BLACK GOLD

In *Dirt*, *The Erosion of Civilizations*, geologist David Montgomery writes about the soil that grows the world's crops, soil we think of as dirt and need to start thinking of as gold, if we're to survive halfway pleasantly beyond the current century. Without viable, living, constantly renovated soil, he argues, we can't feed ourselves much longer. Hydroponics and the 1940's – 1970's Green Revolution's wonders require constant big jolts of oil-derived agrochemicals, and the oil's scheduled to dribble down to 10% of current production by 2100. As Montgomery warns, "with just a couple of feet of soil standing between prosperity and desolation, civilizations that plow through their soil vanish." (5)

Globally we lose twenty-four billion tons of topsoil annually – several tons for every person on the planet. Egypt, the most durable of the ancient valley civilizations, thanks to the once yearly inundations of the Nile, now imports most of its food, done in by the Aswan Dam, as China's Yellow River has been by diking. When the Russians diverted water for agriculture and dried up the Aral Sea, most of the topsoil blew away, hastening the collapse of the Soviet Union. In Europe – as in Australia, Jamaica, the Phillipines, Western Africa and Ethiopia – "erosion outpaces soil productivity by ten to twenty times." (165) About a third of the planet's land is desertifying. (17)) And at the 1970's rate of erosion, all the U.S.'s topsoil will be gone in a century. (173)

About half the agrochemical fertilizers used in the U.S. each year just replace nutrients lost to erosion. So we're

using rare and expensive fossil fuels to replace – so far – common and cheap dirt. (200) And we pay 300 billion annually in global subsidies – "paying industrial farmers to practice unsustainable agriculture that undercuts the ability of the poor to feed themselves – the only possible solution to global hunger." (245)

How did we get here? Largely through overpopulation and our twin faiths in human ingenuity and nature's inexhaustibility. Most of the story follows a pattern of exhausting more and more marginal soils as population pressures increase, followed by collapse and, until the beginnings of modern civilizations, long periods of recovery. Though both the ancient Greeks and Romans understood soil conservation, they allowed themselves to be driven by exploding populations and wealth, and ended destroying theirs. And as in the Levant and the Middle East, so in Latin America, where slash and burn agriculture worked while populations were small and land abundant, then yielded to soil destruction and collapse as populations swelled.

Then, in the nineteenth century, agrochemicals rode to the rescue, and it seemed we no longer needed healthy soil. With the discovery of huge accretions of guano on tropical islands, we broke the millennial "reliance on the nutrient cycle [manure and compost] into a one-way transfer of nutrients to consumers. From then on, nothing came back to the soil." (187) Guano soon yielded to superphosphates and nitrates. Now "large scale agrochemistry became conventional farming, and traditional practices became alternative . . . ." (184-5) And in 1901 the USDA declared that "[soil] is the one resource that cannot be exhausted."

Whatever the appearance, chemistry, it seemed, would give it life.

But even before the century ended we had learned that chemically solving the nitrogen problem did not reduce world hunger; instead populations boomed and in 2007 we had more hungry people on earth than ever.

Where, then, are we to turn? "In the 1980's," Montgomery says, "the total . . . land under cultivation [worldwide] began declining for the first time since farming reached the land between the Tigris and Euphrates." (170) And "the increases fueled by the Green Revolution [nitrogen-fed super grains] have stalled." Since crops don't use half the nitrogen available in the soil today, "it may not do much good to add more, even if we could." 240) And probably "the easiest – and greatest – increases in crop yields from plant breeding have already been achieved." (240) We don't, it seems, have many moves left.

To cement the point, and remembering that earth itself is an island, Montgomery details the fates of several island civilizations – among them Easter, Iceland, Haiti and Cuba.

Easter, perhaps most dramatic because of its massive stone heads, declined in three centuries from a tropical Polynesian paradise to a desert. Thanks to deforestation, erosion, and destruction of guano-producing birds, they were reduced to incessant warfare and cannibalism, living in caves among their great totems.

Icelanders degraded their once-forested land by deforestation and overgrazing; cold weather and wind did the rest.

Perhaps the saddest of these histories is Haiti, where freed slaves divided and re-divided their own small farms, as the population grew, until half its arable soil was gone, and most people now live in permanent poverty.

Cuba, forced by Soviet withdrawal and then collapse and by a U.S. embargo, launched a so far successful experiment in zero population growth and organic no-till agriculture which feeds everyone; in Havana alone there are hundreds of gardens, enough to keep the city in vegetables. Whether such an experiment could succeed in a democracy, is another question.

And erosion has largely shaped the recent dynamics of Island Earth, Montgomery says, from the English enclosing of the commons to colonization, to the French revolution and the American Civil War, to the Irish potato famine and the Midwest Dust Bowl, to ongoing world hunger in the wake of the Green Revolution's failed promises.

Our Island is, among other things, up against Time. Truly conservationist agriculture would keep the "balance between the geologic processes of rock decay and [mostly human caused] erosion . . . [yet] 'it will in most cases require thousands of years before the surface can be restored to its original estate.'" (N.S. Shaler, early 20thC, p. 148)

Still, there is hope. Some have practiced topsoil-retaining agriculture for centuries – Moses' Jericho, Holland, Denmark, Brazil, Thailand, England and France, for instance. And by the late 1990's one in ten U.S. families and two-thirds of Muscovites were engaged in some form of urban agriculture.

But can contemporary farmers switch to sustainable practices and survive economically? Montgomery answers emphatically yes: many studies show, he says, "substantially lower production costs more than offset slightly smaller harvests from organic farms" (207) and no-till, cover crops, green manure and biological pest control are all growing in popularity because they make farmers money and insure their futures. By 2001 60% of Canadian farmland, and by 2004 41% of U.S farmland (but, alas, only 5% of farmland worldwide) were engaged in erosion-reversing no-till agriculture. A good sign, since, as Montgomery says, "if agriculture doesn't become sustainable, nothing else will." (214)

Adam derives from the Hebrew for "soil," Eve from "living," and homo from the Latin humus. The connections were fundamental at our very beginning, in the roots of our language.

Bill Keep word count: 1,141