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## DEEP SHIT

Shortly after I published the first edition of this book, I was invited to speak to a group of nuns at a convent. I had only printed 600 copies of the book and had assumed they would sit in my garage for the rest of my life because no one would be interested in the topic of composting “humanure.” Not long after, the Associated Press put the word out that I had written a book about crap. Then I got a phone call.

“Mr. Jenkins, we recently bought a copy of your book, *Humanure*, and we would like to have you speak at our convent.”

“What do you want me to talk about?”

“About the topic of your book.”

“Composting?”

“Yes, but specifically, *humanure* composting.” At this point I was at a loss for words. I couldn’t understand exactly why a group of nuns would be interested in composting human crap. Somehow, I couldn’t imagine standing in a room full of holy nuns, speaking about turds. But I kept the stammering to a minimum and accepted the invitation.

It was Earth Day, 1995. The presentation went well. After I spoke, the group showed slides of their gardens and compost piles, then we toured their compost area and poked around in the worm boxes. A delightful lunch followed, during which I asked them why they were interested in *humanure*, of all things.

“*We are the Sisters of Humility*,” they responded. “*The words*

*'humble' and 'humus' come from the same semantic root, which means 'earth.' We also think these words are related to the word 'human.' Therefore, as part of our vow of humility, we work with the earth. We make compost, as you've seen. And now we want to learn how to make compost from our toilet material. We're thinking about buying a commercial composting toilet, but we want to learn more about the overall concepts first. That's why we asked you to come here.*" This was deep shit. Profound.

A light bulb went off in my head. Of course, composting is an act of humility. The people who care enough about the earth to recycle their personal by-products do so as an exercise in humility, not because they're going to get rich and famous for it. That makes them better people. Some people go to church on Sunday, others make compost. Still others do both. Others go to church on Sunday, then throw all their garbage out into the environment. The exercising of the human spirit can take many forms, and the simple act of cleaning up after oneself is one of them. The careless dumping of waste out into the world is a self-centered act of arrogance — or ignorance.

Humanure composters can stand under the stars at night gazing at the heavens, and know that, when nature calls, their excretions will not foul the planet. Instead, those excretions are humbly collected, fed to microorganisms and returned to the Earth as healing medicine for the soil.

## THE EGO VS. THE ECO

There are numerous theoretical reasons why we humans have strayed so far from a benign symbiotic relationship with the planet, and have instead taken on the visage, if not the behavior, of planetary pathogens. Human beings, like all living things on this planet, are inextricably intertwined with the elements of nature. We are threads in the tapestry of life. We constantly breathe the atmosphere that envelopes the planet; we drink the fluids that flow over the planet's surface; we eat the organisms that grow from the planet's skin. From the moment an egg and a sperm unite to spark our existence, each of us grows and develops from the elements provided by the Earth and sun. In essence, the soil, air, sun and water combine within our mother's womb to mold another living creature. Nine months later, another human being is born. That person is a separate entity, with an awareness of an individual self, an *ego*. That person is also totally a part of, and completely dependent upon, the surrounding natural world, the *eco*.

When the ego and the eco are balanced, the person lives in harmony with the planet. Such a balance can be considered to be the true meaning of *spirituality*, because the individual is a conscious part of, attuned to, and in harmony with a greater level of actual Being. When too much emphasis is placed on the self, the ego, an imbalance occurs and problems result, especially when that imbalance is collectively demonstrated by entire cultures. To suggest that these problems are only environmental and therefore not of great concern, is incorrect. Environmental problems (damage to the eco) ultimately affect all living things, as all living things derive their existence, livelihood and well-being from the planet. We cannot damage a thread in the web of life without the risk of fraying the entire tapestry.

When the ego gets blown out of proportion, we get thrown off balance in a variety of ways. Our educational institutions teach us to idolize the intellect, often at the expense of our moral, ethical, and spiritual development. Our economic institutions urge us to be consumers, and those who have gained the most material wealth are glorified. Our religious institutions often amount to little more than systems of human-worship where divinity is personified in human form and only human constructs (e.g., books and buildings) are considered sacred.

No discussion of a subject should be considered complete without an examination of its moral, philosophical and ethical considerations, *as well as* a review of the intellectual and scientific data. When we ignore the ethics behind a particular issue, and instead focus on intellectual achievements, it's great for our egos. We can pat ourselves on the back and tell ourselves how smart we are. It deflates our egos, on the other hand, to realize that we are actually insignificant creatures on a speck of dust in a corner of the universe, and that we are only one of the millions of life forms on this speck, all of whom must live together.

In recent decades, an entire generation of western scientists, a formidable force of intelligence, focused much of its efforts on developing new ways to kill huge numbers of human beings all at once. This was the nuclear arms race of the 1950s which continues through the present day — a race that left us with environmental disasters yet to be cleaned up, a huge amount of natural materials gone to total waste (5.5 *trillion* dollars worth),<sup>1</sup> a military death toll consisting of hundreds of thousands of innocent people, and the threat of nuclear annihilation hanging over all of the peace-loving peoples of

the world, even today. Surely this is an example of the collective ego run amok.

Religious movements that worship humans are ego-centered. It is ironic that a tiny, insignificant lifeform on a speck of dust at the edge of a galaxy lost somewhere in a corner of the universe would declare that the universe was created by one of their own kind. This would be a laughing matter if it were not taken so seriously by so many members of our culture who insist that the source of all life is a human-like creator deity named “God.”

Many humans have matured enough to know that this is simply myth. We can't begin to comprehend the full nature of our existence, so we *make up* a story that works until we figure out something better. Unfortunately, human-worship breeds an imbalanced collective ego. When we actually *believe* the myth, that humans are the pinnacle of life and the entire universe was created by one of our own species, we stray too far from truth and wander lost, with no point of reference to take us back to a balanced spiritual perspective we need for our own long-term survival on this planet. We become like a person knee deep in his own excrement, not knowing how to free himself from his unfortunate position, staring blankly at a road map with a look of utter incomprehension.

Today, new perspectives are emerging regarding the nature of human existence. The Earth itself is becoming recognized as a living entity, a level of Being immensely greater than the human level. The galaxy and universe are seen as even higher levels of Being, with multiverses (multiple universes) theorized as existing at a higher level yet. All of these levels of Being are thought to be imbued with the energy of life, as well as with a form of consciousness which we cannot even begin to comprehend. As we humans expand our knowledge of ourselves and recognize our true place in the vast scheme of things, our egos must defer to reality. We must admit our absolute dependence upon the ecosystem we call Earth, and try to balance our egotistical feelings of self-importance with our need to live in harmony with the greater world around us.

## ASIAN RECYCLING

The Asian people have recycled humanure for thousands of years. The Chinese have used humanure agriculturally since the Shang Dynasty, 3,000-4,000 years ago. Why haven't we westerners? The Asian cultures, namely Chinese, Korean, Japanese and others,

evolved to understand human excrement as a natural resource rather than a waste material. Where we had human waste, they had night soil. We produced waste and pollution; they produced soil nutrients and food. It's clear that Asians have been more advanced than the western world in this regard. And they should be, since they've been working on developing sustainable agriculture for four thousand years on the same land. For *four thousand years* these people have worked the same land with little or no chemical fertilizers and, in many cases, have produced greater crop yields than western farmers, who are quickly destroying the soils of their own countries through depletion and erosion.

A fact largely ignored by people in western agriculture is that *agricultural land must produce a greater output over time*. The human population is constantly increasing; available agricultural land is not. Therefore, our farming practices should leave us with land *more* fertile with each passing year. However, we are doing just the opposite.

Back in 1938, the U.S. Department of Agriculture came to the alarming conclusion that *a full 61% of the total area under crops in the U.S. at that time had already been completely or partly destroyed, or had lost most of its fertility.*<sup>2</sup> Nothing to worry about? We have artificial fertilizers, tractors and oil to keep it all going. True, U.S. agriculture is now heavily dependent upon fossil fuel resources. However, in 1993, we were importing about half our oil from foreign sources, and it's estimated that the U.S. will be out of domestic oil reserves by 2020.<sup>3</sup> A heavy dependence on foreign oil for our food production seems unwise *at best*, and probably just plain foolish, especially when we're producing soil nutrients every day in the form of organic refuse and throwing those nutrients "away" by burying them in landfills or incinerating them.

Why aren't we following the Asian example of agronutrient recycling? It's certainly not for a lack of information. Dr. F. H. King wrote an interesting book, published in 1910 titled Farmers of Forty Centuries.<sup>4</sup> Dr. King (D.Sc.) was a former chief of the Division of Soil Management of the U.S. Department of Agriculture who traveled through Japan, Korea and China in the early 1900s as an agricultural visitor. He was interested in finding out how people could farm the same fields for millennia without destroying their fertility. He states:

*"One of the most remarkable agricultural practices adopted by any civilized people is the centuries long and well nigh universal conservation and utilization of all [humanure] in China, Korea and Japan,*

*turning it to marvelous account in the maintenance of soil fertility and in the production of food. To understand this evolution it must be recognized that mineral fertilizers so extensively employed in modern Western agriculture have been a physical impossibility to all people alike until within very recent years. With this fact must be associated the very long unbroken life of these nations and the vast numbers their farmers have been compelled to feed.*

*When we reflect upon the depleted fertility of our own older farm lands, comparatively few of which have seen a century's service, and upon the enormous quantity of mineral fertilizers which are being applied annually to them in order to secure paying yields, it becomes evident that the time is here when profound consideration should be given to the practices the Mongolian race has maintained through many centuries, which permit it to be said of China that one-sixth of an acre of good land is ample for the maintenance of one person, and which are feeding an average of three people per acre of farm land in the three southernmost islands of Japan.*

*[Western humanity] is the most extravagant accelerator of waste the world has ever endured. His withering blight has fallen upon every living thing within his reach, himself not excepted; and his besom of destruction in the uncontrolled hands of a generation has swept into the sea soil fertility which only centuries of life could accumulate, and yet this fertility is the substratum of all that is living.”<sup>5</sup>*

According to King's research, the average daily excreta of the adult human weighs in at 40 ounces. Multiplied by 250 million, a rough estimate of the U.S. population in the late 20th century, Americans each year produced 1,448,575,000 pounds of nitrogen, 456,250,000 pounds of potassium, and 193,900,000 pounds of phosphorous. Almost all of it was discarded into the environment as a waste material or a pollutant, or as Dr. King puts it, “*poured into the seas, lakes or rivers and into the underground waters.*”

According to King, “*The International Concession of the city of Shanghai, in 1908, sold to a Chinese contractor the privilege of entering residences and public places early in the morning of each day and removing the night soil, receiving therefor more than \$31,000 gold, for 78,000 tons of [humanure]. All of this we not only throw away but expend much larger sums in doing so.*”

In case you didn't catch that, the contractor *paid* \$31,000 gold for the humanure, referred to as “night soil” and incorrectly as “waste” by Dr. King. People don't pay to buy waste, they pay money

for things of value.

Furthermore, using Dr. King's figures, the U.S. population produced approximately 228,125,000,000 pounds of fecal material annually in the late 20th century, or 228 billion pounds of *Gross National Product*.

Admittedly, the spreading of raw human excrement on fields, as is done in Asia, will never become culturally acceptable in the United States, and rightly so. The agricultural use of raw night soil produces an assault on the sense of smell, and provides a route of transmission for various human disease organisms. Americans who have traveled abroad and witnessed the use of raw human excrement in agricultural applications have largely been repulsed by the experience. That repulsion has instilled in many Americans an intransigent bias against, and even a fear of the use of humanure for soil enrichment. However, few Americans have witnessed the *composting* of humanure as a preliminary step in its recycling. Proper thermophilic composting converts humanure into a pleasant smelling material devoid of human pathogens.

Although the agricultural use of *raw* human excrement will never become a common practice in the U.S., the use of composted human refuse, including humanure, food refuse and other organic municipal refuse such as leaves, can and should become a widespread and culturally encouraged practice. The act of composting humanure instead of using it raw will set Americans apart from Asians in regard to the recycling of human excrements, *for we too will have to constructively deal with all of our organic byproducts eventually*. We can put it off, but not forever. As it stands now at least, many of the Asians are recycling much of their organic discards. We're not.

## THE ADVANCES OF SCIENCE

How is it that Asian peoples developed an understanding of human nutrient recycling and we didn't? After all, we're the advanced, developed, scientific nation, aren't we? Dr. King makes an interesting observation concerning western scientists. He states:

*"It was not until 1888, and then after a prolonged war of more than thirty years, generated by the best scientists of all Europe, that it was finally conceded as demonstrated that leguminous plants acting as hosts for lower organisms living on their roots are largely responsible for the maintenance of soil nitrogen, drawing it directly from the air*

*to which it is returned through the processes of decay. But centuries of practice had taught the Far East farmers that the culture and use of these crops are essential to enduring fertility, and so in each of the three countries the growing of legumes in rotation with other crops very extensively, for the express purpose of fertilizing the soil, is one of their old fixed practices.”*<sup>6</sup>

It certainly seems odd that people who gain their knowledge in real life through practice and experience are largely ignored or trivialized by the academic world and associated government agencies. Such agencies only credit learning that has taken place within an institutional framework. As such, it's no wonder that Western humanity's crawl toward a sustainable existence on the planet Earth is so pitifully slow.

*“Strange as it may seem,” says King, “there are not today and apparently never have been, even in the largest and oldest cities of Japan, China or Korea, anything corresponding to the hydraulic systems of sewage disposal used now by Western nations. When I asked my interpreter if it was not the custom of the city during the winter months to discharge its night soil into the sea, as a quicker and cheaper mode of disposal [than recycling], his reply came quick and sharp, ‘No, that would be waste. We throw nothing away. It is worth too much money.’ ”*<sup>7</sup> *“The Chinaman,” says King, “wastes nothing while the sacred duty of agriculture is uppermost in his mind.”*<sup>8</sup>

Perhaps, someday, we also will understand.

## WHEN THE CRAP HIT THE FAN

While the Asians were practicing sustainable agriculture and recycling their organic resources and doing so over millennia, what were the people of the West doing? What were the Europeans and those of European descent doing? Why weren't our European ancestors returning their manures to the soil, too? After all, it does make sense. The Asians who recycled their manures not only recovered a resource and reduced pollution, but by returning their excrement to the soil, they succeeded in reducing threats to their health. There was no putrid sewage collecting and breeding disease germs. Instead, the humanure was, for the most part, undergoing a natural, non-chemical purification process in the soil which required no technology.

Granted, a lot of “night soil” in the Far East today is not composted and is the source of health problems. However, even the returning of humanure raw to the land succeeds in destroying many human pathogens in the manure and returns nutrients to the soil.

Let’s take a look at what was happening in Europe regarding public hygiene from the 1300s on. Great pestilences swept Europe throughout recorded history. The Black Death killed more than half the population of England in the fourteenth century. In 1552, 67,000 patients died of the Plague in Paris alone. Fleas from infected rats were the carriers of this disease. Did the rats dine on human waste? Other pestilences included the sweating sickness (attributed to uncleanliness), cholera (spread by food and water contaminated by the excrement of infected persons), “jail fever” (caused by a lack of sanitation in prisons), typhoid fever (spread by water contaminated with infected feces), and numerous others.

Andrew D. White, cofounder of Cornell University, writes, “*Nearly twenty centuries since the rise of Christianity, and down to a period within living memory, at the appearance of any pestilence the Church authorities, instead of devising sanitary measures, have very generally preached the necessity of immediate atonement for offenses against the Almighty. In the principal towns of Europe, as well as in the country at large, down to a recent period, the most ordinary sanitary precautions were neglected, and pestilences continued to be attributed to the wrath of God or the malice of Satan.*”<sup>9</sup>

It’s now known that the main cause of such immense sacrifice of life was a lack of proper hygienic practices. It’s argued that certain theological reasoning at that time resisted the evolution of proper hygiene. According to White, “*For century after century the idea prevailed that filthiness was akin to holiness.*” Living in filth was regarded by holy men as evidence of sanctity, according to White, who lists numerous saints who never bathed parts or all of their bodies, such as St. Abraham, who washed neither his hands nor his feet for fifty years, or St. Sylvia, who never washed any part of her body except her fingers.<sup>10</sup>

Interestingly, after the Black Death left its grim wake across Europe, “*an immensely increased proportion of the landed and personal property of every European country was in the hands of the church.*”<sup>11</sup> Apparently, the church was reaping some benefit from the deaths of huge numbers of people. Perhaps the church had a vested interest in maintaining public ignorance about the sources of disease. This insinuation is almost too diabolical for serious consideration. Or is it?

Somehow, the idea developed around the 1400s that Jews and witches were causing the pestilences. Jews were suspected because they didn't succumb to the pestilences as readily as the Christian population did, presumably because they employed a unique sanitation system more conducive to cleanliness, including the eating of kosher foods. Not understanding this, the Christian population arrived at the conclusion that the Jews' immunity resulted from protection by Satan. As a result, attempts were made in all parts of Europe to stop the plagues by torturing and murdering the Jews. Twelve thousand Jews were reportedly burned to death in Bavaria alone during the time of the plague, and additionally thousands more were likewise killed throughout Europe.<sup>12</sup>

In 1484, the "infallible" Pope Innocent VIII issued a proclamation supporting the church's opinion that witches were causes of disease, storms, and a variety of ills affecting humanity. The feeling of the church was summed up in one sentence: "*Thou shalt not suffer a witch to live.*" From the middle of the sixteenth to the middle of the seventeenth centuries, women *and* men were sent to torture and death by the thousands by both Protestant and Catholic authorities. It's estimated that the number of victims sacrificed during that century in Germany alone was over a hundred thousand.

The following case in Milan, Italy, summarizes the ideas of sanitation in Europe during the seventeenth century:

The city was under the control of Spain, and it had received notice from the Spanish government that witches were suspected to be en route to Milan to "anoint the walls" (smear the walls with disease-causing ointments). The church rang the alarm from the pulpit, putting the population on the alert. One morning in 1630, an old woman looking out her window saw a man who was walking along the street wipe his fingers on a wall. He was promptly reported to the authorities. He claimed he was simply wiping ink from his fingers which had rubbed off the ink-horn he carried with him. Not satisfied with this explanation, the authorities threw the man into prison and tortured him until he "confessed." The torture continued until the man gave the names of his "accomplices," who were subsequently rounded up and tortured. They in turn named *their* "accomplices" and the process continued until members of the foremost families were included in the charges. Finally, a large number of innocent people were sentenced to their deaths, all of this reportedly being a matter of record.<sup>13</sup>

One loathsome disease of the 1500s through the 1700s was the

“jail fever.” The prisons of that period were filthy. People were confined in dungeons connected to sewers with little ventilation or drainage. Prisoners incubated the disease and spread it to the public, especially to the police, lawyers and judges. In 1750, for example, the disease killed two judges, the lord mayor, various aldermen and many others in London, including of course, prisoners.<sup>14</sup>

The pestilences at that time in the Protestant colonies in *America* were also attributed to divine wrath or satanic malice, but when the diseases afflicted the Native Americans, they were considered beneficial. “*The pestilence among the Indians, before the arrival of the Plymouth Colony, was attributed in a notable work of that period to the Divine purpose of clearing New England for the heralds of the gospel.*”<sup>15</sup>

Perhaps the reason the Asian countries have such large populations in comparison to Western countries is because they escaped some of the pestilences common to Europe, especially pestilences spread by the failure to responsibly recycle human excrement. They presumably plowed their manure back into the land because their spiritual perspectives supported such behavior. Westerners were too busy burning witches and Jews with the church’s wholehearted assistance to bother thinking about recycling humanure.

Our ancestors did, eventually, come to understand that poor hygiene was a causal factor in epidemic diseases. Nevertheless, it was not until the late 1800s in England that improper sanitation and sewage were suspected as causes of epidemics. At that time, large numbers of people were still dying from pestilences, especially cholera, which killed at least 130,000 people in England in 1848-9 alone. In 1849, an English medical practitioner published the theory that cholera was spread by water contaminated with sewage. Ironically, even where sewage was being piped away from the population, the sewers were still leaking into drinking water supplies.

The English government couldn’t be bothered with the fact that hundreds of thousands of mostly poor citizens were perishing like flies year after year. So it rejected a Public Health Bill in 1847. A Public Health Bill finally became an Act in 1848 in the face of the latest outbreak, but wasn’t terribly effective. However, it did bring poor sanitation to the attention of the public, as the following statement from the General Board of Health (1849) implies: “*Householders of all classes should be warned that their first means of safety lies in the removal of dung heaps and solid and liquid filth of every description from beneath or about their houses and premises.*” This may make one wonder if a compost pile would have been considered a “dung heap” in those days,

and therefore banned.

Sanitation in England was so bad in the mid-to-late eighteenth centuries that, *“In 1858, when the Queen and Prince Albert had attempted a short pleasure cruise on the Thames, its malodorous waters drove them back to land within a few minutes. That summer a prolonged wave of heat and drought exposed its banks, rotten with the sewage of an overgrown, undrained city. Because of the stench, Parliament had to rise early.”* Another story describes Queen Victoria gazing out over the river and asking aloud what the pieces of paper were that so abundantly floated by. Her companion, not wanting to admit that the Queen was looking at pieces of used toilet paper, replied, *“Those, Ma’am, are notices that bathing is forbidden.”*<sup>16</sup>

The Tories or “conservatives” of the English government still thought that spending on social services was a waste of money and an unacceptable infringement by the government on the private sector (sound familiar?). A leading newspaper, “The Times,” maintained that the risk of cholera was preferable to being bullied by the government into providing sewage services. However, a major Act was finally passed in 1866, the Public Health Act, with only grudging support from the Tories. Once again, cholera was raging through the population, and it’s probably for that reason that any act was passed at all. Finally, by the end of the 1860s, a framework of public health policy was established in England. Thankfully, the cholera epidemic of 1866 was the last and the least disastrous.<sup>17</sup>

The powers of the church eventually diminished enough for physicians to have their much-delayed say about the origins of disease. Our modern sanitation systems have finally yielded a life safe for most of us, although not without shortcomings. The eventual solution developed by the west was to collect humanure in water and discard it, perhaps chemically treated, incinerated or dehydrated — into the seas, into the atmosphere, onto the surface of the land, and into landfills.

## ASIAN UPDATE

It would be naive to suggest that the Asian societies are perfect by any stretch of the imagination. Asian history is rife with the problems that have plagued humanity since the first person slid out of the first womb. Those problems include such things as oppressive rule by the rich, war, famine, natural catastrophes, oppressive rule by heathens, more war, and now overpopulation.

Today, Asians are abandoning the harmonious agricultural techniques that Dr. King observed nearly a century ago. In Kyoto, Japan, for example, “night soil is collected hygienically to the satisfaction of users of the system, only to be diluted at a central collection point for discharge to the sewer system and treatment at a conventional sewage treatment plant.”<sup>18</sup>

A Humanure Handbook reader wrote an interesting account of Japanese toilets in a letter to the author, which is paraphrased here:

*“My only real [humanure] experience....comes from living in Japan from 1973-1983. As my experience is dated, things may have changed (probably for the worse as toilets and life were becoming ‘westernized’ even toward the end of my stay in Japan).*

*My experience comes from living in small, rural towns as well as in metropolitan areas (provincial capitals). Homes/businesses had an ‘indoor outhouse.’ The Vault: Nothing but urine/feces were deposited into the large metal vault under the toilet (squat style, slightly recessed in the floor and made of porcelain). No cover material or carbonaceous stuff was used. It stunk !! Not just the bathroom, but the whole house! There were many flies, even though the windows were screened. Maggots were the main problem. They crawled up the sides of the vault onto the toilet and floor and sometimes even made it outside the bathroom into the hall. People constantly poured some kind of toxic chemical into the vaults to control the smell and maggots. (It didn’t help — in fact, the maggots really poured out of the vault to escape the chemicals.) Occasionally a slipper (one put on special ‘bathroom slippers’ as opposed to ‘house slippers’ when entering the bathroom) fell into the disgusting liquid/maggot-filled vault. You couldn’t even begin to think about getting it out! You couldn’t let little children use the toilet without an adult suspending them over it. They might fall in! Disposal: When the vault was full (about every three months), you called a private vacuum truck which used a large hose placed in an outside opening to suck out the liquid mass. You paid them for their services. I’m not sure exactly what happened to the humanure next but, in the agricultural areas near the fields were large (10 feet in diameter) round, concrete, raised containers, similar in looks to an above ground swimming pool. In the containers, I was told, was the humanure from the ‘vacuum trucks.’ It was a greenish-brown liquid with algae growing on the surface. I was told this was spread onto agricultural fields.”*

In 1952, about 70% of Chinese humanure was recycled. This had increased to 90% by 1956, and constituted a third of all fertilizer used in the country.<sup>19</sup> Lately, however, humanure recycling in China seems to be going downhill. The use of synthetic fertilizers has risen over 600% between the mid 1960s to the mid 1980s, and now China’s average annual fertilizer usage per hectare is estimated to be double that of the world’s average. Between 1949 and 1983, agricultural

nitrogen and phosphorous inputs increased by a factor of ten, while agricultural yields only tripled.<sup>20</sup>

Water pollution in China began to increase in the 1950s due to the discarding of sewage into water. Now, about 70% of China's wastewater is said to be dumped into China's main rivers. By 1992, 45 billion tonnes of wastewater were flowing into China's rivers and lakes annually, 70% untreated. In urban areas, 80% of the surface water is polluted with nitrogen and ammonia, and most lakes around cities have become dumping grounds for large quantities of sewage. It is estimated that 450,000 tonnes of humanure are dumped into the Huangpu River alone in a year. Half a million cases of hepatitis A, spread by polluted water, occurred in Shanghai in 1988. Soil-borne diseases, practically non-existent in China twenty years ago, are now also causing problems. *"Increasingly, Chinese urban authorities are turning to incineration or landfill as the ways of disposing of their solid wastes rather than recycling and composting, which means that China, like the west, is putting the problem onto the shoulders of future generations."*<sup>21</sup>

For a sense of historical perspective, I'll leave you with a quote from Dr. Arthur Stanley, health officer of the city of Shanghai, China, in his annual report for 1899, when the population of China amounted to about 500 million people. At that time, no artificial fertilizers were employed for agricultural purposes — only organic, natural materials such as agricultural residues and humanure were being used:

*"Regarding the bearing on the sanitation of Shanghai of the relationship between Eastern and Western hygiene, it may be said, that if prolonged national life is indicative of sound sanitation, the Chinese are a race worthy of study by all who concern themselves with public health. It is evident that in China the birth rate must very considerably exceed the death rate, and have done so in an average way during the three or four thousand years that the Chinese nation has existed. Chinese hygiene, when compared to medieval English, appears to advantage."*<sup>22</sup>

Sounds like an understatement to me.