
4 Horsemen of the Apocalypse

THE PALE HORSE



DISEASE EPIDEMICS

In the book of Revelation we find a disturbing vision of four fearsome horsemen (Rev. 6:1-8). Each of these horsemen is a symbol of the four major punishments to be inflicted upon a rebellious mankind — probably in the not-too-distant future! Each represents the final, end-time culmination of the major crises with which the world has been confronted for centuries — false religion, war, famine and disease epidemics. This series of booklets will make the prophecies of Revelation 6 come to life. You will learn the significance of each symbolic horse and rider. This message is one of the most frightening in all of the Bible. You need to be informed and prepared for what's ahead in Bible prophecy!



4 Horsemen of the Apocalypse

THE PALE HORSE

DISEASE EPIDEMICS

by George Ritter

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THE PALE HORSE TAKES ITS TOLL





When it comes to progress, no one can accuse the human race of being in a rut. Since the turn of the century man has broken the sound barrier, probed the depths of outer space, unraveled the secrets of the atom, and even made precision landings on the moon. Yet for all his scientific wizardry, man continues to be baffled by one of his oldest enemies — disease.

Even today, in the age of miracle drugs and space-age medicine, the toll that pestilence takes is staggering by anyone's standards. Every year one million people around the world succumb to tuberculosis. Malaria claims another million lives in Africa alone. Schistosomiasis, a painful, debilitating snail-borne disease, afflicts a quarter of a *billion* third-world inhabitants or roughly 8½% of the population. Venereal disease is all but out of control in many nations, and has been found to infect as many as 10% of the young people sampled in some areas.

In some parts of the world,

disease is a way of life and all too frequently a way of death. Some 34 million Brazilians (35% of the population) are hobbled with a host of maladies including goiter, yaws, tuberculosis and leprosy. One quarter of black Africa is under the continual threat of sleeping sickness. In other parts of the continent up to 20% of the adult population have been reduced to a groping, stumbling existence because of the ravages of a tiny bloodsucking black fly, carrier of the dreaded river-blindness disease.

In the Western world the number of walking wounded grows every year as people pay the delayed penalties of a synthetic, sated, "civilized" lifestyle. In the United States alone, over 28 million Americans are afflicted by some form of heart and blood vessel disease. Almost four million have suffered coronary attacks. One in six Americans is afflicted by hypertension. Forty million are pained in varying degrees by arthritis. Four million are diabetics, and there are another five million who are potential candidates for insulin injections.

Every year more Americans die from cancer than were killed during the entire course of World War II. One million

are currently under treatment for various malignancies and another 49 million (or roughly one out of every four persons) will eventually contract this degenerative disease.

The state of the nation's dental health also offers some rather unpalatable food for thought. Some 20 million Americans are estimated to have lost over half their teeth. The odds are two in five that an American will be totally toothless by the time he reaches age 50. And by the time he is 65 the chances will have increased to an even one in two.

The Ever-Potent Pandemic

Over the entire course of history, disease has undoubtedly been man's greatest enemy in terms of sheer loss of life. According to Folke Henschen, a leading Swedish pathologist: "Infectious diseases . . . have probably been the most dangerous enemies of mankind, much more so than war and mass murder.

"When one studies the constant epidemics of the past and the deficiency diseases on land and at sea, one realizes that the whole of civilization could have succumbed, and one is constantly surprised that mankind has survived."

And Hans Zinsser, writing in



UN Photo

A YOUNG victim of smallpox. Smallpox is still endemic in many parts of the Indian subcontinent and Africa.

Rats, Lice, and History, likewise explained: "Swords and lances, arrows, machine guns, and even high explosives have had far less power over fates of the nations than the typhus louse, the plague flea, and the yellow fever mosquito. . . . War and conquest and that herd existence which is an accompaniment of what we call civilization have merely set the

stage for these more powerful agents of human tragedy.”

The infamous Black Plague of the fourteenth century is estimated to have wiped out one third to one half of humanity. Even as late as the twentieth century the influenza epidemic that erupted at the close of the First World War claimed more lives in a few months than were lost during the entire course of this monumental worldwide

conflict. And pestilential pandemics have shown little respect for human life, even during the last few decades of history. In 1957 and again in 1968, the Hong Kong flu swept around the world, taking tens of thousands of lives. At the height of the 1957 outbreak, 1700 Americans in 122 large cities died every week. Before it was over, 30,000 Americans and Britons lost their lives.

CHOLERA weakens its victims through extreme dehydration, vomiting, and diarrhea. Mortality rates can run as high as 50% if no medical treatment is available.

Ernst Herb

In the 1960s, a new variety of cholera virus known as *El Tor* rampaged through Asia, parts of Russia and the Middle East. By 1971 it reached Spain and Portugal, and isolated cases



were found in Sweden, France, West Germany and England.

Smallpox, the disease that was almost ready to be relegated to the pages of history, was still alive and well in India,

“Swords and lances, arrows, machine guns, and even high explosives have had far less power over fates of nations than the typhus louse, the plague flea, and the yellow fever mosquito.”

Bangladesh and Pakistan during the 1960s and 70s. In 1967, ten million people are thought to have been infected. As late as 1974 over 30,000 smallpox deaths occurred — principally on the Indian subcontinent.

Recent disease epidemics have also caused massive displacements, panics and uproars. In 1974 a meningitis outbreak in São Paulo, Brazil, took some 2000 lives. Residents of the city fled by the thousands. Neighboring Uruguay was so concerned she closed down the border as a precautionary measure.

Ever-Present Pestilence

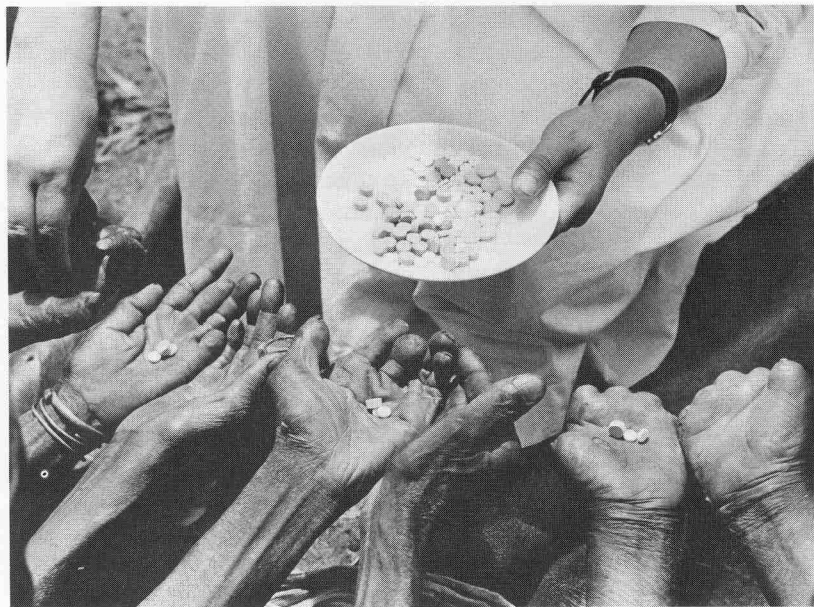
Infectious disease is neither a respecter of men nor nations. No part of the world is immune.

For example, in the United States malaria cases have cropped up in California, Alabama and Texas in the last few years. Tuberculosis is widespread among Latins and Asians in Los Angeles County, and a strain of typhoid fever currently resistant to antibiotics is being imported into the United States by illegal aliens from Mexico.

Bubonic plague vermin are still alive and flourishing in many parts of western America. In 1974 a twelve-year-old girl who apparently had come in contact with a plague-carrying animal died from the disease. And one year later plague also took the life of a seventeen-month-old baby in Ventura, California.

The threat of infectious disease outbreaks cannot be blithely ignored, according to an article in the *Wall Street Journal* (October 13, 1971): “To most Americans, the possibility of an insect-borne epidemic in the U.S. seems remote. . . . Such scourges as yellow fever, plague, typhus, dengue fever and scores of other diseases seem like something out of the eighteenth century — or at least out of the backward nations of today.

“But to public-health officials and epidemiologists, the insect-borne epidemic repre-



Ambassador College

sents one of the more fearsome types of disease outbreaks. The slightest hint that an epidemic might be in the making is enough to send into instant action teams of health officers, epidemiologists, veterinarians and entomologists. . . . Once such an epidemic begins, it is difficult to stop. And even if it is brought under control, it may remain among animals and insects for months and years afterward — always posing a threat that, under certain conditions, it might break out again.”

William E. Small, then editor of *Biomedical News*, and author of the book *Third Pollu-*

PILLS for lepers in Tanzania. Symptoms of leprosy include wasting of muscle and deformities.

tion, had this to say: “That many diseases are under control at the moment does not mean that public health efforts can be relaxed. Typhoid, cholera, yellow fever, summer diarrhea, dysentery, tuberculosis, anthrax, intestinal worms, and many other diseases are still with us and could again return as plagues of old. During the garbage strike in New York in 1968, public health officials geared up to give massive immunizations against typhoid fever, so great was the potential

hazard from garbage in the streets.”

Jet-Age Germs

The communicable disease problem is further being complicated by the potential hazards brought on by jet-age transport. No longer do nations live in relative isolation, separated by vast oceans or days and weeks of travel. Now a potential disease carrier can infect another country or continent thousands of miles away — all in a matter of hours. A person could carry a disease like yellow fever from the forests of Brazil to the suburbs of New York City and no one would be the wiser. Since the incubation period of such a disease usually amounts to several days, a potential carrier could easily clear customs long before the first telltale symptoms would break out.

In addition, there is the threat of new disease strains which can be sprung on an unsuspecting country like an infectious bolt out of the blue. Typical examples include the Marburg virus which was carried into Germany by African green monkeys. Seven out of 25 research workers who contracted this lethal little bug were killed. Lassa fever, unheard of until the 1970s, was

also found to be so virulent that researchers at Yale University Laboratories were forced to terminate all work on the virus.

Just how susceptible is the

Smallpox, the disease that was almost ready to be relegated to the pages of history, was still alive and well in India, Bangladesh and Pakistan during the 1960s and 70s.

human race to massive disease epidemics? Will the Pale Horseman yet ride again with renewed vengeance and fury? Will mankind be engulfed in a tidal wave of disease epidemics that will rival the worst ones of history? Or has the human race seen the last of the grim reaper?

Before discussing these questions, let's examine the role disease has played in history and the key factors that led to some of the major epidemics of the past.

A photograph of a man lying on a metal cot in a thatched hut. The man is wearing a white shirt and a green and white striped dhoti. He is looking towards the camera with a serious expression. A small white bowl and a bottle are on the cot next to him. The hut has a thatched roof and is situated in a rural, grassy area. The lighting is bright, suggesting daytime.

**PESTILENCE:
PAST AND
PRESENT**



Since the dawn of history, disease has played a pivotal role in the rise and fall of nations, empires, and even civilizations. God used plague and pestilence as powerful persuaders to free His people from Pharaoh's tight grip. An outbreak of "emerods" quickly made the Philistines think twice about keeping the Ark of the Covenant. And ancient Jerusalem was saved from certain destruction when an overnight plague decimated Sennacherib's army.

Even the mighty empires of old were powerless against the vicious onslaught of virulent disease. The plague of Athens that struck in 430 B.C. contributed heavily to the fall of that ancient city-state. The once-proud but weakened Athenians were unable to strike a much-needed military blow at their arch-enemies. Twenty-seven years later the city was finished as a major power.

The Roman Empire also had its share of pestilential woes. During the first century B.C., a severe attack of malaria re-

sulted in a drastic drop in the native birthrate. Rome was forced to augment its armies with foreign mercenaries. The Plague of Galen in A.D. 166 further sapped the strength of the Empire. Germanic tribes managed to make an incursion in the weakened Roman defenses until pestilence likewise caught up with them.

The Penultimate Pandemic

But by far and away the most devastating disease ever to hit the human race was the Black Plague. It was the greatest of all pandemics and was perhaps the worst single disaster the world has experienced since Noah's Flood. The exact toll it took remains a mystery, but various estimates place it at anywhere from 40 to 60 million souls.

Conditions were ripe for such an epidemic during the 1300s. Cities were crammed with people seeking shelter, security and a better way of life. Buildings six stories high often lined streets so narrow that two ponies had difficulty establishing a right-of-way. Since these edifices usually were constructed with considerable overhang, little if any sunlight penetrated to the surface of the street below.

When it came to sewage it

was practically every man for himself. Often passersby were showered with excrement unceremoniously dumped from nearby windows. The sewers of that day were shallow trenches that ran along well-traveled roadways. Often they were

The exact toll of the Black Plague remains a mystery, but estimates place it at anywhere from 40 to 60 million souls.

clogged with refuse and offal. Pigs, goats and poultry ran freely through the streets, contributing their share of disease-laden litter.

Bathing, if not unheard of, was looked upon with suspicion. Filth and dirt permeated practically every aspect of man's environment. At night people were often packed twelve to a room. It was not uncommon for an article of clothing to be worn for months, years, or even handed down to succeeding generations without being washed.

While these conditions were not in themselves directly responsible for the spread of the plague, they did their part to weaken the citizenry through frequent attacks of dysentery

and diarrhea. And by providing copious amounts of dirt and filth they aided and abetted the ubiquitous black rat, chief purveyor of the plague in that day.

There were other key factors that also played a part in promoting the pandemic. For several years preceding the Black Plague, Europeans had experienced a succession of disastrous crop failures. Malnutrition and starvation were rampant. People often ate dogs or resorted to cannibalism. Unseasonably cold and rainy weather further reduced crop yields. This on top of a burgeoning population growth meant even less food to feed more hungry mouths. Buffeted by continual war and famine, weakened by overwork and disease, and cowed by a fatalistic brand of religious worship, the people of Europe were more than ready for the knockout blow. Here was a classic case of the first three Horsemen — false religion, war and famine — paving the way for the arch-agent of death itself — the Pale Horse of Pestilence.

The Pale Horseman in High Gear

Apparently the plague had its origins in infested animals inhabiting the hinterlands of Central Asia. It spread to the

shores of the Black Sea and from there leapfrogged to Italy via heavily traveled Mediterranean sea lanes. From Italy it systematically marched northward until no part of Europe was left unscathed.

There was nothing like it before or since. It completely terrorized and demoralized the populace of Europe. People fled from an infected city hoping to escape the ravages of the disease only to hasten its spread. In some instances harsh methods of quarantine were used. Occupants of the first three houses that became infected in Milan, Italy, were walled up inside and left to die. The milk of human kindness often ran dry. Parents abandoned children. Sick people were left to spend their last living moments confined to their beds in total isolation as friends and relatives bailed out. Others, suspecting the end was just around the corner, descended into an orgy of drunken debauchery.

Dead bodies were everywhere. They littered the fields and accumulated in the streets. They were picked up and piled like cordwood in clattering carts and then unceremoniously dumped in mass burial sites. Ships at sea were quickly transformed into floating derelects. Wild animals capitalized



Culver Pictures, Inc.

VICTIM of Bubonic Plague, from an old German woodcut, probably of the fifteenth century.

on the weakened state of the human populace. According to Johannes Nohl, author of *The Black Death*: "Savage wolves roamed about in packs at night and howled round the walls of the towns. In the villages they would not slake their thirst for human blood by lurking in secret places...but boldly entered the open houses and tore the little ones from their mothers' sides" (p. 35).

Raw figures can hardly convey the enormity of the tragedy and stunning devastation the Black Plague brought. Twenty-five million people died in Europe. Thirteen million in China.

Two-hundred thousand towns in Europe were left completely depopulated. Some cities in Italy lost 60% of their inhabitants. Only one third of the people in Norway managed to live through the plague. Moscow lost 127,000 people, Venice 300,000. Towns of 20,000 were suddenly reduced to villages of 2000. All told, an estimated one third to one half of the people in Europe perished.

In the centuries and decades that followed, plague continued to periodically erupt with predictably catastrophic results. Not until the 1600s did it finally die down in Europe. But in other parts of the world, it took much longer. In the waning years of the nineteenth century plague again swept out of the steppes of Central Asia to wreak havoc on the defenseless peoples of India and China. From 1893 through 1918 it added another ten million casualties to its enormous death toll.

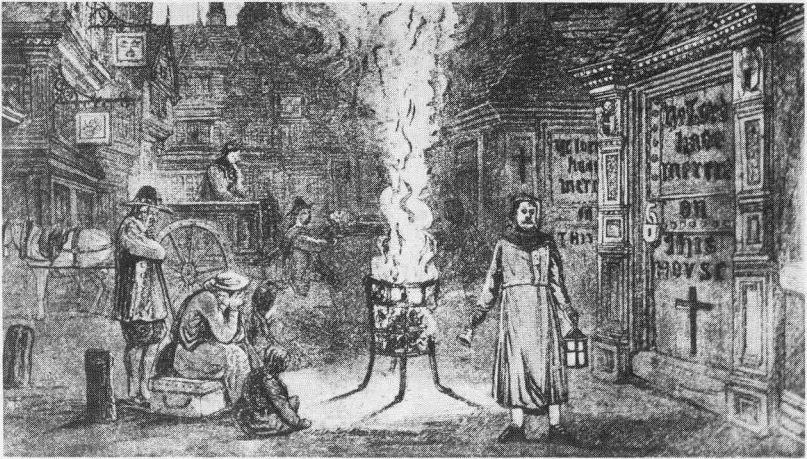
Disease Decides History

Bubonic plague was not the only major disease that led to pandemics of the past. Smallpox took its share of lives as well. The Spanish used smallpox as their number-one ally in the conquest of Mexico. The arrival of Cortez in the 1500s

touched off an epidemic among the Indians that wiped out almost half their population. During the seventeenth century, 60 million people in Europe alone succumbed to this disease.

Disease, rather than superior numbers or generalship, often decided the outcome of many a battle. In 1528, during the pivotal siege of Naples, the French army was destroyed not by the enemy, but by an outbreak of typhoid fever. Thanks to this timely epidemic, Charles V of Spain was able to be crowned Emperor of the Holy Roman Empire.

Napoleon came to grief on several occasions because of unexpected epidemics. An outbreak of yellow fever virtually annihilated his 25,000-man army in Haiti and cost him control of the island. During the Peninsular Wars of 1804-1814, the French lost 100,000 in battle but three times that many from disease. Pestilence also ravaged Napoleon's crack Army of the Nile and was one of the reasons he had to abandon his grandiose plans for a Middle Eastern empire. But Napoleon's biggest defeat at the hands of disease came during the Russian campaign. Out of a central task force of 265,000 men only 90,000 reached



Culver Pictures, Inc.

Pathology of the Plague

Bubonic plague, the disease responsible for the Black Death during the Middle Ages (woodcut above shows bodies being removed from a London street during the plague), is usually brought on by contact with an infected rat flea which carries a germ known as *Pasteurella pestis*. The spread of the disease usually takes the following pattern. Often a flea will become infected by biting a diseased rat. When the rat succumbs to the plague, the flea will move on to greener pastures. If humans or other animals happen to be in contact with diseased rats, there is a likely chance they will be the next victims.

The highly contagious *pneumonic* plague, unlike the bubonic variety, can be spread by direct human to human contact. Usually it is not prevalent unless the incidence of plague is widespread and rampant. It was *pneumonic* plague that was chiefly responsible for the rampages of the Black Death during the Middle Ages.

Bubonic plague usually results in painful swellings around the groin and armpits which are known as buboes. In reality these are

swollen lymph glands attempting to fight off the infection. If the person does not receive prompt treatment, death can come quickly.

The main reservoir for the plague in the world is found in central Asia, where infected marmots and gophers perennially carry the disease. A similar plague reservoir was created in the United States at the turn of the century when infected rats in San Francisco were not checked in time. They quickly spread the plague to squirrels and other wildlife in the vicinity. Today, plague is carried by at least 32 different types of animals in the Western United States.

In spite of the increased knowledge about plague that has come during the twentieth century, a strange air of mystery still hovers over this virulent disease. For instance, no one is really sure why plague disappeared from Europe in the eighteenth century. Mass resistance of the population is not the answer, because plague, like the flu, confers little immunity after one infection. Part of the answer may lie in the fact that during that general period of history the brown, or Norwegian, rat basically drove the black rat out of Europe. While brown rats can carry plague, they generally avoid man, thus lessening the chances of infections. Future plague problems may result from the rapid push of urbanization that is now taking place around the world. As *World Health* magazine reported some years ago: "The growing urbanization of countries, with the consequent push outward into rural areas where plague-stricken animals are naturally present, has made the spread of the disease a real danger, particularly in developing countries."

Moscow. Most of the casualties had fallen not because of Russian bullets but because of a devastating outbreak of typhus. According to Hans Zinsser, writing in *Rats, Lice, and History*: "It is hardly debatable that the power of Napoleon in Europe was broken by disease more effectively than by military opposition or even by Trafalgar" (p. 121).

Typhus in the Twentieth Century

Typhus was also the prime mover in the disease epidemics that came on the heels of the Russian Revolution. A mind-boggling twenty million Russians were infected and three million of them died. Typhus had plenty of help during this pandemic of the proletariat. Hundreds of thousands of Russians came down with cholera, typhoid and smallpox. War may be hell, but the disease that often follows sometimes makes the war look like a picnic. This was certainly the case during the Revolution. According to Ralph H. Majors, writing in *Fatal Partners, War and Disease*: "From 1919 to 1922 millions of Russian refugees, made homeless by civil strife, wandered over the country in search of food. These poor, wretched, ragged, dirty vaga-

bonds tramped from town to town, leading by the hand wizened, shriveled children resembling little skeletons. Many of these dropped dead along the roadside or on the city streets. In many of the cities at sunrise one could see dead bodies in the streets, often piled up in heaps waiting to be carted away" (p. 293).

The Influenza Epidemic

While the Soviet Union was undergoing its trial by disease, another massive pandemic was being unleashed on the world. It was called the Plague of the Spanish Lady, which was something of a misnomer. Apparently American soldiers were responsible for its dissemination. As in the days of the Black Plague, this particular flu bug found easy going among a populace weakened by the rigors of World War I.

Aided by modern means of transportation, the influenza bug traveled with incredible rapidity. Virtually no part of the globe, however remote, could escape its lethal impact. Eskimo villages in Alaska were wiped out to the last man. Natives on faraway Pacific Islands were also infected. At the height of the epidemic, 100 people a day died in New York City. Theaters, restaurants and



Speiser — UNICEF

CHILD receives smallpox immunization (sponsored by the World Health Organization) in Argentina.

schools were closed across the United States. Citizens in various cities were even required to wear protective face masks.

Some survivors suffered a complete loss of hearing for the duration of a year. Others never fully recovered. Many were rendered virtual cripples, wheezing and gasping for breath. An estimated one third of the survivors were subsequently subjected to attacks of nephritis, pulmonary tuberculosis and cardiac disorders. Before it was all over, one billion people — half the world's population — came down with the disease. Twenty million people died, including 540,000 Americans. In

roughly half a year, it killed twice the number that died during the entire course of World War I. It took six times as many American lives as did the German army.

The Spanish Lady came and went with an air of mystery. According to Richard Gallagher, writing in *Diseases That Plague Modern Man*: "Its departure reflected the grand style of the pandemics, that is, it was mysterious and unfathomable" (p. 49).

Regardless of its origins, the

influenza epidemic of World War I rates as the most devastating disease outbreak to strike the world since the Black Death. As Gallagher put it: "This influenza was one of the most destructive holocausts in all history to this present time. Only the great medieval plagues outmatch it in virulence and deadliness" (p. 47).

Modern Man at the Crossroads

Since the days of World War I, the pattern of disease in the Western world has taken a radically different turn. With the development of vaccines, penicillin, streptomycin, the sulfa drugs, and other antibiotics, many infectious maladies no longer pose the threat they once did. Better living conditions, shorter working hours and increased knowledge about health and sanitation have also played a vital part in this process. But as the incidence of infectious illness dropped, there came an almost corresponding rise in the rate of the major degenerative diseases, like cancer, cardiovascular disorders and chronic respiratory ailments.

Lung cancer death rates in the United States have jumped more than 20 times since 1930. Colon cancer incidence has been steadily rising. And since

1940 death rates from the number-one killer, heart disease, have jumped more than 20% in the United States.

These increasing statistics cannot simply be attributed to the wear and tear of aging. As of 1974, 25% of all coronary fatalities were under 65 years of age. Autopsy of dead soldiers

The first three Horsemen — false religion, war and famine — paved the way for the archagent of death itself — the Pale Horse of Pestilence.

during the Korean and Viet Nam conflicts revealed a noticeable deterioration in their cardiovascular systems. In some instances 40-year-olds were found to have a worse set of arteries than many men in their eighties.

In the meantime, the number of walking wounded has continued to rise. By the early 1970s, there were 1.3 million Americans afflicted with emphysema, six million suffering from asthma, 6.5 with chronic bronchitis, 40 million pained by arthritis, and 10.3 million hampered by serious heart disease.

Increasing life expectancy statistics also belie the degene-

rating state of the nation's health. Most of the increase is accounted for by the fact that children today have a much better chance of reaching age 40 than they did around the turn of the century. But beyond that point a person's chances of living longer are little increased. For instance, a 45-year-old man can only expect to live 2.9 years longer than his counterpart at the turn of the century. A man aged 65 has barely over a year's advantage.

In some cases, overall death rates in some Western countries have either remained virtually stationary or actually shown an increase. In addition, more people stricken with heart attacks, strokes and cancer are kept alive by better medical care.

According to Lewis Herber, a leading expert on modern environmental problems: "What this means, in effect, is that if it weren't for the extraordinary medical advances and great improvements in the material conditions of life, today's adult might well have a much shorter lifespan than his grandparents had." Herber went on to say: "It suggests that modern man would find it very difficult to survive outside a medical and pharmaceutical hothouse" (*Our Synthetic Environment*, p. 198).

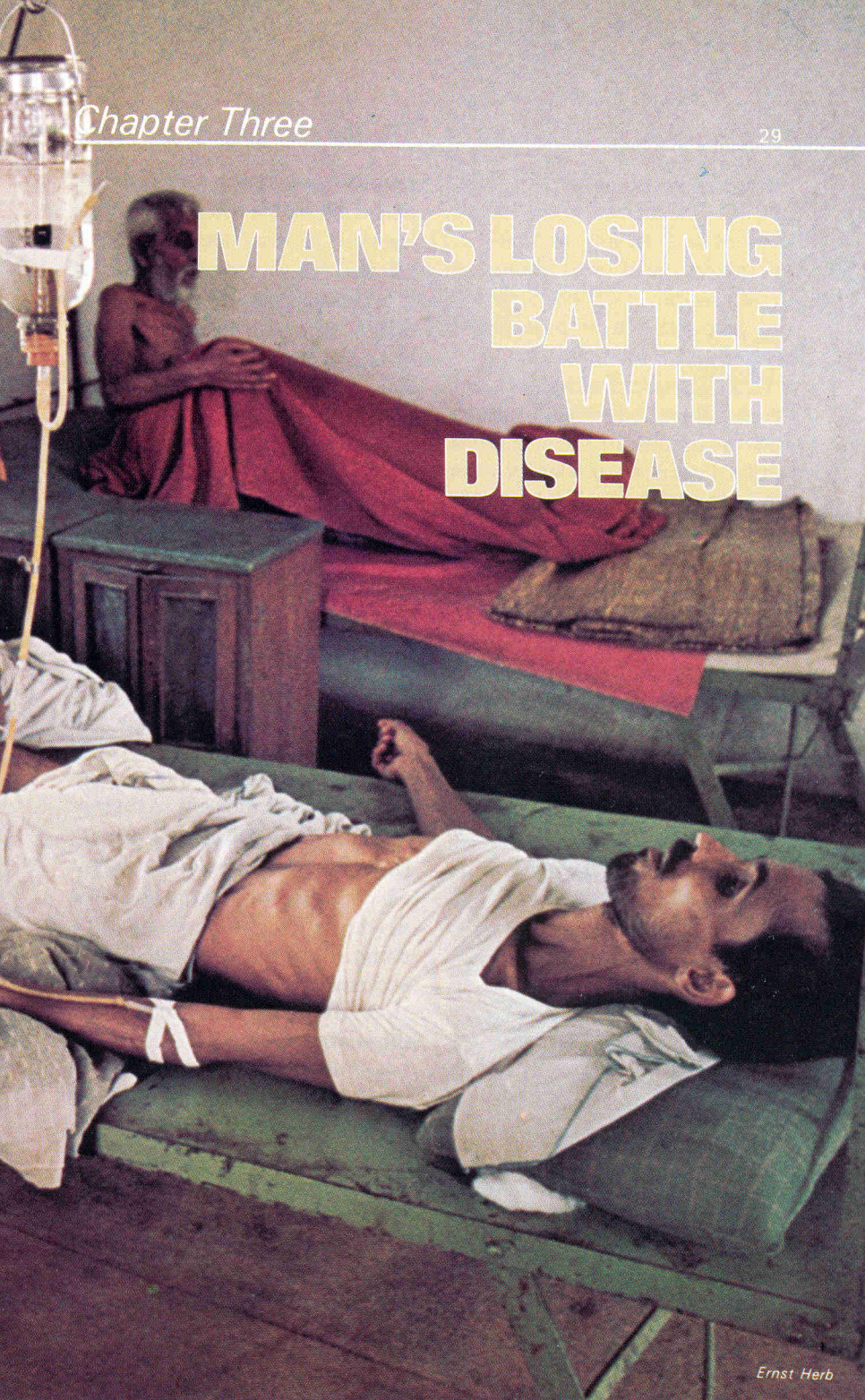
Man, in spite of the advances of modern medicine, has yet to really successfully combat disease at its source. He has, to date, achieved a working balance that can easily be upset. As Rene Dubos put it: "Epidemiologists, who study the frequency and distribution of diseases, now know that man lives in a state of precarious equilibrium with the microorganisms that surround him." Dubos went on to say: "Useful as modern drugs may be in treating disease, they are now undergoing a critical reappraisal as it becomes clear that *microbes have power beyond the magic of medicine*" (*Health and Disease*, pp. 53, 62).

Frederick F. Cartwright, author of *Disease in History*, put it this way: "Diseases have been known to emerge from restricted areas in the past and they may emerge again, causing worldwide pandemics against which modern medicine will not necessarily prevail. Such viral diseases are known to exist" (p. 236).

In the next chapter we will discuss in greater detail some of the increasing problems that the human race is experiencing in the continuing battle against disease.



MAN'S LOSING BATTLE WITH DISEASE



With the advent of World War II, the use of drugs and medicines to treat disease really began to come into its own. Penicillin and the sulfa drugs saved many a life that would otherwise have been lost during this great conflict. Because of these initial successes, vaccines and drugs soon became widely regarded as cure-alls for almost any and every disease.

According to one author: "Many leaders in medicine and public health were convinced that the germ theory explained fully the spectrum of disease and firmly believed that vaccines and antitoxins were the principal means for the protection of the health of the public" (*Our Precarious Habitat*, p. 31).

But as time went on, the horizons of preventive medicine began to widen. Perhaps the increasing resistance of many microbes to some of the wonder drugs (see box on page 40) gave people second thoughts. In any event, leading medical experts began to realize that there was much more to disease than

merely the presence or absence of germs. Rene Dubos, for one, had this to say: "Despite frantic efforts, the causes of cancer, of arteriosclerosis, of mental disorders, and of other great medical problems of our times remain undiscovered. . . . Search for the cause may be a hopeless pursuit because most disease states are the indirect outcome of a constellation of circumstances rather than the direct result of single determinant factors."

Dr. Jacques M. May, director of the Medical Geography Department of the American Geographical Society, was even more emphatic: "I think that we have been very near to committing the major sin in disease etiology [the study of causes]; that is, to consider that what we call disease may have a single cause. There is no such thing. A multiplicity of causes are always needed to produce that alteration of tissues creating maladjustment. . . ."

Germs per se do not cause illness. It is quite common for a person to harbor disease-causing pathogens within his body for years without suffering any ill effects.

Sickness only comes when bodily resistance is lowered to the point that a person's de-

fense mechanisms can no longer fight off the invading microbes. And bodily resistance is determined not by the medical care a person receives, but primarily by how well he reacts to his surrounding environment.

Allan Chase, author of *The Biological Imperatives*, put it this way: "More often than not, the ability of an individual's host defense systems to neutralize or destroy enough foreign pathogens in time to stop them from causing diseases is not determined by the quality of the medical care he receives when disease threatens. On the contrary, it is determined by the quality and the amounts of food he has eaten for most of his life, as well as by the nature of the total environment in which he lives. The total environment ranges from the presence or absence of running water and other sanitary facilities to the levels of noise, chemical, and other pollutants in his daily surroundings."

Dr. E. S. Rogers, professor of Public Health and Medical Administration at the University of California, also echoes these concepts: "... Most, if not all illness, is an expression of a basic imbalance in man's physiologic adaptation to multiple physical and emotional stresses that are initiated, for the most

part, in the condition of his external environment."

Medicine can be used to treat a malady once it occurs, but in many cases it is powerless to forestall or correct the basic environmental factors responsible for widespread illness. So it is primarily to the environment that we should look to determine just how well man is doing in staving off the threat of disease.

A PHARMACEUTICAL research lab in West Germany. Immunologists working in laboratories like this one continue to look for ways to improve existing vaccines and develop new ones.



*Photo Researchers*

The Rat: Purveyor of Pestilence

In terms of sheer physical destructiveness and disease-carrying potential, the rat has to rate as animal enemy number one. He is lord of the urban underworld — a lover of filth, darkness and refuse. He is a known vector for 35 different diseases, including bubonic plague, jaundice, typhoid and trichinosis. He is loaded with various types of flukes, worms and other assorted parasites that are harmful to man.

Rats seem to thrive in the same basic kind of habitat as humans do. And experts estimate they are almost as numerous. The world rat population is put in the neighborhood of 3.5 to four billion — almost one rat for every human being. India alone is suspected of harboring some 2.4 billion of these ravenous rodents. The United States, by comparison, hosts a modest population of some 100 million.

Rats owe most of their amazing numerical strength to their prolific reproduction rate. The female is fertile throughout the year and can produce up to six litters annually, each consisting of from six to 22 offspring. Within three to four months the young are ready to be-

come parents themselves. On a theoretical basis, a pair of rats could deluge the world with 20 million descendants within three years.

Rats are estimated to consume 33 million tons of food every year — enough to feed 40 million people on the average American diet. Much of this food is lost where it is needed most — in the famine-wracked areas of the world.

Rats can develop immunity to standard poisons such as arsenic and strichnine within a few generations. They are suspicious by nature and will take small samples of a newly discovered food source as a precautionary measure. Even warfarin, the pesticide hailed as sure death to rats, is now losing some of its potency and punch. Warfarin was designed to kill rats by preventing their blood from coagulating. But now a generation of immune "super rats" is spreading in both the United States and Europe.

In places like New York City, rats have a field day. A number of residents hang unprotected food from the ceiling of their apartments in order to preserve it from menacing rat packs. Garbage is piled as high as first-floor windows in some areas of the city, and the rats dig in. Katie Kelly described this affinity in her book *Garbage*: "The rats are all over, scurrying through the garbage, up a sanit[ation] man's sleeve as he lifts the can off the sidewalk, past his face as he dumps it into the hopper, down his leg as it makes its escape" (pp. 163-164).

Until the garbage piles, sewer lines and old tenement buildings are cleaned up, it looks like we are going to have to share our existence with this most unwelcome guest for some time to come.

Waterborne Woes

Unfortunately, in many parts of the world man's surroundings are beginning to show definite signs of deterioration. For example, take one area of our environment that is vital for the maintenance of good health and the prevention of disease — fresh water. For an estimated one billion people, pure drinking water is an unheard-of luxury. Five-hundred million people suffer from crippling waterborne maladies; every year some five million infants are killed by diarrheal diseases largely associated with polluted water. Granted, most of this human tragedy occurs in the third-world nations which currently have neither the resources, technology, nor capital to rectify the situation. But worsening water supplies are also becoming a growing concern to the nations of the industrialized West as well. The Thames River, from which London derives most of its water, consists of about 14% effluent. The Rhine in Germany, a vital water source for six million people, usually contains about 40% sewage. During periods of low stream flow the sewage quota sometimes approaches 100%.

Turn the Tap at Your Own Risk

In the United States, the water situation also presents a

rather murky picture. Some 65 million Americans drink water that was discharged from a city or industrial sewer only hours before. A recent Environmental Protection Agency survey found that 23 million Americans were drinking water that violated public health standards. Supplies for another eight million people were deemed "potentially dangerous."

Recent outbreaks of waterborne disease tend to bear out the fact that the liquid coming out of the tap isn't as pure and pristine as it ought to be. In the decade between 1964 and 1974, 20 deaths and 46,374 illnesses have been traced to contaminated water. All told, 130 outbreaks of waterborne disease were tallied during that same period. But the EPA estimates ten times that many go unreported. In 1964, 16,000 citizens of Gainesville, Florida were doubled over by an outbreak of waterborne stomach flu. The following year 18,000 residents of Riverside, California came down with salmonellosis. Again experts suspected a "bug" somewhere in the water system. On one occasion persistent protozoans found their way into purified water in Essex Center, Vermont. The result was an outbreak of giardiasis, a com-

mon parasitic infection. And in 1973, bad water was responsible for cases of typhoid in a labor camp near Miami.

Contrary to man's popular misconceptions, water cannot assimilate wastes but merely transports them. The flush toilet aptly illustrates this limitation. It, in effect, allows a little filth to go a long way. Essentially over 99% of the discharge from a toilet is water. The actual effluent amounts to less than one per cent of the flow. But that little fraction spreads out to pollute thousands of miles of streams and waterways. Billions of dollars then have to go into the construction and operation of sewage plants to prevent the spread of water-borne disease.

And that is where another snag develops in our story, because most of America's existing sewage plants aren't really equipped to do an adequate cleanup job. The vast majority have been built around nineteenth century concepts. Their main stock in trade is catchment control, primary treatment and chlorination. That was fine for the nineteenth century, but it's now somewhat behind the times. Chlorination, the mainstay of the nation's water purification program, can only do so much. Basically it kills disease bacteria and that's all. Chlorination can't take care

GARBAGE COLLECTOR'S strike in Paris created this eyesore and serious health hazard.

Ambassador College



of the many viruses, organic compounds, or toxic metals that have come to be part and parcel of our water system.

Organic compounds in particular seem to be finding their way into the nation's water supply in rapidly increasing numbers. A recent survey of the lower Mississippi River found 66 organic chemicals present in the drinking water. Eight were known to be highly toxic or potentially carcinogenic. Dieldrin, another proven carcinogen, has been found in the water supplies of Philadelphia and Miami. Of the 70 cities the EPA surveyed, *all* had trace amounts of cancer-causing compounds in their drinking water. One can argue about whether or not minute amounts of carcinogens are harmful. But the fact that New Orleans has a 15 to 20% higher cancer rate than surrounding communities who don't imbibe of the "Colon of Mid-America" ought to tell us something.

Pouring It On

But there is another aspect of the current water problem that bears mentioning. The average sewage plant is designed to turn noxious organic wastes into harmless inorganic substances. Inorganic material, if discharged in sufficient quantity,

will result in the eutrophication of nearby lakes and streams. While this in itself won't make anyone sick, it does have certain unsavory side effects. According to the April 1973 issue of *Environment* magazine: "As eutrophication and organic pollution increase, the increased organic content of water gives it, like soil, the ability to sup-

For an estimated one billion people, pure drinking water is an unheard-of luxury.

port heavy bacterial growth. This, in turn, can lead to the growth of some types of highly toxic amoeba."

As more demands are placed on waterways, the greater the effort necessary just to maintain existing standards. Recently Glen Seaborg, former chairman of the Atomic Energy Commission, warned: "By 1980, we will be producing enough sewage and other waterborne wastes to consume, in dry weather, all the oxygen in all 22 river systems in the United States, while the need for fresh water will have almost doubled."

More sewage pumped out means more chlorine gas has to

be dumped in. This in itself may be a problem since chlorine has been found to react with organic compounds present in water to produce cancer-causing agents. Still, man goes right ahead with his outmoded systems of water use and treatment. And with 500 new chemicals added to the nation's streams and rivers each year, experts aren't really sure what the ultimate outcome will be. But Henry J. Graeser, director of the Water Utilities Department of Dallas, Texas, did have this to say: "We are surely moving toward the time when a major waterborne problem, either from ingestion of long-term materials or from a severe epidemic, is going to appear upon the scene and create a national hysteria and crisis in water hygiene" (*Water Wasteland*, p. 6).

Reeling from Refuse

A growing mountain of solid wastes also poses a potential health hazard in many parts of the Western world. Every year Americans throw away 360 million tons of bottles, cans, refuse and waste. On a daily basis this amounts to 800 million pounds for the average community. Looking at the national trash pile another way, if all the United States expects to pro-

duce from 1965 to the end of the century were compacted to a depth of 20 feet it would cover an area the size of Rhode Island.

To combat this growing mountain of trash, most cities still shovel it into the old sanitation standby — the open dump. Obviously, there are problems with this approach. The city dump is a lush breeding ground for flies, rats, fleas, ticks, cockroaches and other odious vermin. (It is interesting to note that one cubic foot of garbage can produce 70,000 flies, and every fly is a potential carrier of 500 million bacteria.) It smells rotten, takes up badly needed space, and pollutes nearby streams and groundwater. And with the amount of refuse expected to triple by 1980, most cities are going to be hard pressed to find adequate dumping grounds.

According to the book *Third Pollution*, written in 1970: "Within five to ten years, some experts predict, a large city without a shortage of landfill area will be a rarity. New York City's landfill space may run out in from four to nine years. At present, half of New York City's 15,000 tons of waste per day goes into filling marshes and extending shores."

So far this only includes the

garbage that gets collected. In some major urban areas not everything ends up on the sanitation truck. Katie Kelly, writing in the book entitled *Garbage*, gave this on-the-spot report concerning conditions in certain parts of New York City: "Across the street, the airmail garbage deposit is being put to use: three bags of garbage arc through the air from a fifth-floor window, landing with a splash and a splat in a refuse-ridden vacant lot down below, joining a long list of previous deposits." It sounds remarkably similar to the type of refuse disposal used during the Middle Ages. Even where garbage is concerned, history often repeats itself.

Agricultural Agony

Another area that is fraught with disease-causing potential is the world agricultural situation.

Ironically, efforts to increase food production have led in some instances to increased incidence of disease. The Aswan High Dam is a classic case in point. One reason for its construction was to increase arable farm land in Egypt through an extensive irrigation system. But the dam increased something else as well — the incidence of the snail-borne disease bil-

harzia. Snails bearing the parasitic worms known as schistosomes flourished in the newly dug canals. As a result, several million additional cases of bilharzia resulted.

Need for stepped-up food production has also encouraged extensive use of insecticides such as DDT and other chlorinated hydrocarbons in many parts of the world. But heavy spraying of insecticides has an adverse effect. It breeds a generation of superbugs resistant to most insect sprays. This in turn often frustrates public health officials attempting to use similar methods to eradicate these same disease-carrying pests. According to the World Health Organization *Technical Report on Vector Control*, published in 1975: "The severity of the resistance problem is illustrated by the large number of species [including disease-carrying mosquitoes] resistant to organochlorine insecticides (91 to dieldrin and 61 to DDT)... The hope that the problem might be overcome by the use of organophosphorus and carbamate compounds has already proven overoptimistic by the appearance of resistance to these insecticides in 27 vector species."

The report went on in a rather pessimistic vein: "The

amount and variety of insecticides being applied are steadily increasing. This trend will continue as the food-and-cash crop production increases to face the growing demand of world population. Since resistance is often nonspecific, this use of insecticides in agriculture further enlarges the resistance problem."

But if chemical sprays are discontinued, large crop losses are bound to follow. As Rene Dubos and Barbara Ward explained in *Only One Earth*: "There are pests. They do eat the crops. In parts of Asia, up to a quarter of the harvest may go to feed not humans but predators" (p. 81).

Packing in the Populace

Without this increased food production made possible by use of pesticides, more people would end up suffering from malnutrition. And lack of proper nourishment promotes the incidence and severity of infectious disease. As a result, mankind ends up sitting on the horns of a dilemma. Increased food production requires artificial methods which in turn promote the incidence of parasitic diseases. Abandonment of these same methods leads to further disease through malnutrition. In other words, diseased



Attie, ALPHA

EVERY YEAR some 30 million Americans spend time in a hospital.

if you do, and diseased if you don't.

There is one other environmental problem that, perhaps more than any of the others mentioned, is fraught with pandemic possibilities. It involves the massive redistribution of the world's population that is now taking place. As in the days of the Industrial Revolution, a tidal wave of rural dwellers is now in almost lemming-like fashion descending on the major metropolitan areas of the

*WHO Photo*

Germs That Fight Back

Smiles and encouragements (photo above) are powerful weapons in persuading a young man (in Afghanistan) who has been in contact with diphtheria to open his mouth so that a throat swab can be taken.

Although various vaccines and antibiotics have been responsible for significant gains in the battle against disease, some of these successes have come at a price. Initially the use of penicillin, sulfa drugs and others was hailed as a remarkable achievement. Certainly many lives were saved that otherwise might have been lost had these drugs not been available.

But unfortunately, the medical euphoria was short-lived. Bacteria and viruses didn't take the invasion of miracle drugs lying down. They began to stiffen, resist and fight these invading antitoxins. Increased use of drugs led to a breeding process among the bugs, better known as "survival of the fittest." Drug-sensitive, thin-walled germs were replaced with tough, thick-walled variants as more and more drugs were introduced.

In the late 1960s, bacteriologists discovered that bacteria subjected to drug treatment had the ability to "infect" their microbial cousins with multiple drug resistance. It was as if the bacteria were

getting a combined booster shot. Researchers found that pathogens of plague, typhoid fever, cholera and dysentery were among those that could quickly acquire the resistance factor. *Staphylococcus aureus*, a germ that is responsible for open-wound infections, was found to be particularly troublesome. Antibiotics such as streptomycin, sulfanilamide, chloramphenicol and tetracycline were powerless against these potent pathogens. Penicillin was found to have problems with malaria, tuberculosis and gonorrhoea.

In August 1966, the *New England Medical Journal* warned: "As a consequence of the prevalence of the resistance-transfer factor, the effectiveness of antibiotics in the treatment of enterobacterial [intestinal] infections may change virtually overnight." The journal went on to label the newly discovered resistance factor "intellectually fascinating and therapeutically frightening."

True to form, resistant strains began showing up in increasing numbers. During the 1950s resistant dysentery bacteria were very rare in Japan. By the mid 1960s they made up 70% of the dysentery pathogens recovered from patients.

Much of the blame for this troublesome trend was laid at the feet of the livestock industry. According to Dr. Tsutomu Watanabe, who was instrumental in discovering the resistance factor: "It has now been shown clearly that the presence of antibiotics in livestock exerts a strong selective pressure in organisms with resistance factors . . . and plays an important role in the spread of infectious resistance" (*Scientific American*, December 1967, pp. 26-27). (Apparently people can pick up the same resistance factor by eating dairy or meat products containing either the antibiotics or the drug-resistant germs. The resistance factor is then passed along to resident bacteria within the body.)

Doctors in both the United States and Britain have repeatedly warned against the indiscriminate use of medicated feeds, but for the most part their warnings have gone unheeded. According to a recent issue of *Prevent* magazine: "The problem of resistant organisms is increasing and in a few years no non-toxic antibiotics may be available for treating some hospital-acquired or intestinal infections" (*Prevent*, 1972/3, vol. 1, no. 2, p. 48).

Dr. Watanabe concluded his article on a similar note: "Unless we put a halt to the prodigal use of antibiotics and synthetic drugs we may soon be forced back into the pre-antibiotic era of medicine" (*Scientific American*, December 1967, p. 27).

world. In 1960, two thirds of the world population lived off the land. By the turn of the century only 33% will be left down on the farm. Most of the migrants are heading for urban centers known as supercities — those that have reached the 10 million population mark.

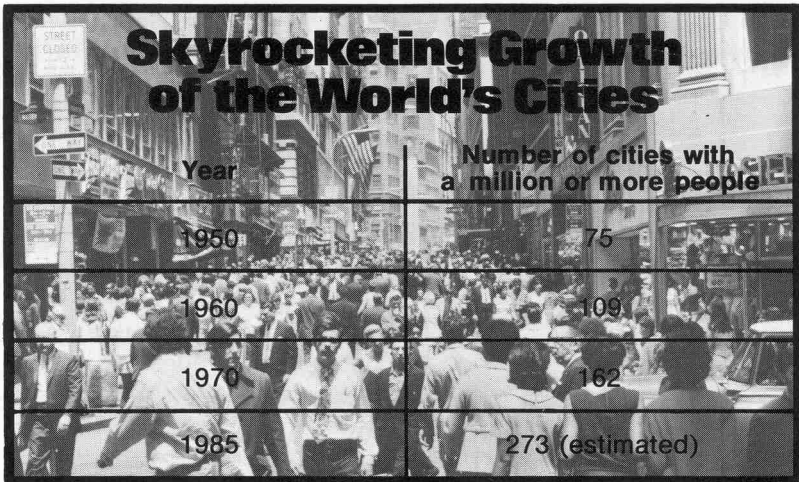
In 1950 there were only two such cities — New York and London. Since that time four more have been added: Tokyo, Shanghai, Peking and Moscow. But by 1985 demographers estimate that 17 of these monster megalopolises will dot the face of the globe. Or looking at the trend from a century-to-century perspective, by the year 2000 there will be more supercities of 10 million or more inhabitants than there were cities of one million in 1900.

Unfortunately, the lion's share of this urban implosion is not occurring in the industrial West but in the poverty-stricken third world. Of the 17 supercities that will exist by 1985, seven will be in Asia and four in Latin America. By that time the developing nations will also be supporting an additional 47 "junior-jumbo" cities in the one million population bracket.

The bulk of this urban influx consists of individuals known as squatters or slum dwellers. The basic reason for their mass

movement is simple — too many people and too few jobs in the rural areas of the world. Robert MacNamara, president of the World Bank, described the plight of the typical migrant in a speech he made several years ago: "To many in the countryside it appears more attractive to migrate to the cities and wait there — even without work — in the hope of eventual employment, rather than to endure the poverty of underemployment in agriculture."

The squatter is willing to hole up anywhere in the city, regardless of the living conditions. Any filthy nook or crevice will do. The idea is to carve out a precarious toehold and hope for the best. Already more than one third of the urban population of third world countries are slum dwellers, and their ranks are growing at the phenomenal rate of 15% a year. Seven hundred fifty thousand are jammed into the environs of Jakarta, Indonesia; and in Cairo one tenth to one third of the population falls into this category. The squalor and misery that these people endure is almost beyond comprehension. According to a recent U.N. environmental report: "The degree of environmental deprivation found there is devastating. People live in these settlements



Joe Clayton

at the lowest subsistence level, lacking basic services, such as access to water, sewage and garbage disposal. Living accommodation is overcrowded, offers inadequate protection from the elements, and is surrounded by a densely packed micro-environment which provides a fertile breeding ground for vermin and pestilence....”

Playing a Losing Numbers Game

When the mass metropolitan movement that is now underway is coupled with an exploding population growth, the average third world city can't go anywhere but down. Rene Dubos and Barbara Ward explain why: “The inexorable mathematics of population increase, of city growth, of invest-

ment levels... makes it certain that the resources needed to feed, house, employ and educate two and a half billion more people at anything like a reasonable living standard in the next thirty years will require a new and massive mobilization of local and international resources. How, otherwise, can cities which already hold one to two million people — a third of them squatters, a quarter of them without work — still prepare for a wave of two to three million more?” (*Only One Earth*, p. 238.)

Solution Impossible?

Just to keep pace with this projected population growth, the world will need 2000 new cities of a million people plus another 1200 million homes by



Ernst Herb

A SCENE outside a hospital in Calcutta, India. An acute shortage of doctors and lack of medical facilities is common in many underdeveloped countries.

the end of the century. India, in particular, will have to construct a city that can shelter one million inhabitants every *thirty days!* Aurelio Peccei, a leading member of the Club of Rome, put this bewildering problem in the following per-

spective: "The job of building the houses, schools, hospitals, churches and churchyards, and the roads, ports, bridges, and transport systems, and of erecting the factories and reclaiming the lands required by this population doubling — *a job to be finished in some thirty years* — equals the construction work accomplished by mankind over the last two millennia, even if we are incapable of duplicating Venice and Bruges, the Taj Mahal and the Kremlin" (*Who Speaks for Earth?* p. 165).

Aid for this monumental undertaking would obviously have to come from the industrial West. But with the developed nations reeling from sharply increased petroleum prices, it is highly doubtful if most of them can even maintain existing levels of foreign aid, let alone think about significant increases. Meanwhile, the deteriorating slums of the world stand as an open invitation to future disease disasters. In this vein, a recent publication put out by the U.N. (*Human Settlement*) warned that this accelerating trend could "soon lead to a major collapse in many of the largest cities of the world." The report went on to say: "It becomes clear that the crisis is already upon us."

Maurice Strong, executive di-

rector of the United Nations Environmental Program, likewise sounded this gloomy warning: "If we do not stem this tide, some of the cities of the developing world will become literally uninhabitable in the next decade." Strong went on to say: "Some of them [cities] are hanging on by the skin of their teeth. It would take very little in terms of a crisis — a flood, or perhaps a breakdown in administration — to turn them into a disaster area. The major problem will be contaminated water. *A disaster in*

"If we do not stem this tide, some of the cities of the developing world will become literally uninhabitable in the next decade."

one of these cities could trigger an epidemic on a world scale" (emphasis ours).

With the growing deterioration of the world's water supply, the mounting accumulation of solid wastes, the increasing resistance of insects and bacteria and the mushrooming mass of humanity now packing into the world's major cities, one can't help but wonder if the human race is again

more than overripe for a new round of disease pandemics. It's no wonder that Rene Dubos and Barbara Ward had this to say: "When we consider the planet's still-increasing population, we may even wonder whether the traditional figure of the harvester may not be turning before our eyes into that other image of the man with the scythe — the archetypal image of Death itself" (p. 109).

Frederick F. Cartwright, author of *Disease and History*, likewise made a rather ominous-sounding statement: "Man must come to terms with himself. If he does not learn self-discipline, if he fails to solve the problems which he has created, then at least temporarily, those problems will be solved for him. The solution will lie in the hands of one or all of his age-old enemies, Famine, Pestilence and War, the Three Horsemen of the Apocalypse, who bring in their train the Fourth Rider, Death upon his Pale Horse" (p. 238).

Cartwright seems to have captured the essence of the current dilemma now facing humanity. Will the world ever experience this type of future epidemiological ordeal? The next chapter will examine this frightening question.

EPIDEMICS OF THE FUTURE





The world has yet to see the last of widespread disease epidemics. That, in effect, was what Jesus Christ told His disciples in the pivotal Olivet prophecy recorded in Matthew 24 and Luke 21.

Right along with wars and famine came pestilence: "For nation shall rise against nation, and kingdom against kingdom: and there shall be famines, and pestilences, and earthquakes, in divers places" (Matt. 24:7). These were some of the prophetic signs that Christ listed in answering the question, "What shall be the sign of thy coming, and of the end of the world [age]?" (Verse 3.)

Granted, pestilence, famine and war have been ongoing problems that have plagued mankind ever since the dawn of history. But the main thrust of Christ's message is futuristic. The overall context of the Olivet prophecy readily attests to this fact. In verses 21 and 22 of Matthew 24, Christ referred to a time when the total annihilation of human life would be a distinct possibility. Only with

the recent development of multiple-megaton nuclear weaponry could such an event have become a reality.

The book of Revelation also underscores the fact that such tumultuous times are yet in store for the future. John's apocalyptic scenario centers around the events surrounding the Day of the Lord (Rev. 1:10). In the sixth chapter we see war, famine and pestilence (the last three of the four horsemen of John's vision) riding together at this critical juncture in world history.

The Pale Horseman Rides

With both the black horse of famine and the red horse of war riding roughshod over the earth, it is only natural for the pale horse of pestilence to follow hard on their heels. Ezekiel also described the devastating effect this deadly triad can have: "A third part of thee shall die with the pestilence, and with famine shall they be consumed in the midst of thee: and a third part shall fall by the sword round about thee; and I will scatter a third part into all the winds, and I will draw out a sword after them" (Ezek. 5:12).

Parallel prophecies found in the Old Testament clearly indicate why man will continue to suffer from the ravages of

disease. Notice this cause-and-effect relationship as outlined in the 28th chapter of Deuteronomy: "But if you will not obey the voice of the Lord your God," warns man's Creator, "the Lord will make the *pestilence* cling to you until He has consumed you from off the land, which you go to possess. The Lord will smite you with consumption [wasting, degenerative disease], with fever and inflammation [possibly infectious contagions]...and the tumors, the scurvy [deficiency disease] and the itch, of which you cannot be healed. The Lord will smite you with madness [mental disorders] and blind-

ness and dismay of heart [emotional trauma]" (verses 15, 21-22, 27-28, *The Amplified Bible*).

Misgovernment, greed and oppression over the course of nearly 6000 years of history have saddled the human race with the unwanted burden of disease. For instance, man's proclivity to crowd into disease-prone cities is indicative of this

A MENTALLY retarded child (Pakistani refugee) found left by her parents at a railway station near Calcutta. In the district hospital she was tied to a line for days and left to lie in her own excrement. Conditions similar to this are often extant after war or major civil upheavals.

Ernst Herb



Old Testament Health Laws- Still Ahead of Their Time

Several millennia ago, God gave a people the opportunity to live a basically disease-free existence. Shortly after the children of Israel came out of Egypt, He told them: "If you will diligently hearken to the voice of the Lord your God . . . I will put none of the diseases upon you" (Ex. 15:26, RSV).

Many of the laws and statutes that God gave to them contributed directly to the elimination of disease at its source. For instance, the seventh commandment, "Thou shalt not commit adultery," is insurance against gonorrhea, syphilis and herpes.

God also told the Israelites to bury their sewage (Deut. 23:12, 13), rather than using it to contaminate their waterways. This simple preventive measure, if followed, virtually eliminates the threat of crippling waterborne diseases such as dysentery, cholera, typhoid, hepatitis, and bilharzia.

Old Testament dietary laws made a lot of sense too. The Israelites were instructed not to eat known disease-carrying animals such as pigs, rabbits, oysters and snails. Obedience to these laws would greatly reduce the incidence of trichinosis, tularemia, hepatitis and other parasitic diseases.

Sanitation, cleanliness and quarantine were also emphasized. Lepers and diseased people were required to be isolated from the main body of the Israelites. Houses known to harbor disease were quarantined (Lev. 14:33-38) and then given a thorough scrubbing (verses 39-42).

Procedures were also given for treatment of people with various types of running sores and infections (see Leviticus 15). Virtually anything the person touched was considered contaminated, including dishes, clothes and even saddles.

Adherence to these laws, even in the "advanced" twentieth century, would alleviate quite a bit of suffering and misery among millions of people around the world today.

problem. And it is interesting to note that Bible prophecy seems to indicate that this crowd-at-all-costs policy will eventually backfire on the human race. Notice Leviticus 26:25: "... And *when ye are gathered together within your cities*, I will send the pestilence among you..." Also Ezekiel 7:15: "The sword is without, and the pestilence and the famine within: he that is in the field shall die with the sword; and he that is in the city, famine and pestilence shall devour him."

It Has Only Just Begun

This type of lethal disease epidemic, working hand in glove with war and famine, will lay the groundwork for perhaps the greatest catastrophe ever to confront the human race. In Revelation 6:8, John writes: "And I saw, and behold, a *pale horse*, and its rider's name was Death, and Hades [the grave] followed him; and they were given power over a fourth of the earth, to kill with sword and with famine and with pestilence and by wild beasts of the earth" (RSV). By today's head count, that would amount to a mind-boggling one billion people. And according to the Olivet prophecy, that is only the "beginning of sorrows" (Matt. 24:8). Much more is to follow as the world

moves into the darkest moments of its entire history. Jeremiah called it the "time of Jacob's trouble" (Jer. 30:7). Christ said there would be "great tribulation, such as was not since the beginning of the world... nor ever shall be" (Matt. 24:21).

In the eighth chapter of Rev-

"And I saw, and behold, a pale horse, and its rider's name was Death, and Hades [the grave] followed him; and they were given power over a fourth of the earth, to kill with sword and with famine and with pestilence and by wild beasts of the earth."

elation, John again writes: "And the third angel sounded, and there fell a great star from heaven, burning as it were a lamp, and it fell upon the third part of the rivers, and upon the fountains of waters; and the name of the star is called Wormwood; and the third part of the waters became wormwood; and many men died of the waters, because they were made bitter" (verses 10-11).

Was John perhaps referring to yet another round of deadly waterborne disease epidemics?



Riboud — WHO

DDT-DUSTING operations against insect-borne diseases in a small Iranian Village.

Could this be the result of man's continual pollution of his freshwater sources? Regardless of the reason, it is apparent that at this point in time humanity is in dire straits. Perhaps that is one reason a massive horde of 200 million "horsemen" (a great army) decides to descend on the pivotal area of the Middle East

(Rev. 9:16). Could the increased pressures of widespread famine and disease pandemics have something to do with this warlike mass movement? Again it is difficult to read between the lines of John's prophecy. However, it is interesting to note that some authors have speculated on just such a possibility.

Frederick F. Cartwright, author of *Disease and History*, had this to say: "Sheer pressure of numbers and of hunger may dictate a return to Mongolian and Viking-type invasions; since all the more desirable parts of the world are thickly inhabited, global war would inevitably result" (p. 237).

Robert Heilbroner writes in *The Human Prospect*: "Massive human deterioration in the backward areas can be avoided only by a redistribution of the world's output and energies on a scale immensely larger than anything that has hitherto been seriously contemplated Such an unprecedented international transfer seems impossible to imagine except under some kind of threat" (p. 44).

Whatever future role disease plays in precipitating these events, it is obvious from the above prophecies that if God did not personally intervene and put a final stop to the con-

tinually escalating rounds of war, famine and disease that will more than likely engulf this planet, all humanity would perish (Matt. 24:21-22).

Healing a Disease-Torn World

Fortunately, God will not allow the human race to pass the cosmic failsafe point. Jesus Christ will return to save mankind from the triple threat of war, famine and disease. One of the first things He will do is put a final end to man's age-old war-making activities (Micah 4:3). Not only will that

“Massive human deterioration in the backward areas can be avoided only by a redistribution of the world's output and energies on a scale immensely larger than has hitherto been seriously contemplated.”

take care of the red horse, it will go a long way toward reducing the proclivity for disease epidemics.

Christ will also be faced with a world whose rivers and streams are too polluted to support any kind of life (see Revelation 8:10-11 and 16:4). To correct this situation, living

waters will begin to flow from Jerusalem to heal the world's water supply (Zech. 14:8; Ezek. 47:8).

The world's agricultural system will be revolutionized and men will no longer have to endure the rigors of malnutrition and deficiency diseases (Amos 9:13-14). Land reform will also be a primary item on the agenda. Crowded, disease-ridden cities will go by the boards. Every human being will be entitled to his own plot of ground (Micah 4:4). But even more important, mankind will begin to live by a new system of principles and laws. Instead of destroying and desecrating their surroundings, they will learn how to dress and keep the earth (Gen. 2:15). This will undoubtedly eliminate the favorite breeding grounds of many a rat, fly, cockroach and mosquito.

Before Christ's thousand-year reign is over, humanity will at long last understand what it means to be truly free from sickness and pestilence. Like the dodo, passenger pigeon and saber-toothed tiger, disease will be something men read about in their history books.

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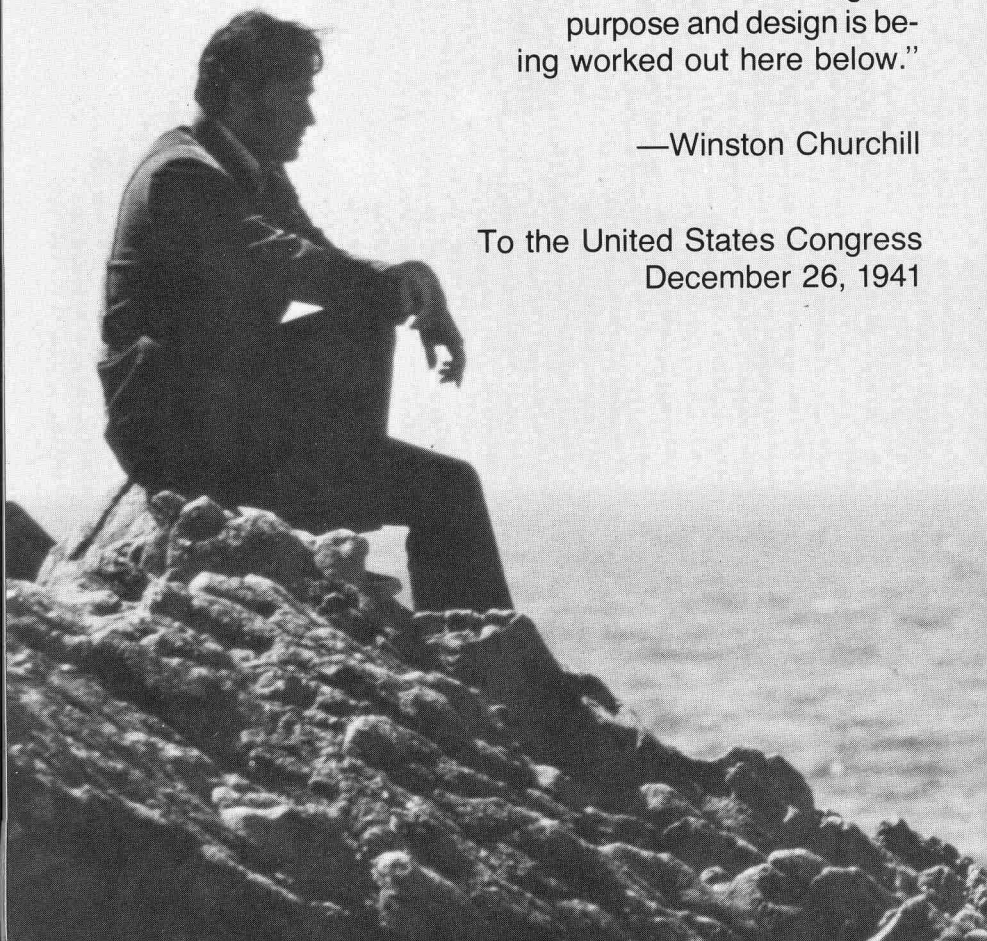
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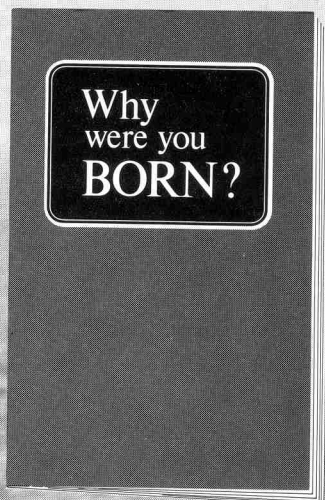
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