

The female edge against disease

When it comes to disease resistance, there is little doubt that women are the superior sex. For instance, more boys than girls die in the womb, at birth and shortly after birth. More men than women are susceptible to severe parainfluenza respiratory infections; staphylococcal, *H. influenzae* and *E. coli* infections; central nervous system infection with polio virus or ECHO virus; fatal infectious mononucleosis; rotavirus gastroenteritis; two slow virus diseases; Legionnaires' disease; and even cancer. Men's lower resistance to disease, along with certain occupational and lifestyle factors, probably explains why women outlive men, on the average, by eight years.

Why do women possess a superior resistance to disease? It may be because evolutionary selection has equipped them with a double dose of genes that code for the immune system, David T. Purtilo and John L. Sullivan of the University of Massachusetts Medical School in Worcester propose in the December *AMERICAN JOURNAL OF DISEASES OF CHILDREN*. They base their hypothesis on ample evidence published by various investigators.

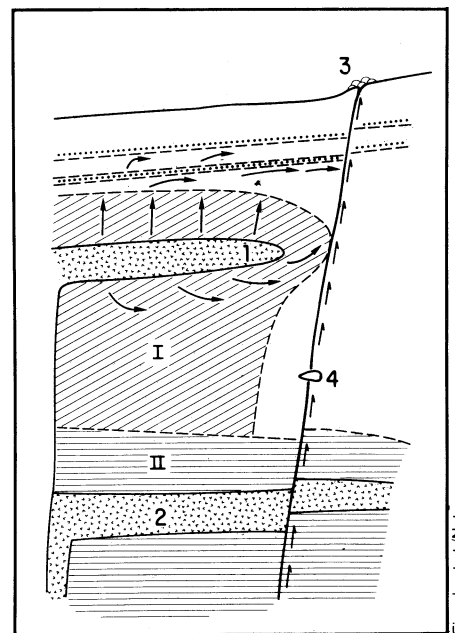
For instance, there is a wealth of data showing that resistance against disease depends on a strong immune system, and

some data that a number of human immune regulatory genes reside on the X sex chromosome. So, because women have two X chromosomes, and men only one, it is quite plausible that females possess a double dose of certain immune genes and hence a double dose of certain immune fighters in their bodies, such as T cells, B cells and antibodies. In fact, women have been found to form more antibodies against polioviruses and *E. coli* bacteria and to have more IgM and IgG antibodies than men do.

The reason that women have two X chromosomes and hence more immune genes than men have, Purtilo and Sullivan continue, is perhaps an evolutionary adaptive response to protect women from excessive immune suppression during pregnancy. Women's immune systems are known to be hampered somewhat during pregnancy, probably not enough to open women to disease but enough so that they will not reject the fetuses.

Women's superior immune responses, however, sometimes backfire on them, Purtilo and Sullivan point out. Unlike many other diseases, autoimmune diseases such as systemic lupus erythematosus, myasthenia gravis and rheumatoid arthritis strike women considerably more often than they strike men. What happens, it appears, is that female sex hormones somehow allow the female immune system to turn against the body rather than against some foreign enemy. □

Ore formation the early ocean way



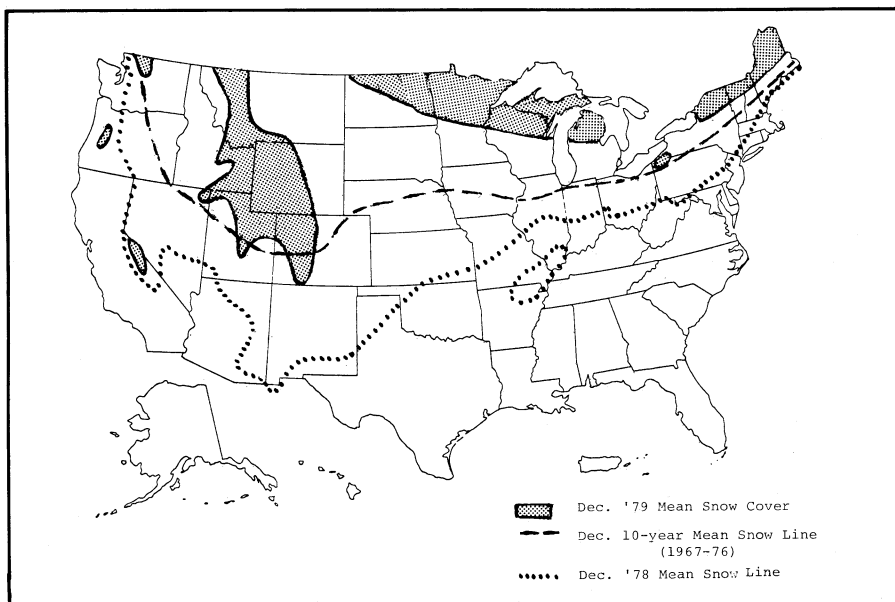
Magma (1 and 2) intrudes into sediments (I and II). Water leaves sediments, carrying minerals up cracks and deposits them on sea floor (3) where they are buried (4).

Where else to look for the origin of continental ore deposits but in the ocean? Fountains of hot water and minerals on the East Pacific Rise — one of many places where new ocean crust is forming — were researchers' first glimpse at the formation of ores by hydrothermal activity (SN: 1/12/80, p. 26). Warm water vents found 2,000 miles south on the Galapagos Rift proved to be their timid cousins: Instead of belching out minerals, they coyly drop their leached ores just below the sea floor surface. Now, evidence for another type of hydrothermal ore formation has been found in the sea floor.

Distinct from the processes discovered earlier because it does not involve the circulation of water through the crust, this latest variation on the ore formation theme may be typical of very young oceans that are just beginning to open, researchers say in the Jan. 31 *NATURE*. Such an ocean exists in the Gulf of California where evidence for the process was recovered in the form of deep sea cores. The Guaymas Basin in the Gulf is a young ocean — 3.5 million years old — that is forming as new sea floor is created along the East Pacific Rise. River runoff from land on both sides dumps huge amounts of sediment onto the newly formed volcanic crust. Scientists speculate that similarly thick sediments piled up on the newborn Atlantic sea floor until the broken continental edges moved farther away from the spreading center.

The thick sediments seem to be the key to the type of hydrothermal ore formation

Snow no show



To illustrate what Olympic organizers in Lake Placid, N.Y., already knew, the National Environmental Satellite Service of the National Oceanic and Atmospheric Administration put together this map comparing December 1979 U.S. snow cover with that of previous years. The situation has since improved for Olympic schussboomers and New England ski resort owners, but the map shows that the December 1979 snow cover (shaded area) fell far short of the record-breaking cover for December 1978 (dotted line) and didn't even come close to the 10-year average (dashed line). It also shows that the winter predictions of heavy snows in the Midwest, Plains and Rockies haven't quite panned out (SN: 12/8/79, p. 388). The map was compiled from satellite imagery.

seen in the Guaymas Basin. When scientists aboard the *Glomar Challenger* drilled there in late 1978 (SN: 2/10/79, p. 85), they brought back cores that showed sheet-like volcanic flows intruding into the soft sediments. They also found that the sediments sandwiched between the magma intrusions appeared compacted and dehydrated and that certain minerals usually found in sediments had been removed or were hydrothermally altered. In some cores, they found evidence for deposits of minerals typical of those formed by reaction with hot water, such as magnesium silicates and iron or manganese oxides or sulfides.

From these bits of evidence, German researcher Gerhardt Einsele, Joris M. Gieskes, Joseph Curray and others pieced together a mechanism: The newly formed magma intrudes as sheets into the rapidly deposited sediments. There, the heat and weight of the cooling rock expels the water contained in the sediments. As the heated water (about 300°C) leaves the sediments, it carries minerals formed by reac-

tions between the magma, the sediments and the water. When the water reaches cracks in the sediments or the volcanic rock, it carries its mineral load toward the surface and deposits it. Eventually, researchers speculate, such deposits are carried on top of the spreading sea floor and slapped onto the continents.

The hot and warm water vents, the magma expelled water and ore deposits formed on land appear to be "different manifestations of the same process," says Gieskes of the Scripps Institution of Oceanography. Because each occurs under slightly different conditions, each produces a different suite of minerals.

Alternating layers of magma and sediments in a young ocean basin had been suggested prior to the recovery of the cores, according to co-worker David G. Moore. But the mineralization process was not anticipated, he says. If the process is indeed characteristic of young oceans, similar deposits might be found, for example, in very old sediments near the margins of the Atlantic Ocean. □

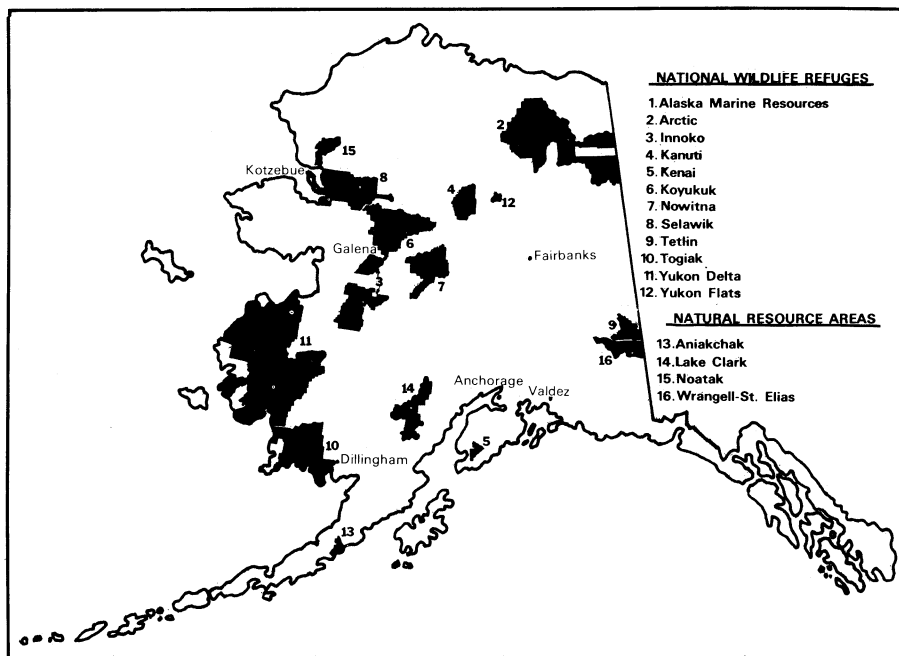
obstructionism based on the threat of a one-man filibuster."

Alaska's Senator Mike Gravel, a Democrat, has waged a prodevelopment fight against protective legislation in the past. But he and colleagues recently agreed to a time limit for debating the measure during this Congress, thereby ruling out any chance of a filibuster. Andrus expressed concern, however, that the lateness of the Senate's intended debate — now scheduled for after July 4 — "will lead to a stalemate in the closing days of the 96th Congress, just as happened to its predecessor in 1978." Hence his action.

Among the lands withdrawn for protection by Andrus are the vital habitats for 10 percent of all ducks, 20 percent of the geese and 45 percent of the swans inhabiting North America. Some 70 to 90 percent of the rookeries and hauling grounds for Alaska's sea lions, sea otters and harbor seals would also be protected. The Alaska Marine Resources refuge alone provides nesting grounds for an estimated 40 million seabirds, including several marine species that breed nowhere else in North America.

Later this year another 12 million acres of Alaska lands now under study may be added to the 40 million, and receive the extended, 20-year protection. □

Interior extends Alaska lands protection



Blackened regions denote acreage receiving extended environmental protection.

Restrictions against commercial oil, gas and mineral development on 40 million acres of federal land in Alaska — due to expire late next year — have been extended for an additional two decades. Designation of the affected regions as wildlife refuges by the Interior Department permits work on existing mining claims to continue, but bars most new claims and other forms of commercial development.

Curbs on land use under the Interior Department claims are more restrictive than any legislation currently under consideration by Congress. That's why Interior Secretary Cecil D. Andrus referred to

his Feb. 12 move as "an insurance policy." Since Congress alone can alter this Executive Department designation, Andrus hopes this prod will assure passage this year of permanent protective legislation for 55 million acres of Alaska lands by the Senate, including the 40 million affected by his most recent action.

The House voted resoundingly in both 1978 and 1979 to "protect the resources of Alaska's crown jewels in perpetuity as national parks, wildlife refuges, forests and wild and scenic rivers," Andrus said. Meanwhile, he added, Senate action was forestalled in 1978 "because of deliberate

Interferon trials expanded

Interferon, which has been known for a long time as a natural human body substance that might be harnessed to fight disease, may finally be coming into its own. Back in 1978, for instance, preliminary clinical findings suggested that exogenously applied interferon could counter cancer, so the American Cancer Society decided to invest \$2 million in controlled clinical trials to further document and explore interferon's cancer-fighting abilities (SN: 10/28/78, p. 295). Last month, Charles Weissmann of the University of Zurich reported that he and his colleagues had made human interferon with recombinant DNA techniques, opening the possibility of mass-producing the scarce and terribly costly substance (SN: 1/26/80, p. 52). And the ACS announced this week that, because the preliminary results of its interferon clinical trials look good, it is allocating another \$3.4 million to expand them.

Most of this extra money, ACS president S. B. Gusberg explains, will be used to buy more naturally produced interferon, which now costs about \$30,000 per patient. Although Weissmann and his team anticipate that they will be able to provide moderate amounts of cheap, recombinant DNA-produced interferon for clinical trials within a year, ACS officials think it will be more like two to three years from now.

To date, the ACS clinical trials include 150 patients with four kinds of cancer being treated at 10 medical centers. □