

International Biology*

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When we speak of science and warfare we are apt to have physics and chemistry in mind. Rarely do we associate biology with warfare beyond its relationships with the more or less salvage operations of medicine. Nevertheless, in spite of its high degree of mechanization modern warfare still remains essentially a contest between human beings.

We Americans are wont to "put things in the saddle" and to overglorify the machine. Not that we would detract from the importance of machinery in warfare, but we should bear in mind that ultimately it is the "man behind the gun" that counts.

I should like to call to your attention a small segment of available material that is for the most part being overlooked in current biology teaching.

It seems to me that no better approach to the world of tomorrow has yet been advanced than that revealed from the study of science in general and biology in particular. For example, consider the intriguing possibility suggested by President Karl Compton in the *Rotarian* magazine a few years ago. I am not quoting him directly, but his reasoning went somewhat like this: Until a few generations ago, there were only two primitive recipes for securing the good things of life. One was to work hard and long to produce them. The other was to take them by force and strategy

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from someone else. Now there are visions of a third way. Science, says Compton, creates new wealth. And while science cannot remove ambition and envy from human beings, it can outmode wars between the "haves" and the "have-nots." It can supply nations with substitutes for natural products at a cost far less than war. Herein lies a strong ray of hope for the future. When the masses of the people learn that they can secure the goods they need without recourse to force, it must follow that they will begin to think and act in new ways.

In our science classes we might begin by stressing the international character of science. So deep are these roots struck that neither wars nor revolutions can uproot them. To be sure, during wars science is necessarily partisan but, as Raymond Fosdick points out in a recent *Rockefeller Foundation Report*, this is a perversion of its real character. Says Fosdick: "When the war is done, men will again have access to all knowledge, wherever it may be found, and armed guards will no longer protect the secrets of research that might bring health and a better life to the race. Laboratories surrounded by barbed wire are ugly monuments to the intellectual and moral distortion of our times. For of all the activities of men, science and learning are most truly international."

As exponents of science we are naturally proud of the accomplishments of American Science in this war. Long before Selective Service, American scientists had made a voluntary registration of their talents and were launched upon their unmatched record in winning the

war. Did I say *American Science*? That in itself is a misnomer, for science knows no boundaries. Mustard gas came out of the German dye industry, but so did the sulfa drugs. Today the emphasis is upon what mustard gas represents; tomorrow upon the sulfa drugs, penicillin and the like.

The naming of plants and animals should take on added significance in times like these. At the International Botanical Congress held in Vienna in 1905, it was possible to reach substantial agreement on the controversial subject of plant names. There is a similar Code of Zoological Nomenclature. Both plant and animal codes are based primarily upon the tenth edition of the *Systema Natura* of Linnaeus, published in 1758. Hence, our enemies may choose to call men swine or dogs, but in biology classes the world over man is still *Homo sapiens* and the dog is *Canis familiaris* whether it be a German police, a Scottish terrier or a French poodle. Furthermore, whatever be the color of their skin, all men (everywhere, as Mr. Roosevelt puts it) belong to the same biological species. This is a very good time for a lesson on biological nomenclature.

It is an even better time for the study of diseases with an international flavor. "Spanish" influenza lost its nationalistic name when it became a pandemic following the last world war. It struck down friend and foe alike with frightening impartiality. Yellow fever is another such disease. The entire United States army is to be vaccinated against yellow fever against which nature imparts neither national nor racial immunity. While we are about it, we might seek to correct an erroneous impression that has crept into some of our history books to the effect that the French could not build the Panama Canal. As a matter of fact the French were master canal builders, having just completed the Suez Canal

where shifting sands made the job doubly difficult. In Panama the French could not compete with insects and disease, and not until Walter Reed and his associates had paved the way could American engineers build the canal.

If diseases that have made history be our topic, surely we must give some attention to war's sixth column—the deadly typhus. In all great wars this disease has exacted a greater toll than gunfire. For elaboration the reader is referred to books of the type of Zinsser's *Rats, Lice and History*. We have almost forgotten Guadalcanal, but the boys who made history there will not soon forget because the malarial parasites playing havoc with their blood corpuscles will serve as an unpleasant reminder. Each Pacific island has its own perils other than gunfire and the danger of introducing some of these tropical diseases into this country is something not to be lightly overlooked. "In relation to great scourges like malaria and influenza—as indeed to many other great perils—nations today are roped like Alpine climbers crossing a glacier: they survive or perish together."

Animals and plants are blissfully unaware of state lines. Accordingly, one important phase of international biology is the control of immigrant species. These immigrants, released from the pressure of their natural enemies, often run amuck and become pests. The English sparrow and the starling in this country, and the rabbit in Australia come instantly to mind, but the list could be indefinitely extended. It is said that of the fifty most serious insect enemies of American agriculture more than three-fifths are immigrants. Every biology text contains a list of such pests. The Hessian Fly came from Europe as did also the Codling Moth, the Gipsy Moth and the Brown-tail Moth; the Chinch Bug came from Tropical Amer-

ica; the Boll-weevil and the Mexican Bean Beetle from Mexico; the San José Scale from Japan; and the Cottony Cushion Scale from Australia. But, like lend-lease, the traffic has not been all one-sided. The exchange of bugs has been international. We sent the Grape Phylloxera from New England to France whence it spread into Spain, Portugal, Switzerland and Italy. Our Colorado Potato Beetle went first into France and then into Germany.

Neither has the exchange of organisms always been an unprofitable transaction. Sir Walter Raleigh may be said to have started it, but it is still good business. As in the case of some of our literature and other native American products, Europe also appreciated the tomato first, while Americans did not generally know it was good to eat until about 1850, and the first improved varieties came from France and England. The Indians of the region now called Peru domesticated from seventy to eighty different plant species, among them the potato—both Irish and Sweet, Maize or Indian Corn, probably the most ancient of all cereals, and cocoa. The lowly peanut of which more than \$40,000,000 worth were consumed last year by the American people (plus the elephants in the zoos) is a native of Brazil and Uruguay. Tropical America gave the world the pineapple, the avocado, the guava. The pecan is a native of Southern United States and Mexico, and Columbus found the natives of the West Indies walking a mile, not for a Camel, but for cigars.

Cucumbers and muskmelons are believed to have come originally from India and watermelons from tropical Africa, while pumpkins and squash are of American origin. Peas apparently originated in Ethiopia, and the Israelites wandering in the wilderness complained bitterly to Moses because they had no onions. It is interesting that practically all of our widely used grasses are immigrants.

Of the introduced animals mention might be made of the large Japanese oyster in California waters; now a profitable oyster industry is established where formerly there existed a small one. That small mollusk, the periwinkle (*Littorina*), of the Atlantic Coast is neutral economically because in this country we have not cultivated a taste for it as have Europeans. The periwinkle was first reported from Halifax, Nova Scotia, in 1857. It now ranges southward to Delaware Bay where the warmer water probably checks its further spread.

Pelagic species present a special problem by virtue of the fact that they migrate. The fur seal, the whale, and various species of Pacific salmon are the property of no single nation and their protection is doubly difficult. For example, the Pribilof herd of fur seal had been reduced from an estimated five million seals in the late 1700s to about 100,000 in 1911. In that year the United States, Russia, Great Britain (representing Canada) and Japan signed the North Pacific Sealing Convention. By 1934 the herd had increased to 1,125,000, and Japan alone was averaging \$75,000 a year in pelt receipts without lifting a harpoon. It is not so well known that just two months before Pearl Harbor, Japan abrogated this treaty which had given three decades of protection to seals and thereby left another baby on the doorstep of those who will make the peace terms with that country.

Of all the nations engaged in whaling only the Japanese would not sign the treaty concluded at Geneva in 1931 looking to the conservation of whales. Up to the outbreak of the war Japan was slaughtering around ten or twelve thousand whales annually. Such a slaughter cannot be maintained after the war.

Japan, you must remember, is the greatest fishing and fish-eating country in the world. It was therefore natural

that among the concessions Japan secured by defeating Russia in 1904-05 was the right to operate canneries in Siberian waters until 1919. Only reluctantly has Russia granted short-timed renewals since, and some months ago she canceled the long-standing concessions over Sakhalin Island. It was in 1936 that Japanese fishermen turned in earnest to Alaskan waters. Japan finally was induced to sign a gentleman's agreement to stay on her side of the Pacific—to save both salmon and halibut from extinction. Thus the whole problem is again to end up in the lap of the peace makers.

The Migratory Bird Treaty Act of 1918 and the Migratory Bird Conservation Act of 1929 provide for the Federal administration of the migratory bird resources of the continent. During the year 1932 wild life refugees were started at strategic points on the waterfowl breeding grounds or flyways in twenty-one states. In contrast to the sordid record of Japan, it is suggested that high school pupils look up the record of Canada and the part she has played in protecting migratory birds to warrant this tribute from Dr. Ira N. Gabrielson, Director of our Fish and Wildlife Service: "Certainly the Fish and Wildlife Service could have asked for no more cooperation than Canada has always given it. She has been a good neighbor indeed."

Man is likewise a migratory species. Into this land of the free have flowed the brain and brawn of every race. At immigration ports our authorities decide who shall enter, who shall be debarred. Biologists cannot fail to note that the basis for entrance is often far from biological. Immigration laws look at the outward appearance, but biology looks at the inner make-up of the individual. The biologist would inquire into the kind of genes that the newcomer brings to be dumped into the melting pot of our great

country. Animals and plants are quarantined at the border, but so far as is known no tests are applied to discover whether immigrant people are harboring certain intestinal parasites. Again, the relationship between animal and plant species and immigration itself has never been thoroughly explored. The potato famine of 1845 which caused large numbers of peasants to leave Ireland was in turn caused by a fungus. The slave ships brought both sorghum and hookworm as well as slaves.

Human culture has been forced to take to the road again in our own times. America has received an Einstein, an Iltis, and a Thomas Mann. America's gain has been Europe's loss, and Europe has lost much. The lights have gone out one by one in many of her institutions of culture. Libraries have been destroyed; scholars have been scattered or are dead. America has remained relatively unscarred. We still have books and periodicals and all of the other elements that contribute to culture. Our duty to the race would seem to be clear—to set aside a small surplus of the good things that we enjoy against the day when European and Asiatic cathedrals of learning shall rise again.

This has perforce had to be a hasty sketch. Many makers of history have of necessity had to be omitted, such as the beaver whose onetime importance is enshrined in the heroic traditions of the Hudson's Bay Company, or the humble cod which adorns the State House of Massachusetts. We have left out of consideration the things that men fight over—rubber, coal, oil, and other by-products of life on the earth. If animals and plants were given to verbal expression they might say, each to his own kind, as the twin Gods when questioned as they appeared to hearten the ranks of Rome: "By many names men call us; in many lands we dwell."