Wealth and Waste and Writing on the Wall (or, Somebody Go Get Daniel)

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This paper uses the imagery of Belshazzar's feast, described in the fifth chapter of Daniel, as an analogy of the way affluent societies deal with the global issues revealed by scientific data. Daniel, the scientist-ethicist, is called upon to read and interpret the writing on the wall (the facts of science), written by the disembodied hand (the "value-free" activities of science), to the lords of the feast (all of us who believe that the wealth that technology produces may be possessed without responsibility or penalty). Four examples of modern "writing on the wall" are explored: 1) atmospheric carbon dioxide levels and global warming, 2) rainforest destruction and the loss of species diversity, 3) depletion of the ozone layer and the onset of skin cancer, and 4) world oil reserves and the threat of war. The paper concludes with the musings of a pair of early talmudic scholars, Rabbi Jonah ibn Janah of Saragossa and Rabbi Akiva, the latter a contemporary of the Apostle Paul.

What a party! All the right people were there, all the up-and-coming "yuppies." Everybody who was anybody was invited. Babylon's elite were assembled. Imagine the glitz, with a thousand nobles, their wives and lovers. The wine flowed like the waters of the Euphrates. Imagine being invited to dinner in the great banquet hall of the palace, where, reclining at the head table was Belshazzar, master of the kingdom, heir of Nebuchadnezzar, and lord of the feast.

We can imagine Belshazzar's eyes glowing with pride as he surveys the opulence of the occasion. A hush falls over the room and the mighty ruler speaks: "My friends, this year of my reign [539 B.C.] has been a very good year. To celebrate, let us drink a toast to the gods of real power, to the measure of the good life, to the gods of stone and wood, iron and bronze, silver and gold. Drink from the goblets set before you, my friends. These golden goblets were liberated by my forefather

from the god of the Jews. Raise them in a toast to the gods of reality."

Belshazzar's party was more than a single great occasion, more than one extravagant feast. If the ancient historian Herodotus is to be believed, it was a whole lifestyle, a lifestyle of wealth and waste and self-deception.

Then it happened, that mysterious writing on the wall. A terrified Belshazzar, knees knocking and pale as a ghost, watched a disembodied hand scratch the truth into the plaster: "*MENE MENE TEKEL UPHARSIN*." Was it part of the entertainment? No, the king was frantic: "What does it mean? Somebody tell me! I offer my golden amulet, my scarlet robe, third place in my kingdom, to anyone who can tell me what it means!" The lords of the realm and court officials and the counselors of the king all stood frightened and mute.

Of course, any who were educated could read the words. As nouns, they were simply coins of the realm: mina, 50 shekels; tekel, one shekel; and upharsin, one-half shekel. In the verb form, they were activities of science or economics: *mene*, to number; *tekel*, to weigh; and *upharsin*, to divide. There was one other clue: in the past tense, *upharsin* was read *peres* or *paras*, the Aramaic word for Persians.

Some in the banquet hall may have guessed the true meaning, but no one spoke. Then Daniel, the truth teller, was brought forward. He spoke to the quivering ruler: "Keep your gifts for yourself and give your rewards to someone else. I will read the inscription and I will make the interpretation." So Daniel interpreted the message that no one else dared read:

"**MENE**—God has numbered your kingdom and put an end to it."

"**TEKEL**—You have been weighed in the balance and have been found wanting."

"**UPHARSIN**—Your kingdom has been divided and given over to the Medes and Persians."

Shocked, Belshazzar offered Daniel the promised reward. By doing so, the king acknowledged Daniel's interpretation to be correct, at the same time demonstrating that he was blind to the truth that it held. The truth was simple: the feast was over. The kingdom no longer belonged to Belshazzar, who owned no reward to give. In fact, Belshazzar was slain and the kingdom lost that very night.

What a party! For those who survived, it was a night to remember.

The account of Belshazzar's feast in the fifth chapter of Daniel provides a haunting analogy of today's world. Garrett Hardin (1986) has suggested that the disembodied hand writing cryptic warnings on the wall has become the instrumented hand of science and technology. Daniel, as reader of the message, may be viewed as the generic, "value-free" scientist simply giving the facts. But Daniel does not stop with the facts. As interpreter of the message, Daniel fills the role of ethicist by comparing what is to what ought to be and by warning of the consequences of wrong actions. Although much of today's "writing on the wall" is complex, confusing, and even contradictory, some messages are being written with increasing clarity each passing year. We look briefly at four of these messages.

MENE: Atmospheric Carbon Dioxide Levels and Global Warming (or, "Burn, Baby, Burn")

Modern society survives by burning fossil fuel. Oil, coal, and natural gas are the fuels that produce our electricity; power our industry; fuel our automobiles, trucks, buses, trains, and planes; power our agricultural and commercial enterprises; heat and cool our homes; and, in large measure, allow us to live a lifestyle that even Belshazzar would envy. There are side effects to all this burning. Among them is the discharge of large quantities of carbon dioxide into the atmosphere. The problem is compounded by the fact that less atmospheric carbon dioxide is being recycled because of

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deforestation, particularly in the tropics. Atmospheric scientists have monitored the level of carbon dioxide in the atmosphere since the late 1950s and the writing on the wall is both striking and ominous (Figure 1).

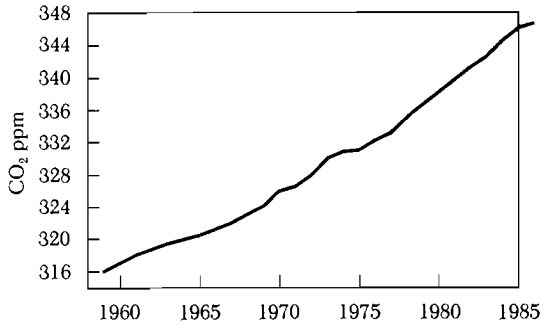

Figure 1. Average annual concentration of atmospheric dioxide measured at Mauna Loa Observatory, Hawaii 20° North Latitude (World Resources Institute and the Institute for Environment and Development 1986).

Numbered, numbered, weighed, divided

But what does it mean? To a "value-free" scientist, it is a fascinating global experiment. Researchers studying a phenomenon dubbed "the greenhouse effect" can now predict how the earth's climate will respond to ever higher concentrations of carbon dioxide. As the carbon dioxide content of the atmosphere goes up, the earth's ability to reradiate heat goes down, the delicate temperature balance is disrupted, and the earth's atmosphere warms up.

Although much of today's "writing on the wall" is complex, confusing, and even contradictory, some messages are being written with increasing clarity each passing year.

The consensus emerging among scientists is that if current trends continue, sometime around the middle of the next century the concentration of carbon dioxide in the atmosphere will reach twice the preindustrial level and the earth's average temperature will be between 2 and 5 degrees Celsius higher than it is today (Tangley 1988). A variety of complicating factors notwithstanding, that will almost certainly lead to the collapse of the Arctic pack ice and the melting of a substantial part of the Antarctic ice sheet. The subsequent rise in sea level could make life very uncomfortable for residents of Boston, New York, Tokyo, Shanghai, Amsterdam, Stockholm, and a number of other coastal cities (Barth and Titus 1984). Large areas of low-lying, fertile farmland, including such highly populated regions as the Ganges River delta in Bangladesh, will also be lost.

The calamity doesn't stop there. Recent research results indicate that the projected temperature increase could also lead to a substantial drying out of the mid-continent, mid-latitude regions of the northern hemisphere, principally in the United States, Canada, and the Soviet Union (Miller 1988). In the U.S. cornbelt, for example, the anticipated climate change could cut corn yields by 50 percent.

"Don't worry, if it gets warmer, we'll just turn up the air-conditioner."

Somebody go get Daniel.

MENE: Rainforest Destruction and Loss of Species Diversity (or, "Fast Food for Fast Times")

Consider the menu for our modern "feast." A burger and a soft drink provide fast food for fast times for millions of affluent people. Worldwide consumption of hamburgers now exceeds 10 billion burgers per year. In America and Europe, meat consumption has increased by more than 45 percent since 1960, an increase dwarfed by the increase among nations newly arrived at the feast (Myers 1984). Fashionable citizens of Japan now join their Western counterparts by matching them burger for burger, causing meat consumption in Japan to rise by 600 percent since 1960. Even the Chinese are pulling their chairs up to the banquet table, willing to pay a week's wages for a meal at an American-style fast-food restaurant. In 1960, all beef consumed in America was home grown. By the early 1980s, the nation was importing more than 10 percent of its total consumption, with three-quarters of that (over 100,000 tons annually) coming from Central America (Myers 1984). The tropical forest began to disappear and, lo, there was writing on the wall (Figure 2).

Numbered, numbered, weighed, divided

But what does it mean? Stretching across Central and South America, Africa, and Asia, the tropical moist forest forms the most diverse and complex ecological system on earth. Containing about one-half of all living species, tropical forests provide us with food, medicine, new energy sources, and germplasm stocks that are the

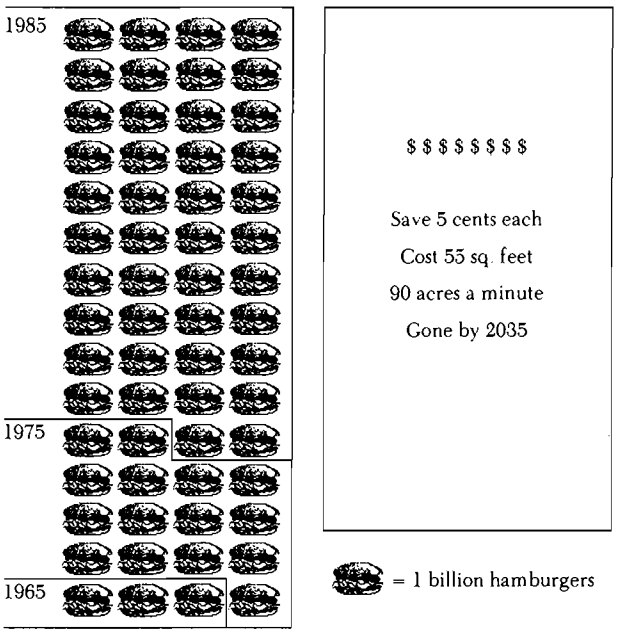

Figure 2. Hamburger sales at the largest fast-food restaurant chain in North America (adapted from Seymour and Girardet 1987) and selected data relating to tropical forest loss (see text for explanation).

raw material of genetic engineering. It has been estimated that the tropical moist forest may contain as many as 30 million different species, each a unique manifestation of life's diversity, each with its own genetic "fingerprint" (Wilson 1985). A comparison to temperate forests staggers the imagination. Whereas a square mile of Indiana woodlot might contain ten or fifteen kinds of trees, a similar plot in the tropical moist forest would contain hundreds of distinct tree species. The value of this magnificent ecological treasure cannot be overestimated, yet, it is being degraded and depleted faster than any other biome on earth.

Africa has lost more than 52 percent of its tropical moist forest, Asia 42 percent, Central America 37 percent and South America 36 percent (Miller 1988). Remote-sensing satellites now document a loss rate of about 90 acres per minute, or some 70,000 square miles each year. Conservative estimates suggest that if current loss rates continue, all of the remaining tropical forest will be gone or seriously disturbed by the year 2035. The causes of tropical deforestation are varied. In Africa and Asia the poor are gathering firewood faster than nature can regenerate it. Commercial logging by multinational companies is widespread, especially on the islands of the Pacific and in West and Central Africa. Poor people throughout the biome are also clearing forest lands to grow food.

In Central America and Brazilian Amazonia, large-scale ranching operations, underwritten by multinational corporations, are clearing the tropical forest. Cattle grazed on the cleared lands yield low-cost beef, primarily for export to the United States, Europe, and Japan. This is what Norman Myers (1984), a leading authority on this problem, calls "the hamburger connection" or the "hamburgerization" of the tropical forest.

The tragedy of the conversion of tropical forest to pastureland is compounded by the fact that the process can produce only short-term results. In as little as three to five years after clearing, the land will no longer sustain cattle and is abandoned to become infertile desert scrub (Miller 1988). To satisfy the demand for cheap beef, more forest is cleared and the cycle begins again. In Costa Rica alone, this process destroys between 125,000 and 175,000 acres of forest annually (Seymour and Girardet 1987). The scale of these operations is incredible. For example, in 1985 Coca-Cola Foods and its associates bought 13 percent of the land area of Belize for $200 million, which was $50 million more than the gross national product of that Central American country (Rainforest Action Network 1987). Perhaps such a deal was more than any government could resist. At the same time, Belize also received the U.S. Department of Agriculture certification necessary to export beef to the United States. Most North American fast-food chains vigorously deny using imported beef and claim to be using only domestic meat. In fact, all meat imported into the United States is classed as domestic by the USDA as soon as it leaves the point of entry. Hence, the beef in your next burger could be from Costa Rica and still be "domestic."

Fashionable citizens of Japan now join their Western counterparts by matching them burger for burger, causing meat consumption in Japan to rise by 600 percent since 1960.

Numbered, numbered, weighed, divided

When the calculations are done, each quarter-pounder made from beef imported from a country converting tropical forest into pastureland accounts for the irretrievable loss of about 55 square feet of this magnificent ecosystem (Miller 1988). Thus, while various groups of Christian believers debate the mechanism of creation, the very property and handiwork of God are

being destroyed. Why? So that we can pay five cents less for a burger. Are we stealing the "golden goblets" from the treasury of the Creator, using them frivolously at the peak of our feasting, and discarding them as if we owned them? It is estimated that if current trends continue we will be participants in the loss of between five and ten million species—the greatest mass extinction since the Ice Ages (Wilson 1985).

"What do you expect us to do? Give up burgers?"

Somebody go get Daniel.

TEKEL: A Hole in the Ozone Layer and Skin Cancer (or, "Smell Good, Be Cool, and Fry")

In 1985, a group of British scientists led by Joseph C. Farman published data indicating that the springtime amounts of ozone high in the atmosphere over the Antarctic had decreased by more than 40 percent between 1956 and 1984. The decline has recently been confirmed using satellite telemetry. The National Aeronautics and Space Administration now projects a 10 percent depletion of the global ozone layer by the year 2050 (Kerr 1988). More writing on the wall (Figure 3).

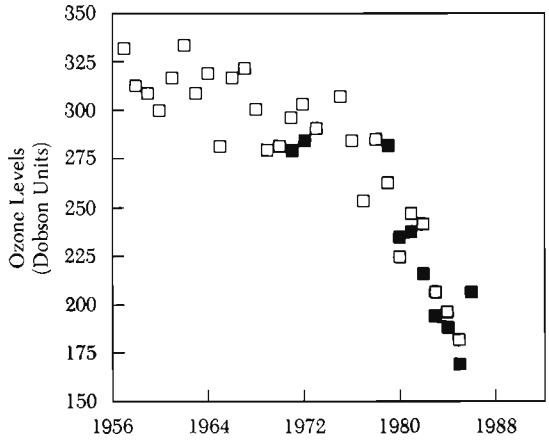

Figure 3. Mean October atmospheric ozone levels over Antarctica. Open boxes: British Antarctic Survey data. Closed boxes: NASA data (redrawn from Stolarski 1988).

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But what does it mean? Ozone is a curious gas. In the lower atmosphere, it is a pollutant that makes smog more toxic, injures plants, and damages human health. On the other hand, high in the stratosphere, it acts to screen out most of the sun's harmful ultraviolet radiation. Current research (Stolarski 1988) indicates that the increased ultraviolet radiation that would occur with even a slight decrease in the ozone layer would cause a large increase in the number of cases of skin cancer, eye cataracts, severe sunburn, and suppression of the immune system. Other negative effects include damage to many terrestrial plant species, disruptions of ocean food chains, and the reduction of productivity in food crops like rice, corn, and wheat. A recent Environmental Protection Agency risk assessment study (January 1987) projected that continued disruption of the ozone layer will lead to some 40 million additional cases of skin cancer resulting in 800,000 deaths over the next 88 years. Despite some scientific uncertainty, rapidly accumulating evidence implicates chlorofluorocarbons as the major culprit in ozone-layer depletion.

Chlorofluorocarbons (CFCs) are molecules with a number of widely sought qualities. They are colorless, odorless, essentially nontoxic, noncaustic, noncorrosive, nonflammable, very stable, and they have relatively low boiling points. Best of all they are synthetic and dirt cheap. Discovered in the 1930s, their production expanded rapidly as they came into widespread industrial and commercial use. Their impact on our lifestyle and economy is hard to overestimate. CFCs are the coolants that air-condition our homes, offices, schools, and cars. They are used to make the plastic foam that, as insulation, improves energy efficiency and keeps our hot fast-food hot and our cold fast-food cold. They sterilize our medical equipment, freeze our perishable foods, clean our computer chips and circuit boards, and even make our furniture cushions soft. The final end-use value of installed equipment and products dependent on CFCs is about $135 billion annually (Cohn 1987). If these compounds are so beneficial, what's the problem?

This writing on the wall was rather faint at first. The debate began in the early 1970s when scientists began to suspect that CFCs released into the air would drift upward, be broken down by ultraviolet radiation, and destroy the ozone layer. Research quickly confirmed these suspicions and by 1978 a ban was placed on aerosol uses of CFCs in the United States. That ban, even though Canada and Sweden followed the U.S. lead, had little effect on the total release of CFCs into the atmosphere. Growing global markets and the expansion of industries using CFCs allowed the companies producing them to continue production at or above pre-ban levels. And there is an additional problem. The unusual chemical stability of CFCs means that when they are released into the atmosphere, they stay there for a long, long time. It is estimated that 95 percent of the CFCs released into the atmosphere will not break down for a hundred years (Stolarski 1988). Hence, even though we are now releasing CFCs at a rate of about 600,000 tons a year, the cumulative loading of CFCs

impacting the ozone layer is already nearing 15 million tons, up by a factor of 15 since 1960.

Concern over the ozone problem is growing, but the kind of expensive, global solution needed will be very difficult to achieve. EPA Administrator Lee Thomas has said that: "Despite the range of scientific uncertainty, there is substantial evidence of significant health and environmental effects. . . . If we wait for actual verification of the depletion, we will already be seeing the consequences of that loss" (Cohn 1987). On the other hand, Secretary of the Interior Donald Hodel, at a meeting of the Reagan administration's Domestic Policy Council in May of 1987, displayed the "give-Daniel-a-robe-and-send-him-away" mentality that environmental scientists have come to expect from the lords of the feast. Hodel, who describes himself as an evangelical Christian, flippantly suggested sunscreens and hats as an alternative to reducing CFC production (Spitler 1987). In other words, let the feast continue! By all means, don't stop the feast.

"You want me to give up my burgers *and* my air-conditioner? No way!"

Somebody go get Daniel.

PERES: Oil Imports and the Threat of War (or, "Over a Barrel Again")

Oil fuels the feast. Petroleum has probably changed the lives of more people in more ways than any other substance in all of history. It is the lifeblood of every modern industrialized society. Oil has transformed everything: our homes, jobs, entertainment, and our environment. It is the critical factor as decisions are made regarding the economy, agriculture, the structure of our nation's military, and the shape of our foreign policy. It has made the United States and the Soviet Union into superpowers, the automobile a way of life, OPEC a household word, and the 55-gallon drum the most recognized and widely distributed object in the world. In the United States, it takes more than 13 million barrels of oil each day to maintain our lifestyle (Gever et al. 1986). Oil fuels the feast, but there is writing on the wall (Figure 4).

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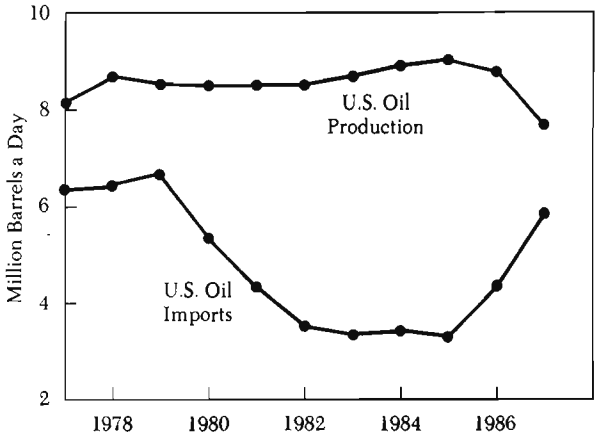

Figure 4. Oil production and oil importation by the United States (data source: U.S. Energy Information Administration, Annual Energy Review, U.S. Department of Energy).

Numbered, numbered, weighed, divided

But what does it mean? With one of the highest literacy rates in the world, the U.S. still seems to have trouble with mathematics, geography, and history. The math is not difficult. Divide the amount of oil we have used to date in history by the cumulative oil reserves and you realize that about half of the world's oil has already been used. In the United States, our proven reserves total 25.3 billion barrels (Tanner 1988). New discoveries of any size are highly unlikely because we have already thoroughly explored all of the most likely sites. For sake of argument, though, let us assume that we might discover three new oil fields the size of the Prudhoe Bay field in Alaska. This would add some 30 billion barrels to our reserves of 25.3 billion barrels. Then the question would be: "If we had 55.3 billion barrels of oil in reserve, how long would they last?" Again the math is simple. We use 13.5 million barrels a day, or 4.9 billion barrels per year. If we use no imported oil, our liberal estimate of 55.3 billion barrels is gone in a mere 11.3 years. What about the more realistic estimate of 25.3 billion barrels? At the present rate of consumption it will be gone in just over 5 years.

The policy of the Reagan administration was to end U.S. dependence on foreign oil by producing and using more American oil. That is a curious response. Trying to solve the problem of a limited oil reserve by using it up as fast as possible will only make us totally dependent on imports even sooner.

Now let's turn to geography. Since we almost certainly expect our feast to last more than ten or twelve additional years, we must ask: "Where will the oil come from?" The United States controls about 4 percent of

the known reserve, Mexico has 6 percent, the Soviets have 9 percent, the Chinese 3 percent, and the countries of OPEC (including Iran and Iraq) control 75 percent (Miller 1988). It is clear that most of the oil used during the rest of the Oil Age will come from the Middle East.

On to the history of events so recent that they hardly qualify as history. Less than two decades ago the world was thrown into economic chaos when OPEC turned off the spigot. The last time it happened the United States was importing less oil per year than we imported in 1988. Barring a national economic collapse, in 1989 we will produce less and import even more oil. Is it any wonder the United States has been willing to commit its navy to battle stations in the Persian Gulf?

Belshazzar's feast ended when the Persians diverted the waters of the Euphrates and entered Babylon along the dry river bed, past guards too drunk to notice. Could it be that history will read that America's feast ended when "the Persians" diverted the flow of oil?

Belshazzar's feast ended when the Persians diverted the waters of the Euphrates and entered Babylon along the dry river bed, past guards too drunk to notice. Could it be that history will read that America's feast ended when "the Persians" diverted the flow of oil? Could it be that we are too drunk, too satiated on feasting to notice?

How far will we go militarily to maintain our feast for a little longer?

Somebody go get Daniel.

Epilogue

From the writings of an eleventh century Hebrew philologist, Rabbi Jonah ibn Janah of Saragossa (Goldin 1957):

> A man is responsible for everything he receives in this world, and his children are responsible too. . . . The fact is, nothing belongs to him, everything is the Lord's and whatever he received he received on credit and the Lord will exact payment for it. This may be compared to a person who entered a city and found no one there. He walked into a house and there found a table set with all kinds of food and drink. So he began to eat and drink thinking, "I deserve all of this, all of it is mine, I shall do with it what I please." He didn't even notice that the owner was watching from the side! He will yet have to pay for everything he ate and drank, for he is in a spot from which he will not be able to escape.

Even earlier, Rabbi Akiva, a contemporary of the Apostle Paul and perhaps the greatest of the early talmudic scholars, set down his vision of the feast, the hand that writes, and personal responsibility (Birnbaum 1949):

> Everything is given on pledge, and a net is spread for all the living, the shop is open; the shopkeeper gives on credit; the ledger is open; and the hand writes; and everyone that wishes to borrow, let him come and borrow; but the collectors make their rounds continually every day, and exact payment of humanity with its consent or without its consent, for they have that on which they can rely; and the judgment is the judgment of truth; and all is made ready for the feast.

What a party!

Somebody go get Daniel.

ACKNOWLEDGEMENTS

The author wishes to thank the following organizations for financial support during the preparation of this manuscript: The J. Howard Pew Freedom Trust, Taylor University, and The New York Botanical Garden's Institute of Ecosystem Studies.

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