississippi.²⁴

Old World plants set up business on their own on the Pacific coast of North America just as soon as the Spaniards and Russians did. The climate of coastal southern California is much the same as that of the Mediterranean, and the Spaniards who came to California in the eighteenth century brought their own Mediterranean weeds with them via Mexico: wild oats, fennel, wild radishes. These plants, plus those brought in later by the Forty-niners, muscled their way to dominance in the coastal grasslands. These immigrant weeds followed Old World horses, cattle, and sheep into California's interior prairies and took over there as well.²⁵

The region of Argentina and Uruguay was almost as radically altered in its flora as in its fauna by the coming of the Europeans. The ancient Indian practice, taken up immediately by the whites, of burning off the old grass of the pampa every year, as well as the trampling and cropping to the ground of indigenous grasses and forbs by the thousands of imported quadrupeds who also changed the nature of the soil with their droppings, opened the whole countryside to European plants. In the 1780s Félix de Azara observed that the pampa, already radically altered, was changing as he watched. European weeds sprang up around every cabin, grew up along roads, and pressed into the open steppe. Today only a quarter of the plants growing wild in the pampa are native, and in the well-watered eastern portions, the "natural" ground cover consists almost entirely of Old World grasses and clovers.²⁶

The invaders were not, of course, always desirable. When Darwin visited Uruguay in 1832, he found large expanses, perhaps as much as hundreds of square miles, monopolized by the immigrant wild artichoke and transformed into a prickly wilderness fit neither for man nor his animals.²⁷

The onslaught of foreign and specifically European plants on Australia began abruptly in 1778 because the first expedition that sailed from Britain to Botany Bay carried some livestock and considerable quantities of seed. By May of 1803 over two hundred foreign plants, most of them European, had been purposely introduced and planted in New South Wales, undoubtedly along with a number of weeds.²⁸ Even today so-called clean seed characteristically contains some weed seeds, and this was much more so two hundred years ago. By and large, Australia's north has been too tropical and her interior too hot and dry for European weeds and grasses, but much of her southern coasts and Tasmania have been hospitable indeed to Europe's willful flora.

Thus, many — often a majority — of the most aggressive plants in the temperate humid regions of North America, South America, Australia, and New Zealand are of European origin. It

²⁴ Lyman Carrier and Katherine S. Bort, "The History of Kentucky Bluegrass and White Clover in the United States," *Journal of the American Society of Agronomy* 8 (1916): 256-66; Robert W. Schery, "The Migration of a Plant: Kentucky Bluegrass Followed Settlers to the New World," *Natural History* 74 (December 1965): 43-4; G. W. Dunbar, ed., "Henry Clay on Kentucky Bluegrass," *Agricultural History* 51 (July 1977): 522.

²⁵ Edgar Anderson, *Plants, Man, and Life* (Berkeley and Los Angeles: University of California Press, 1967), pp. 12-15; Elna S. Bakker, *An Island Called California* (Berkeley and Los Angeles: University of California Press, 1971), pp. 150-2; R. W. Allard, "Genetic Systems Associated with Colonizing Ability in Predominantly Self-Pollinated Species," in *The Genetics of Colonizing Species*, ed. H. G. Baker and G. Ledyard Stebbins (New York: Academic Press, 1965), p. 50; M. W. Talbot, H. M. Biswell, and A. L. Hormay, "Fluctuations in the Annual Vegetation of California," *Ecology* 20 (July 1939): 396-7.

²⁶ Félix de Azara, *Descripción é historia del Paraguay y del Río de la Plata* (Madrid: Imprenta de Sanchez, 1847), vol. 1, 57-8; Schmieder, "Alteration of the Argentine Pampa," pp. 310-11.

²⁷ Darwin, *Voyage of the Beagle*, pp. 119-20.

²⁸ *Historical Records of Australia*, ser. 1, vol. 4, pp. 234-41.

may be true that in every broad expanse of the world today where there are dense populations, with whites in the majority, there are also dense populations of European weeds. Thirty-five of eighty-nine weeds listed in 1953 as common in the state of New York are European.

Approximately 60 percent of Canada's worst weeds are introductions from Europe. Most of New Zealand's weeds are from the same source, as are many, perhaps most, of the weeds of southern Australia's well-watered coasts. Most of the European plants that Josselyn listed as naturalized in New England in the seventeenth century are growing wild today in Argentina and Uruguay, and are among the most widespread and troublesome of all weeds in those countries.²⁹

In return for this largesse of pestiferous plants, the Lands of the Demographic Takeover have provided Europe with only a few equivalents. The Canadian water weed jammed Britain's nineteenth-century waterways, and North America's horseweed and burnweed have spread in Europe's empty lots, and South America's flowered galinsoga has thrived in her gardens. But the migratory flow of a whole group of organisms between Europe and the Lands of the Demographic Takeover has been almost entirely in one direction.³⁰ Englishman's foot still marches in seven league jackboots across every European colony of settlement, but very few American or Australian or New Zealand invaders stride the waste lands and unkempt backyards of Europe.

European and Old World human beings, domesticated animals, varmints, pathogens, and weeds all accomplished demographic takeovers of their own in the temperate, well-watered regions of North and South America, Australia, and New Zealand. They crossed oceans and Europeanized vast territories, often in informal cooperation with each other — the farmer and his animals destroying native plant cover, making way for imported grasses and forbs, many of which proved more nourishing to domesticated animals than the native equivalents; Old World pathogens, sometimes carried by Old World varmints, wiping out vast numbers of aborigines, opening the way for the advance of the European frontier, exposing more and more native peoples to more and more pathogens. The classic example of symbiosis between European colonists, their animals, and plants comes from New Zealand. Red clover, a good forage for sheep, could not seed itself and did not spread without being annually sown until the Europeans imported the bumblebee. Then the plant and insect spread widely, the first providing the second with food, the second carrying pollen from blossom to blossom for the first, and the sheep eating the clover and compensating the human beings for their effort with mutton and wool.³¹

There have been few such stories of the success in Europe of organisms from the Lands of the Demographic Takeover, despite the obvious fact that for every ship that went from Europe to those lands, another traveled in the opposite direction.

The demographic triumph of Europeans in the temperate colonies is one part of a biological and ecological takeover which could not have been accomplished by human beings alone, gunpowder notwithstanding. We must at least try to analyze the impact and success of all the immigrant organisms together — the European portmanteau of often mutually supportive plants, animals, and microlife which in its entirety can be accurately described as aggressive and opportunistic, an ecosystem simplified by ocean crossings and honed by thousands of years of competition in the unique environment created by the Old World Neolithic Revolution.

²⁹ Edward Salisbury, *Weeds and Aliens* (London: Collins, 1961), p. 87; Angel Julio Cabrera, *Manual de la flora de los alrededores de Buenos Aires* (Buenos Aires: Editorial Acme S. A., 1953), passim.

³⁰ Elton, *Ecology of Invasions*, p. 115; Hugo Ilitis, "The Story of Wild Garlic," *Scientific Monthly* 68 (February 1949): 122-4.

³¹ Otto E. Plath, *Bumblebees and Their Ways* (New York: Macmillan, 1934), p. 115.

The human invaders and their descendants have consulted their egos, rather than ecologists, for explanations of their triumphs. But the human victims, the aborigines of the Lands of the Demographic Takeover, knew better, knew they were only one of many species being displaced and replaced; knew they were victims of something more irresistible and awesome than the spread of capitalism or Christianity. One Maori, at the nadir of the history of his race, knew these things when he said, “As the clover killed off the fern, and the European dog the Maori dog — as the Maori rat was destroyed by the Pakeha (European) rat — so our people, also, will be gradually supplanted and exterminated by the Europeans.”³² The future was not quite so grim as he prophesied, but we must admire his grasp of the complexity and magnitude of the threat looming over his people and over the ecosystem of which they were part.

³² James Bonwick, *The Last of the Tasmanians* (New York: Johnson Reprint Co., 1970), p. 380.