

## **Robert A. McGuire and Phillip R. P. Coelho: Parasites, pathogens, and progress: diseases and economic development**

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The interaction between humans and their environment began some 150,000–200,000 years ago when our ancestors, the *Homo sapiens*, evolved into their modern form in East Africa. Thereafter, some 70,000–90,000 years ago, our ancestors began the slow process of populating the entire planet through migration. For most of human existence, humans were small hunter-gatherers societies, living off whatever came their way. In a gradual process that began only 10,000 years ago, hunter-gatherer societies transformed from nomadism to sedentism. This transformation brought with it the early civilizations and empires. Nevertheless, up until two or three centuries ago, the vast majority of humanity was living out a subsistence existence with continued slow population growth from about 1 million at the time of the Neolithic Revolution, to 200 million at year 1 A.D. to 500 million by 1500. Five centuries ago, Europe, the densest populated continent at the time, with its advanced technology and access to the Atlantic, began spreading its people, languages, culture and institutions around the globe. This colonialism process sowed the seeds for the Industrial Revolution that is largely responsible for the increasing dispersion in per capita income that we observe today. The creation of technologies and their transferability through time and space has supported a growing population.

Scholars have proposed different hypotheses to explain the relatively recent rapid growth and dispersal of human populations. Differences in geography, culture and political institutions are considered by most to be the main factors. However, in *Parasites, Pathogens, and Progress*, authors Robert A. McGuire and Philip P. Coelho decisively contend that humans and diseases have been co-evolving ever since *Homo Sapiens* emerged and more intensively so since the Neolithic revolution. This co-evolution, in turn, has had a profound effect on the growth and dispersal of

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humanity, and, in particular, on the peoples of the New World. McGuire and Coelho argue that native populations of the New World were falling victim *not* to European “guns, germs and steel”, as Jared Diamond has famously argued, but almost exclusively to the germs Europeans brought with them. In McGuire and Coelho’s view, had the journey from Europe to the Americas been shorter and cheaper, the conquest of the New World and the extinction of the native peoples of the New World would have been even more rapid.

Most of their book is devoted to describing how diseases shaped human populations in the Americas, especially in the regions that eventually became the United States. This story has two parts. The first part is the extinction on the Native Americans. The second part is the re-populating of the Americas with people of African and European origin. Diseases are at the center.

The first part of the story is simple. Europeans domesticated animals over thousands of years. With each domestication event, Europeans were exposed to and infected by animal diseases that later became known as smallpox, measles and mumps—to name a few. Those who were most susceptible to these new diseases did not survive to reproduce. Those who were less susceptible survived and reproduced. Over many generations, exposure to specific pathogens resulted in immunity. One by one, diseases evolved from being epidemic to endemic. In contrast, Native Americans had never been exposed to the pool of diseases that Europeans had experienced. Moreover, the Native American populations were relatively homogeneous genetically. These two factors greatly increased their susceptibility to epidemic disease. In a nut shell, the extinction of Native Americans is a story of too many diseases striking in too short a time for immunities to evolve.

The second part of the story is more complex. Why were the cooler northern parts of the United States and Canada populated by the descendants of Europeans, while the hotter southern parts of the Americas were populated by Africans? McGuire and Coelho claim that since the journey to the New World was too expensive for the relatively high-paid European working class, American planters were left with a choice between European indentured servants or African slaves. Assuming a goal of profit maximization, American planters would choose to employ the cheapest labor (measured in efficiency units). Thus, American planters would be required to calculate the discounted net present value of the two types of labor, which depended on several factors including the productivity per unit of time and the discount rate, which in turn, depended on mortality rates. McGuire and Coelho argue that the later factor, mortality rates, was very different for Europeans and Africans relocated to the different regions of America. For example, Africans had partial immunity to Malaria due to exposure in childhood and to genetic differences. Europeans, on the other hand, were more resistant to respiratory diseases which are a factor in cooler climates. The difference in mortality between Europeans and Africans was the factor that determined which type of labor was purchased in the northern and southern regions of the Americas. It should be noted that diseases also affected labor productivity. Hence, McGuire and Coelho inferred differences in productivity between African slaves and European indentured servants from the observed choices that planters made.

One might erroneously conclude that McGuire and Coelho take the disease environment in the Americas as exogenous and the process of populating the Americas as the

optimal plan given this exogenous factor. Instead, McGuire and Coelho argue that the New World was relatively disease free, because population density was low with little contact between humans and animals. In addition, there was limited contact between humans and their own waste. Old World European populations brought Old World diseases to the Americas; Africans brought tropical diseases. The important exogenous factors, according to McGuire and Coelho, are differences in the weather across different geographic areas. It is the interaction between the weather and the pathogens brought by the Africans and Europeans that created the disease environment. Pathogens originating in Africa, like malaria, hookworm and yellow fever, survived better in the warmer American regions. Thus, it was the initial migration of Africans to the Caribbean that generated a disease environment similar to the one existing in West-Africa, that later devastated the Europeans. Put differently, had the European indentured servants, and not the West-African slaves, first arrived to the Caribbean, the disease environment in the Caribbean would have been such that Europeans would not have suffered such high rates of mortality and morbidity as they did.

*Parasites, Pathogens, and Progress* is a great book to read. Scholars interested in health, development and demographics can generate many research projects from the interesting facts and hypotheses that McGuire and Coelho nicely put together into this book. As an example, McGuire and Coelho speculate that the disease environment that has prevailed in the American South, one that gave such a big advantage to Africans and African descendants in terms of resistance to mortality and morbidity, made slavery so profitable that was worth fighting for in the American Civil War. A rigorous assessment of such an intriguing hypothesis can be the subject of a first-class research project.