PRESIDENTIAL ADDRESS: PARASITES ON A SHRINKING PLANET

David Bruce Conn*
School of Mathematical and Natural Sciences, Berry College, Mount Berry, Georgia 30149-5036, and Department of Invertebrate Zoology, Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, Massachusetts 02138. e-mail: dbconn@fas.harvard.edu

Planet Earth is shrinking at an ever-accelerating pace. It is not shrinking geologically, of course, or even atmospherically, unless you refer to the growing ozone hole. It is not even shrinking biologically in terms of net biomass, though some might argue that biodiversity is shrinking. But for Homo sapiens as a species, the planet is definitely shrinking. Why is this? Because, at least for now and the foreseeable future, planet Earth is our sole living space. The effective size of the available living space for any species is determined by the ability of that species to disperse throughout potential habitats, to successfully colonize those habitats, and to effectively utilize the resources available to them in those habitats. In terms of terrestrial habitats, since we are essentially a terrestrial species, we have pretty much dispersed to and colonized the entire planet. But we are an ingenious species, highly adaptable, and thus likely to find even other Earthly habitats to colonize—under the ocean, beneath the earth’s surface, in areas such as Antarctica and desert landscapes where we can trade minerals, wind and geothermal energy, and other non-biological resources for food. Homo sapiens seem to be the ultimate invasive species.

But, are we really? At first glance, no other species, throughout any of Earth’s history, seems to come close to rivaling the capacity of Homo sapiens for dispersal and colonization of new habitats. The exceptions, of course, are the other species that we intentionally, or unintentionally, take with us as we disperse. These include the plants, animals, and microbes that we take with us as sources of food and fiber—the livestock, the fish, the poultry, and so on. Also included are the parasites—those that live on and in us, those that live on and in the species that we move around with us, and especially those that use both we and our food animals and companion animals as hosts. Since there are apparently more parasitic organisms than free living, these parasites must be actually the ultimate invasive species, using their lowly human and synanthropic animal hosts as vehicles for their own dispersal. Except for the pets or companion animals, we don’t really want to take the other species with us. But we have no choice—we have to eat. And we certainly don’t want to take the parasites with us. But we seem to have no choice here either—the parasites are just too adaptable, too ingenious, too good at staying with us despite our greatest efforts to leave them behind.

Of parasitologists and politicians

In considering all of this, it would seem reasonable to suggest that parasitologists, and other scientists who study infectious diseases, are the most important humans around, at least in terms of explaining, and thus guiding, our biological quest to colonize without being colonized. But, alas, things can never be that simple. As a species, we owe much of our success to the extreme complexity of our society, which in turn has led to complex technology which ultimately requires complex organization, management, and communication to manage our exceedingly multifarious social division of labor. And so, we parasitologists have to share the high status that is rightfully ours with such other human specialists as deans, engineers, lawyers, bankers, accountants, generals, corporate executives, merchants, journalists, and even—dare I say it—politicians.

Actually, some politicians can be rather clever chaps in their own way, making observations across various facets of society to discern important emerging patterns. One such clever politician was almost 70 years ahead of me in recognizing that our planet is indeed shrinking, especially in relation to parasites. Not to allow parasitologists to be outdone by politicians, I hasten to add that it was a parasitologist who most prominently recorded and promoted the ideas of this famous politician. In fact, this parasitologist was a close successor to Henry Baldwin Ward, serving as the third president of the American Society of Parasitologists. The parasitologist was none other than the eminent Professor Richard P. Strong (Fig. 1), one of my scientific heroes, whose contributions to tropical medical parasitology in the early 1900s helped to establish Harvard University as a leading institution in the field during that era (Fig. 2). Today, in my role as Associate in Invertebrate Zoology at Harvard’s Museum of Comparative Zoology, I have the privilege of curating the parasite collections, including those made by Dr. Strong and his colleagues on their many pioneering expeditions to the tropics of Africa, Asia, and South America (Strong et al., 1915, 1926, 1934; Conn, 2002, 2006, 2008).

The famous politician was none other than Franklin D. Roosevelt, the longest-serving president of the United States.