# Minerals Move People

## *As resources are discovered or depleted, populations migrate*

by Walter Youngquist

Along with the influence of mineral supply on the rise and progress of civilization, is a parallel story of how the search for, and discovery of minerals from salt to gold and silver has caused mass migrations of people. In many cases the minerals were the basic cause of the opening of new lands. It has been said that, "the flag follows the miner's pick." The quest for gold and silver lured Spaniards to the New World resulting in the conquests of Mexico, Colombia, Peru, and some of the adjacent lands.

These movements continue to the present. Migrations of people today to resource areas, or to nations that can obtain resources, are perhaps greater than anytime in the past. Seeking jobs and a higher standard of living largely based on mineral resources, people are today moving, both legally and illegally, by the millions.

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### Salt and Trade

Except for the occasional travels by native peoples to certain localities to obtain chert or obsidian with which to make tools and weapons, probably the first mineral to cause people to travel substantial distances was common salt. No doubt even before humans arrived on the Earth, animals traveled considerable distances to salt licks, even as they do today. Trails made by animals to salt licks in the eastern United States were some of the first trails the early settlers used.

History records the caravans and traders who moved salt in ancient times over great distances. Some of these salt routes are still used. In the sixth century salt was the chief item of trade for Venice, which developed a salt monopoly that extended over parts of the Mediterranean, and Venetian salt traders traveled widely in their commerce.

### Gold Seekers

Gold was the first metal used by humans as it is bright and attractive in the native (pure) form, in which it commonly occurs. It can easily be worked into many shapes and does not tarnish. Gold nuggets in streambeds attracted attention very early. This attraction for gold probably precedes humans, as pack rats and some birds will pick up small gold nuggets and put them in their nests. Silver is rarely found in native form and it tarnishes easily. However, many silver ores can be smelted readily so silver, too, has a long history of being sought by humans. It was put into use among earlier peoples chiefly as ornaments, and later as coinage.

#### EGYPT

Gold was one of the earliest reasons for conquest and exploration. What is perhaps the first map ever made is a papyrus map of the Rammessides, which shows a route to the Coptos gold mines along the eastern border of Egypt fringing the Red Sea. Egyptians took great quantities of gold from this area.

The gold occurred as native gold in white quartz veins, and in placers (sand and gravel deposits) downstream in the valleys below. But even richer gold deposits were in the upstream areas of the Nile, outside of Egypt in the Nubian Desert. The name "Nubian" comes from the Egyptian word "nub," which means gold. The Nubian gold lured the Egyptians to exploration and conquest of that area. The first gold was simply taken by plunder

from the natives who already had it. Eventually the Pharaohs sent miners and established regular gold mining camps in Nubia. This pattern of exploration for gold plunder and later the establishment of permanent gold camps was repeated many times in history.

SPANISH CONQUESTS

It was said that the Spaniards had the "gold disease," but the sad fact is they had other diseases also, such as smallpox. Many of the native cultures the Spaniards encountered were virtually destroyed by the contagious diseases that the gold and silver seekers brought with them. In that way, too, gold and silver altered the history of the native nations of the western hemisphere.

## Gold Rushes

CALIFORNIA

The 1849 gold rush to California is one of the great epochs of migration caused by a mineral discovery. Ships went around Cape Horn, and others went to Panama where the passengers hiked across the Isthmus to pick up another ship on the other side. Still others took the overland route to California. Before 1840, migration across the Mississippi River to the west was "hardly more than a trickle." But, with the gold discovery of 1848 about 40 miles from present-day Sacramento, by 1850 California's population was 96,000 and larger than the state of Delaware's. California was opened up by the discovery of gold, and it went on to become one of the great states of the United States, developing an economy of global significance. Gold was the initial catalyst destined to open up California.

AUSTRALIA

The discovery of gold in Australia opened up large areas of that continent which had been previously ignored. The early gold rushes to Victoria and New South Wales caused many changes in Australia. In 1850, there were only about 400,000 people in all of Australia, but with gold discovery by 1861 there were more than a million. Melbourne got its start during the gold rush, and at one time was the richest colony in the British Empire. Many of the fine gardens and some of the buildings (such as Government House) are legacies from what the discovery of gold the middle of the 19th century did for Australia.

Raymond emphasized the importance of gold migration of people in world trade:

> *The finding of gold in Australia, as in California, had a profound effect on the nation's economy, and would do so in other parts of the world where gold was soon to be discovered: New Zealand, South Africa, and Alaska. The gold rushes, wherever they occurred, brought new settlers, new ideas, new vigor, and created new wealth. Without the enormous amounts of gold that were produced in the latter half of the 19th century the commerce of the modern world could never have reached the proportions that it has today. Only after the gold rushes was it possible to speak of something called world trade.*[1]

SOUTH AFRICA

The discovery of diamonds in South Africa in 1867 brought thousands of immigrants to that region. The subsequent discovery of many other important minerals, especially gold, led to the transformation from what was largely an agricultural economy in South Africa to the present day urban-industrial economy. The continuing international interest in South Africa over the years has stemmed largely from its possession of several strategic minerals. It remains a potentially valuable prize.

SIBERIA

Siberia had no gold rush in the classic sense, but with a need for acceptable foreign exchange, the Russians over the years have established gold camps and gradually moved people into the Kolyma gold province of Siberia. These camps have been expanded into permanent settlements, and now there are twelve cities in the region with a total population of more than half a million. Russia does not plan to allow these towns to be ghost towns when the gold is gone. There is a lot of gold so it will last for some time, but planners have gradually established manufacturing facilities there. In this way, they expect to keep the gold country settled permanently. Gold was simply the basis for moving people there initially and getting the settlements started.

More recently the Siberian city of Norilsk has been built 200 miles north of the Arctic Circle.

Temperatures reach 40 below zero and for two months it is dark. Minerals are the only reason for the city, which is based on what is probably the richest ore body in the world. It contains an estimated 35 percent of the world's nickel, 10 percent of the copper, 14 percent of the cobalt, 55 percent of the palladium, and 20 percent of the platinum. The mine, even with no additional discoveries, can continue to produce at the present rate for at least 40 years. The city will be home to the mine's 155,000 employees and their families far into the 21st century.

### SMALLER GOLD RUSHES

To a modest degree, South Dakota, Colorado, and Georgia experienced gold rushes, which brought numbers of people into new territories. In South Dakota it was a military expedition that first found gold in the Black Hills. With this discovery the gold miners moved into what was Native American territory, causing numerous bloody conflicts.

In Colorado, an uninhabited, broad, upland valley in a few short months became Cripple Creek, which grew from a population of 15 people in 1891 to 50,000 by 1900. Similar growth occurred in several other areas of Colorado where gold was discovered, such as Central City.

The earliest discovery of gold in the United States appears to have been in North Carolina in 1799 when a boy found a shiny rock in a creek. But it was not recognized as gold until 1802 when a traveling jeweler saw it. By 1820 people from many parts of the world had come to the area, and at one mine 13 languages were spoken. Most of these people stayed and contributed to the growing population of the state.

In 1829, gold was discovered in what became the town of Dahlonega in northern Georgia and a new gold rush was on. Some of the land involved was Cherokee Indian Territory, but with the influx of gold miners the demand for the land grew and ultimately the Cherokees lost out. In 1835, the Cherokees were forced to give up all their lands east of the Mississippi River and were ordered to move westward. However, about 14,000 refused to leave, and in 1838 were forced out militarily during which time some 4,000 died. The cause of this displacement was the discovery of gold, and ultimately resulted in the uprooting of the Cherokee Nation.

### NATIVE AMERICANS

Usually, it was the trappers and miners who came first to the more remote areas of the west, rather than the settlers who were largely farmers. It was often the miners who first settled on the land occupied by the Native Americans. The Sioux knew of gold in the Black Hills and had shown specimens of it to Father De Smet before Custer's soldiers found it in French Creek. Ultimately, word got out about the gold in the Black Hills. Although the area had been set aside by the government for the Native Americans, this was ignored and miners flocked in. The initial discovery of gold on French Creek was in Native American land which, by the terms of the treaty of 1868, was off limits to white settlement. But miners persisted, and when restrictions were lifted during the year 1875-1876, 11,000 miners entered the Black Hills. This white invasion led the Sioux to resist and resulted in the famous Battle of the Little Bighorn when General Custer and his men were massacred on June 25, 1876. By September of that year, however, the Sioux were forced to sign a treaty giving up the Black Hills. Gold had moved out the Sioux. All across the west, Native Americans came into conflict with the miners and had to give up territory.

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The general result of the invasion of gold miners was loss of lands by the native populations, and a great weakening of their economic and political positions.

### ALASKA AND THE YUKON

The Yukon and Alaska gold

rush of 1897-1898 was the last gold rush of the 19th century, but it had all the excitement and problems of previous gold rushes, and it too opened up virgin territory. It had its origin when two prospectors, Robert Henderson and George Carmack, were salmon fishing in a tributary of the Yukon River. The tributary was later called the Klondike. These men saw the glint of gold in the streambed in the summer of 1896, but news of the discovery did not get out until 1897. Then the rush was on.

Dawson City grew from almost nothing to a population of 25,000 within a single year. By February 1898, 41 ships made regular runs between San Francisco and Skagway, Alaska, the port nearest the gold fields. From Skagway, the prospectors had to go over Chilkoot Pass or White Pass to the Yukon. During the winter of 1897-1898, 22,000 people were checked through the border between Canada and the United States on these trail routes. The interior of Alaska was largely opened up on the basis of gold.

The town of Valdez at the head of Prince William Sound was a little fishing village until the Alaska gold rush started. Although it was not the shortest route to the goldfields, it was a route that did not cross into Canada and therefore avoided border inspection. Twenty thousand people flooded into Valdez. But in a few years the gold was gone, and by the 1930s the population was down to about 500. The population remained small until it was determined that the Alaska pipeline would terminate at Valdez, and once again Valdez boomed. Now, with the steady work that the pipeline terminal affords, the population of Valdez has settled to about 4,000. Thus Valdez has seen two major movements of population – one caused by gold and one by oil. And after oil?

Fairbanks has had a history similar to that of Valdez. It got its start from the gold rush, and then dwindled in population. But the oil discovery at Prudhoe Bay 390 miles north of Fairbanks brought a second boom time to Fairbanks. It was the logical place to build Prudhoe Bay support facilities such as warehouses, and it was the halfway point on the Alaska pipeline. Fairbanks' population doubled in five years.

The northernmost road in North America ends at the northernmost and largest oil field in North America, Prudhoe Bay, for which reason the road was built. Although the road now allows only partial access to the region by the general public, that portion of it that is open to the public has caused some minor migration. The oil pipeline maintenance, and the beginning of the freight road to Prudhoe Bay and all that goes with that, keeps Fairbanks busy.

More recently the discovery of microscopic gold in black shales principally in Nevada (the so-called "Carlin-type" gold deposit) has caused a number of sizable communities to be established. So named the "Silver State" from the Comstock Lode and numerous other silver mines, Nevada is now the major gold producer of the United States and the silver mining is largely gone.

### SILVER

This metal, being much less valuable per ounce than gold, has generally not attracted nearly so much interest as gold. But discovery of the Comstock Lode and the many smaller subsequent silver strikes in western Nevada did bring many people into the area, including quite a few from the Welsh mining areas of Great Britain. They became known as "cousin jacks," and a walk through the cemetery at Virginia City will show many tombstones noting the British origins of those who lie there. The influx of population and the great wealth from the silver also was a major factor in moving Nevada into early statehood (1864), compared with the adjacent states of Utah (1896) and Arizona (1912), and only 14 years later than California (1850).

### CHINESE MIGRATION

In many mining areas of the west, significant numbers of

Chinese arrived largely to do the menial tasks. They also had the patience to rework mine dumps left by the original miners. The Chinese were not generally accepted as part of the community, and so formed communities of their own, some literally underground. Remains of such communities are still in evidence beneath the streets of Pendleton, Oregon, and Idaho City, Idaho. As the mines gave out, some Chinese returned to China. Others stayed and established themselves in farming and various small businesses now scattered across the west.

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MODERN GOLD RUSHES

Twentieth century gold rushes include the black shale Carlin-type Nevada developments, and a much bigger gold rush in Brazil where tens of thousands of people in recent years have moved into the Amazon River Basin. In remote areas, roads and airfields have been built and towns established where a short time ago there was only jungle. Kane has described these events:

> *…in the late seventies, gold prices rose sharply, and gold mining in Brazil took off. Tens of thousands of landless workers left low-paying jobs in the coastal areas to move inland and prospect for the metal. They cleared virgin lands, opened large pits, and often forced out indigenous peoples, some of whom then had no choice but to migrate themselves.*[2]

In addition to affecting the local area environmentally and impacting the social structure of the native populations, miners, who were once simply scattered people throughout Brazil, have now been brought together by gold to form a cohesive group, and have become at least a modest force in Brazil's political scene.

The current Brazilian gold rush, however, was preceded several centuries earlier by the movement of people to Brazil caused by the discovery of gold by the Portuguese, who first held colonial control of that country. They left the legacy of Portuguese as the national language. In 1682, gold was discovered in northeastern Brazil in a province that, because of its rich mineral resources, was named *Minas Gerias* – General Mines. For many years the taxes imposed on Brazilian gold production kept the Portuguese treasury alive. But when the gold supplies declined, so also went the economy of Portugal. Gold briefly made that nation rich, and after the gold was gone Portugal never again enjoyed such affluence.

Somewhat smaller gold rushes moving people into new areas have recently occurred on the southern Philippine Island of Mindanao, and also in New Guinea, where perhaps the largest single gold deposit now known in the world is located. In the relatively primitive wilderness of New Guinea this event has had profound effects in the movement of people, with the construction of a large mining camp and supporting transport facilities into previously remote areas.

CANADA AND ITS NORTHLAND

With more than half the people of Canada living within a hundred miles of the U.S. border, there are vast northern areas of this second largest nation in area in the world that are even today very sparsely inhabited. These regions are largely lakes, swamps, flat, low-lying tundra plains, and some slightly more upland areas with forests of small trees. Small ranges of hills occur in some parts, and some mountainous areas exist in northeastern and northwestern Canada. The northernmost portion of mainland Canada is chiefly a featureless plain.

Aside from limited hunting, trapping, and fishing, the only major economic resources are minerals

and energy minerals. Hunting, trapping and fishing did not provide an economic base to justify building roads, but minerals did. In Alberta, the northernmost road leads to the great Athabasca oil sands deposits near Fort McMurray, a city now almost entirely sustained by the two large oil sands processing facilities.

In Saskatchewan, the two roads that go farthest north are those that lead to mines. The eastern one leads to the Rabbit Lake uranium mine; the western road goes to the Key Lake and other uranium mines in the vicinity. What is now the world's most important uranium mining region is what has opened up northern Saskatchewan, and moved people to that area.

In Manitoba, the North Country was opened up by the great nickel discoveries in the vicinity of the now-thriving town of Thompson, population more than 20,000. The road going the farthest north from there leads to the Lynn Lake mining district of northwestern Manitoba.

In Ontario, the great gold mines at Timmins, which once were the world's largest producers, brought people and large towns to that area, forming a complex of communities today with more than 50,000 people.

In Quebec, the northernmost road makes a big loop, and at the top of the loop are the gold mines of the Chibougama area. Gold was the reason the road was built and is now maintained. Along the Quebec-Labrador border tremendous iron ore deposits are the only reason for Labrador City, and the road and railroad to that area.

## Ghost Towns and Some that Survive

Just as minerals move people into areas, exhaustion of these deposits may cause an outward migration. The presence of many ghost towns in the western United States as well as in other parts of the world, are monuments to the fact that minerals are a one-crop resource.

The economic cycle is the discovery, development, and then decline and exhaustion of minerals, a one-time crop. People accordingly will move into developing mineral resource areas. Then, as the mineral base gradually declines, people begin to move out. There are examples of this now in partially abandoned mining towns, and the decline of once rich, oil-producing areas. This can be seen even now in parts of the past oil giant, Texas. However, in some instances, once people have come to an area because of the mineral wealth, they find other ways to survive after the minerals are gone. Some areas become farming or ranching communities. Others become tourist attractions like Virginia City, site of the former fabulously rich silver Comstock Lode in Nevada. Some have become gambling communities like Cripple Creek and Central City in Colorado.

## Oil

The opening up and settlement of new lands by the oil industry is also a cause for the movement of people. In the northern Sechura Desert of Peru, the town of Talara with about 4,000 inhabitants exists solely because of the oilfield there. Rains come only once every several years or less. Without the oilfield, there would be little basis for a settlement. The now-thriving city of Maracaibo, Venezuela, located near the southeast end of the semi-desert Guajira Peninsula, is there only because of the rich oil deposits in the Maracaibo Basin (a similar geologic, oil-forming setting as the Persian Gulf, but not so large).

The oil discovery in the United States in 1859 by "Col." Drake (assumed title – he was actually a railroad conductor) near Titusville, Pennsylvania, brought a "Fifty-niner" rush. Some 30,000 people almost immediately moved into the area, and then spread out to other areas to search for more oil.

Oil in the Persian Gulf opened work opportunities that brought tens of thousands of people to the region. Indians, Pakistanis, Filipinos, Palestinians, and Egyptians were among the major groups represented. When the 1991 Gulf War broke out, more than half the people living in Kuwait were foreigners. Today, in Dubai of the United Arab Emirates, the population is only 15 percent native. Neighboring Qatar sits atop the world's largest single natural gas deposit (12 percent of world-proved reserves) and has oil exports that give it a per capita income of $13,600 a year. This robust economy has attracted foreign workers to the extent that they make up more than two-thirds of Qatar's current population of about 520,000. Qatar is a desert peninsula with an annual rainfall of only about 2-1/2 inches. For centuries fishing was a principal occupation of the relatively few inhabitants of the

region who led a subsistence existence. Petroleum made profound changes, and caused a large migration of people to the country.

*"[In Haiti] there is an overwhelming desire to migrate from a land with almost no resources to a land that has resource wealth..."*

## Fertile Topsoil

Gold rushes are a strikingly visible demonstration of how minerals move people and make for romantic history, but far more people have moved because of the availability of new lands with fertile topsoil to cultivate. In North America, Canada and the United States were widely settled first by farmers, after which came migration to the cities and the large development of cities today. The rich lands of South Africa, the pampas of Argentina, and the great wheat-growing plains of Australia also encouraged mass migrations of people.

In the case of the United States, the Homestead Act, which granted tracts of public land to settlers who would first claim and then farm the land, moved people westward. On at least one occasion this was a rather dramatic movement when lands in Oklahoma were about to be released for settlement. There was a fixed opening date and a firm boundary behind which people were to assemble and at a signal go in and claim land parcels. But some people did not wait and sneaked into the territories to be offered before the opening date. They arrived sooner and thus the nickname for Oklahoma as the "Sooner" state.

Railroads were granted land, usually alternate sections (a square mile), in a strip ten miles wide along each side of the tracks to encourage them to build the railroad. Once built, the railroads advertised free lands and were eager to move people to them, so the railroads in turn could generate business by hauling settlers and their goods west, and then haul agricultural products east. Availability of rich, fertile land was the prime mover.

A somewhat similar situation existed in Canada and resulted in the settlement of the last great prairie agricultural area of the world, the southern portions of Alberta, Saskatchewan, and Manitoba.

## Move to the Cities

Even as the rich, fertile land resource initially brought immigrants to North America (and also to other places such as the pampas of Argentina), energy resources have since moved much of the population off the farms and into the cities. Today, only about two percent of America's population farms the land, where a hundred years ago the majority of people did. But energy slaves (chiefly oil) now do the farm work, causing another great migration of people to the industrial areas, which, in turn, exist because of abundant energy to run the factories. This has also been true in Europe, and is now taking place in China and Southeast Asia. Mineral and energy resources have caused and continue to cause great human migration, both within countries and across international boundaries.

## The Continued Invasion of North America

In a broad sense, the migration to North America was caused by the availability of fertile lands and other mineral resources. As they were discovered and developed, they produced an ever-higher standard of living, luring more people to come. This attraction continues. Currently, the United States annually has more legal and illegal immigrants than all the rest of the world combined. The natural resources, which are still available in the United States together with those that can now be imported, provide the basis for the standard of living envied and sought by much of the rest of the world.

The persistent attempt by Haitians to enter the United States is resource- based. Haiti, which occupies the western third of the Island of Hispaniola, has an area of about 10,500 square miles. It has no oil, gas, coal, waterpower, nor any other appreciable mineral resources. When one flies into the capital, Port-au-Prince, there is a noticeable brown ring in the ocean shore area where rivers are depositing silt and clay from the

already highly eroded and continually eroding hilly and mountainous regions that make up most of Haiti. What fertile soil remains continues to be lost at a disastrous rate.

Nearly 7,000,000 people crowd Haiti's limited area. Once nearly entirely wooded, Haiti is now almost treeless, and people are digging up roots for fuel. The contrast of this situation to the abundance of resources available to citizens of the United States is enormous. Energy supplies and mineral resources available for an educated technologically developed society to work with make the difference. Haiti has virtually no mineral or energy resources, and does not now have the capability of importing them to sustain any sort of advanced manufacturing economy.

As a result, there is an overwhelming desire to migrate from a land with almost no resources to a land that has resource wealth to provide even its lowest economic segment of society a better standard of living than the average Haitian has. With Haiti's population growth rate of about 2.8 percent annually – one of the highest in the western hemisphere – the problem will only increase. At that rate, the population will double in about 25 years, which can become an absolute disaster. Supplying more and more "outside" food to such a situation with no heed to population control, simply treats the symptoms and not the cause, ensuring even greater problems in the future. Some reasonable relationship between population and the resource base a country has or can import must be established. Otherwise, the people there will either starve or be on permanent international welfare. To continue to export population problems cannot be the ultimate solution either, as fewer and fewer countries are now willing or are ultimately able to continue to be the safety valve for migrating population pressures. France has completely closed its borders to all immigration. Japan accepts virtually no immigrants, and Sweden for the first time has been turning them away. Germany has been expelling foreign nationals. Resources to house and feed the immigrant flood are the critical factors.

## Increasing Urge to Migrate

With rapidly growing populations, and mineral resources becoming more costly as the higher quality and easily accessible sources are exhausted, problems of resource distribution will grow. The pressure for populations to migrate to areas that still have resources available will increase. By both legal and illegal means mass migrations of people continue, and is already a problem, which has the potential for great social unrest, some of which is already happening. In 1995, the decision by President Clinton to return all arriving Cuban refugees to Cuba led to riots in Miami.

The refugee problem is not decreasing. What is decreasing is the willingness of many countries to accept more refugees. In contrast, the United States now has a very liberal immigration policy, allowing 2,000,000 newcomers in each year. It also has a relatively porous border that lets in another estimated half-million or more illegal immigrants. The result is that some states are beginning to resist this burden. Because of the impact of illegal immigrants upon their resources, the states of California, Texas, and Florida in 1994 filed lawsuits against the U.S. Government. The suits assert that lack of enforcement of enforcement of federal immigration laws had resulted in an intolerable drain of resources from the states. In California, the recent growth of that state has been largely due to foreign immigration. As a result, to accommodate the increase just in children, in 1995 one new schoolroom had to be built each hour, and one new school each day. In 1994, California passed Proposition 187 providing that illegal immigrants would be denied a variety of services, including schooling. This has caused numerous protests and demonstrations.

It is important to remember that the physical standard of living that is high in the United States and which attracts immigrants, legal and illegal, is based on the availability of mineral resources. To maintain that standard of living every year each person in the United States must be provided with some 20 tons of mineral resources. As the United States becomes more and more dependent on importing these resources, the balance of international payments problem grows. Being able to supply resources to immigrants is what draws them, but at some point this

in turn will adversely affect the future of the United States if the balance of payments problem will no longer allow increased resources to be imported. The much-valued U.S. standard of living will fall, and its destiny will be altered. A nation that does not control its borders loses it sovereignty, along with control of its economic future.

In a study of why people migrate, Kane has observed,

> *Water tables will continue to be drawn down far faster than they can replenish themselves in many countries; soils continue to erode, and new people will react to these pressures in the future by leaving their homes.*[2]

Describing Ethiopia, with a present population of 57 million, Kane states:

> *…the nation faces a colossal increase of 106 million during the next 40 years, based on current growth rates. It is almost impossible to imagine how Ethiopia could possibly feed so many more people. It has some of the world's most severely eroded soils, much of its cropland is on steep slopes, and its tree cover stands at a mere 3 percent. Many in Ethiopia's next generation will probably have to choose between emigration and starvation.*[2]

Kane calls the tendency of people to migrate "The push of poverty, the pull of wealth." He concludes that a major and increasing cause of human migration is the exhaustion of natural resources:

> *Many countries, particularly in Africa, but increasingly elsewhere as well, have been living off their capital – consuming their foreign reserves, their forests, soils, and freshwater aquifers, and the patience of their citizens – in order to survive. As these reserves are diminished, pressures and conflicts mount and more and more people are forced to flee. The number of people on the move today has reached its highest point in history. But if nations do not shift spending priorities from military security to investments in the long-term environmental and social health of their citizens, these numbers may be dwarfed by the tide yet to come.*[3]

Kane estimates that if present trends continue the world's refugee population will have doubled to 46 million within five years. Brown has drawn the same conclusions as Kane.

## The End of the Physical Frontier

Today there are no large unoccupied rich Earth resource areas to absorb migration. During the last 500 years the major waves of human population have generally migrated westward. When the final big wave hit the Pacific shores of North and South America, beyond lay Asia and India with their teeming billions. The circle was complete. The globe was filling up. New lands with untouched resources were no more.

With no new geographic frontiers in which to expand, today's nations jostle for position within the well-populated and fully explored world. The jostling through migration and perhaps military conflicts will increasingly be over access to Earth's remaining resources of energy, water, fertile soil, and other minerals, for these are the bases for simply surviving. Making rational and successful adjustments between population and resources will determine the destiny of the human race, and populations must recognize that destiny as imposed upon them by geology.

## Geology of Carrying Capacity Problems

Because resources and population are unevenly distributed, the current trend is for people to move from distressed areas to areas that have more resources, or for wealthier nations to send basic resources to the impoverished regions.

If emigration from distressed areas to areas that still have resources continues, without eventually stabilizing the size of the population, will there ultimately be worldwide prosperity or a worldwide slum? Hardin considers this matter: "…the production of human beings is the result of very localized human actions; corrective action must also be local. Globalizing the 'population problem' would only insure that it would never be solved. Hardin adds:

> *Some social experiments have had very bad outcomes indeed. For this reason*

> *Kenneth Boulding wisely said: 'There are catastrophes from which there is recovery, especially small catastrophes. What worries me is the irrevocable catastrophe. That is why I am worried about the globalization of the world. If you have only one system, then if anything goes wrong, everything goes wrong.' The wisdom is very old: Don't put all your eggs in one basket. Given many sovereign nations it is possible for humanity to carry out many experiments in population control. Each nation can observe the successes and failures of the others. Experiments that have a good outcome can be copied and perhaps improved upon; unsuccessful experiments can be noted and not repeated. Such learning by trial and error is perilous if the borderless world created by unrestricted migration converts the entire globe into a single huge experiment.*[4]

## The 'Lifeboat Ethics' Concept

Hardin's observations are a facet of his "lifeboat ethics." A ship is sinking, and there is one lifeboat. It is launched and filled to its stated capacity of 50 people, but there are still 100 people in the water. Do you take on the additional 100 from the water and have everyone drown, or do you preserve the one lifeboat and its passengers so they can get to the far shore and survive? Do you convert the entire world to a giant slum by unrestricted immigration and no population control? Or do you restrict immigration and insist that individual nations do something about population, so that at least some of them who are successful survive? At present, a number of nations are trying to export their population problems that will, if not checked, ultimately become a global disaster. However, it will have the merit of equality – poverty will be universal.

Continued population migration will surely make this concept of "lifeboat ethics" a serious consideration. Respon-sible and firm action may be required to prevent "lifeboat nations" from being swamped and sunk. Lucas and Ogletree relate this to world hunger. Pimentel and Giampetro have an implied "lifeboat" role for the United States in their statement:

> *Self-sufficiency in food production and other basic resources should be viewed as a strategy to guarantee a continued high standard of living and national security to U.S. citizens in the face of turbulence that can be expected around the world in the next decades. There is no time for delay, choosing not to change the current pattern of high immigration and rapid population growth means moving into the Malthusian trap in the United States.* •

NOTES

1. Raymond, Robert, 1986, *Out of the Fiery Furnace: The Impact of Metals on the History of Mankind*, University Park, PA: The Pennsylvania University Press, 1986.

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