

The Indianapolis Literary Club 2011-2012: 134th Year

“Microbes, Medicine, and Metaphors-Lay Down Your Arms”

Essayist: Stephen J. Jay M.D.

Read on Monday, 8:00 P.M., January 23, 2012, at the regular meeting of the Indianapolis Literary Club, Park Tudor School, Indianapolis, Indiana

“Knowing is not enough; we must apply.

Willing is not enough; we must do.”

---attributed to **Goethe**

“The human spirit is not dead: It lives on in secret. It has come to believe that compassion, in which all ethics must take root, can only attain its full breadth and depth if it embraces all living creatures and does not limit itself to mankind. Ancient ethics had not this depth, this strength of conviction, but beside it there now stands a new ethic—that of respect for life, whose validity is more and more widely acknowledged.”

---**Albert Schweitzer**, Nobel Peace Prize address, 1954

The sedge is wither'd from the lake,

And no birds sing.

--**John Keats**. From Original Version of *La Belle Dame Sans Merci*, 1819.

“I am pessimistic about the human race because it is too ingenious for its own good. Our approach to nature is to beat it into submission. We would stand a better chance of survival if we accommodated ourselves to this planet and viewed it appreciatively instead of skeptically and dictatorially.”

--**E. B. White**, In *Rachael Carson: Silent Spring*, 1962

“What has already silenced the voices of spring in countless towns in America?”

--**Rachael Carson**. *A Fable for Tomorrow*, *Silent Spring* 1962.

“Gentlemen, we have run out of money. It is time to start thinking.” “We haven’t got the money, so we’ve got to think.” (Quoted by R. V. Jones, *Bulletin of the Institute of Physics* (1962), 13, No.4, 102

--**Sir Ernest Rutherford**, Nobel Laureate, Physics (1908)

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Stephen J. Jay M.D., Monday, January 23, 2012

Acknowledgments:

Robert Martin, Former Senior Officer, Pew Environmental Group. The Pew Charitable Trusts, Washington, D.C. Now Center for a Livable Future, Johns Hopkins University.

Mr. Martin provided me direct access to PEW experts who have managed the PEW Industrial Agriculture Antimicrobial Resistance program. The aim of this program, managed by Laura Rogers, Project Director, Pew Campaign on Human Health and Industrial Farming, Pew Charitable Trusts, is to raise awareness in the public and in Congress to the pressing adverse public health implications of the long-standing food farm practice of administering, in feed and water, classes of antibiotics used in human medicine to industrial food animals for the purpose of animal growth promotion.

This practice, opposed by all relevant U.S. Federal Agencies, all U.S. and international science based and medical organizations, and more than 300 health-related NGOs, has been a major cause of global antimicrobial resistance and has been associated with enormous human and economic tolls.

Mr. Martin and staff coordinated my involvement as moderator of a Capitol Hill Briefing, March 2, 2010, Dirksen Senate Bld., Washington D.C., titled "Alternatives to Antibiotic Use in Food Animals."

Shannon Heyck-Williams, Government Relations Officer, Pew Environment Group, The Pew Charitable Trusts, Washington, D.C.

Ms. Heyck-Williams has over five years shared with me voluminous information on the research, clinical, human, and political issues surrounding development of legislative proposals to end the practice of using daily antibiotics as growth promoters in industrial food animal production. PEW has provided major support in encouraging Congress to pass the Preservation of Antibiotics for Medical Treatment Act (PAMTA) (H.R. 965, S. 1211) to limit this long-standing practice.

Ms. Heyck-Williams has provided research literature and education materials from PEW for my use in continuing medical education programs in Indiana, in public education forums and in interaction with the media.

Physician Leaders in Infectious Disease; Oncology; Family Medicine at IU Health for providing encouragement to me in advocating for the use quality science to support evidence-based public policies.

We are grateful to both Mr. Martin and Ms. Heyck-Williams and their associates at PEW for their unique leadership in bringing this global public health issue to the attention of the public, media, and decision-makers.

Indianapolis Literary Club

January 23, 2012, Park Tudor School, Indianapolis, IN

“Microbes, Medicine, and Metaphors-Lay Down Your Arms” by Stephen J. Jay M.D.

All my past essays and tonight’s paper focus on health, and in this spirit, I’ll offer a familiar quote by Benjamin Disraeli (Benjamin Disraeli (1804-1881), Prime Minister, U.K., (1874-1880).

“The health of the people is really the foundation upon which all their happiness and all their powers as a state depend.”

By the end of my presentation, you may agree that America is today testing Disraeli’s premise.

In the summer of 1962 I soloed in a J-3 Piper Cub at a small airport with a hilly grass runway, near Crawfordsville. After seven hours, my instructor said I was ready to fly on my own, and I took off into an early morning summer sky to practice. He said if I lost control, not to worry: “take a deep breath and let go the stick”—the Piper would fly itself. I practiced stalls, and when the plane dropped like a stone, I followed instructions; the plane gathered itself and flew.

I was reminded of my instructor’s advice when I read a tragic account of Air France Flight 447. (A 1-3) On May 31, 2009, 228 passengers and crew left Rio de Janeiro on an Airbus 330, for Paris. The plane disappeared mysteriously, but two years later the black box and cockpit recorder were recovered and suggested pilot error. While the Captain slept, an inexperienced co-pilot stalled the plane after becoming confused by a minor icing malfunction of an air speed indicator. Both copilots failed to diagnose the problem, despite 75 stall-warning alarms. When the captain arrived, the co-pilot said the stick was back the entire time. The Captain’s response: “no, no, no.” Seconds before impact the co-pilot asked “..what’s happening?” Despite evidence the plane was stalled, the co-pilot didn’t let go the stick. In five minutes, Flight 447 and all mortal souls plummeted from seven miles up to the south Atlantic.

America’s Daunting challenges 2012

Is Flight 447 a metaphor for America’s plight today? The world’s leading democracy is buffeted by head-winds. (G1-7) Are we hearing repeated “stall warnings” but unable to take a deep breath and “let go the stick?” Stress induced “brain paralysis” of the pilots may have doomed the Airbus. Has stress paralyzed America’s ability to prevent, diagnose, and solve problems? Perhaps we should heed A. E. Housman’s pessimistic urging: (“A Shropshire Lad”)

“Therefore, since the world has still

Much good, but much less good than ill,

And while the sun and moon endure

Luck's a chance, but trouble's sure,

I'd face it as a wise man would,

And train for ill and not for good."

Today, America's problem list is daunting. As a physician, I see our failures eroding our health foundations, placing the young and "least among us" at great risk. Are we creating a "lost generation"? Are we not heeding our Hoosier pioneer ancestors who knew the wisdom of Ecclesiastes and "casting bread upon the waters," as investment for the future, or the wisdom of farmers who would never "eat their seed corn" in bleak mid-winter?

Let's consider our "to-do" list: failing education; (E1-4) eroding research & development; \$3 trillion dollar wars; stagnant energy policy; dysfunctional health care; (H1-4) hobbled economy; withering middle class with soaring income inequalities; environmental degradation with BP Oil in the Gulf; (G 1-4) unprecedented Climate Change; (C 1-9) growing water scarcities; multi-state outbreaks of food borne diseases; an American version of the "Arab Spring," with the "Tea Party" and "Occupy Wall Street". And causing high angst: dysfunctional government with power and votes to the highest bidders; corporate corruption and ethics lapses; socialized bailout of offending corporations in near financial collapse; fear of global non-competiveness; a societal moral compass that appears directionless; and perhaps reflecting a stressed America, new norms of incivility with discourse of screaming and shouting in even previously staid and reflective gatherings, with, of course, the exception of the Indianapolis Literary Club.

My goal tonight is not to dwell on these challenges. T.S. Eliot (1949) cautioned us that:

"Disillusion can become itself an illusion, if we rest in it."

I will focus, instead, on a cautionary tale to offer insights into our travails in 2012, a tale of how corporate giants, government, both political parties, and citizens have chosen to deny the "stall warnings" or, as one author recently put it, to "unknow knows." (G 6) This story is about a problem the World Health Organization calls one of the leading threats to humankind: antimicrobial resistance and our war against "Superbugs". (I 1-7)

My premise is that a major factor in America's inability to address compelling threats, including "Superbugs", is our inability to solve a political "equation" for a Euclidean triangle. Before we grapple with the triangle and the role of war metaphors, let's focus on "Superbugs": What are

they? Why should we care? And how might a cure for “Superbugs” help America resolve it myriad of other challenges?

Origins of antibiotics and antimicrobial resistance

For years the tabloids have headlined horror stories of “flesh-eating bacteria” and movies have offered doomsday epidemics: “Outbreak”, “The Andromeda Strain”, and “Panic in the Streets” that rival the horror of Homer’s Scylla and Charybdis.

Fending off lethal infections has long occupied humans. Ancient Nubians, 2000 years ago, fermented beer containing soil bacteria *Streptomyces* that produced the antibiotic tetracycline. The bones of ancient Sudanese Nubians are saturated with tetracycline that no doubt provided health benefits.

When late 19th c. scientists found that microbes and fungi protected themselves by inhibiting or killing competitors, the discovery of antibiotics was just around the corner. But wary researchers saw that microbes could fight back against assaults by human antibiotics, streptomycin and penicillin. These “miracle drugs” saved many lives but carried dangers of antimicrobial resistance that could emasculate antibiotics for treating patients..

In his Nobel Prize speech December 11, 1945, Alexander Fleming, who discovered penicillin, said this:

“...I would like to sound one note of warning... It is not difficult to make microbes resistant to penicillin ...by exposing them to concentrations not sufficient to kill them, there is the danger that the ignorant man may easily under dose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant.”

Thus, more than sixty years ago, the potential of antimicrobials for curing infections was clear as were the hazards of inappropriate use. But public excitement over the limitless possibilities of antibiotics, coupled with the stream of WWII soldiers dying from horrid wound infections, created pressures to mass produce antimicrobials. My father, who was an Army physician, told me the thrill he and his colleagues experienced in 1943, when they first used penicillin and witnessed lives being saved. Demand and production of antibiotics soared as post WWII research mushroomed.

Storm clouds

But, quietly, another revolution was taking place. In 1946, researchers found that small quantities of antibiotics stimulated growth of chicks; by the early 1950s, the use of animal feeds containing antibiotics to spur growth was commonplace; America needed to feed its citizens and efficiencies in animal production meant lower costs to farmers and public.

But storm clouds were forming. Antimicrobial resistance was soaring in hospitalized patients treated with antibiotics, and by 1960, research showed that antibiotics in animal feed caused antimicrobial resistance (AMR) in animals and their human attendants. In 1969, British researchers (Swann Report) showed rising rates of resistant microbes on industrial livestock farms. The U.S. Food and Drug Administration (FDA) in 1972 urged that use of antibiotics to promote growth be restricted. Fleming's warning 30 years earlier was finally being heeded. Or was it? Demand for antibiotics in clinical medicine and on industrial food animal farms was skyrocketing; enormous profits were flowing, and voices of caution were drowned out.

Today, 40 years after FDA's recommendation, 29 million pounds of antimicrobials are used annually on factory food farms for growth promotion and to counter unhygienic confined feeding operations, called CAFOs. Seventy percent of all antibiotics in America are given daily to food animals in their food or water; 30 % of antibiotics are prescribed for patients. Many antibiotics used in animals are used in human medicine (penicillins, tetracyclines, and erythromycin). When resistance develops in food animals, these antibiotics may no longer work in human infections.

The enormity of the antimicrobial resistance problem has scientists worried. Since Fleming discovered penicillin, one million metric tons of antibiotics have been released into the biosphere, equal to the displacement of ten Nimitz Class aircraft carriers. Microbial genetic ecology has changed through mutation and gene transfer of resistance between microbes and other living things. "Superbugs" have prompted experts to urge government action or risk regressing to the "pre-antibiotic" age of the early 1900s. Dr. Gro Brundtland, the past physician Director-General of WHO said:

"Our grandparents lived during an era without effective antibiotics. We don't want the same situation for our grandchildren."

Since the FDA urged that the practice of feeding animals antibiotics be stopped forty years ago, science has only confirmed the wisdom of their recommendation. "Superbugs," produced within hours in the guts of food animals fed antibiotics are shed widely in animal waste, ground water, soil, and air, to other farm animals or wild animals and to farm workers, who may spread resistant organisms to their families and the community. Slaughter house personnel are often infected. Grocery store meat and produce frequently harbor resistant bacteria. Global travel and importation of animals ensure that "Superbugs" spread quickly.

What is the Magnitude of the Problem?

Over the past forty years, human infections caused by drug-resistant bacteria have increased markedly. In 2002, there were an estimated 1.7 million healthcare-associated infections in U.S. hospitals with 98,987 deaths. In 70% of deaths, the microbe was resistant to one or more antibiotics. Annual direct medical costs of these infections: about \$35 billion. In 2005, among

95,000 cases of Methicillin-Resistant *Staphylococcus aureus* (the “Superbug” called MRSA) infections in the U.S., twenty percent died.

Antimicrobial resistance also affects food safety. The Centers for Disease Control says that annually, one in six Americans (48 million people) get sick, 128,000 are hospitalized, and 3,000 die of food-borne diseases. The U.S. ranks 7th among 17 industrialized nations for food safety.

Hardly a week goes by without seeing a news blurb about outbreaks of salmonella and campylobacter, and more than 80% of human infections with these bugs are acquired from farm food animals. Annually in the U.S., there are 1.4 million illnesses due to salmonella and 2.4 million due to campylobacter; more than one million cases are drug resistant. The bacterium, *Enterococcus faecium*, is resistant to our most powerful antibiotics and is found in 17% of chickens in supermarkets. The transfer of these deadly microbes from food animals to humans is common, and today clinicians deal with “Superbugs” in neonatal units, ICUs, hospital wards and clinics. Georgetown University researchers reported that annual costs of food-borne illnesses in the U.S. are \$150 billion.

What are we doing about the problem in 2012?

Medical schools, residency programs, and hospitals train students in best practices for prescribing antibiotics and hand washing. Hospitals have restricted formularies and offer practice improvement programs. The CDC’s “Get Smart: Know When Antibiotics Work” program is disseminated to professionals and the public; research has shown significant improvement in antibiotic prescribing practices. Unfortunately, the use of antibiotics in industrial farming operations is poorly regulated; antibiotics are given routinely by farm workers, not veterinarians. The harm caused by this practice is clear, yet the FDA and industrial agriculture continue the practice.

The good news is that the public is beginning to ask questions. In Congressional hearings in 2010, leading researchers and clinicians laid out grim facts of the human and financial costs of antimicrobial resistance. The PEW Charitable Trusts’ advocacy effort with Johns Hopkins Bloomberg School of Public Health has informed the public and policy makers of the critical problem.

Today, the Preservation of Antibiotics for Medical Treatment Act (PAMTA, H.R. 1549, S. 619) awaits action in Congress. PAMTA follows FDA’s recommendations to phase out routine, daily use of antibiotics for growth promotion on industrial farms. The list of supporters reads like a “Who’s Who” in science, medicine, and public health. Importantly, similar legislation has been in place in Denmark and the EU for more than a decade, with excellent results. Unfortunately, industrial farm agriculture and the pharmaceutical industry have tenaciously fought proposed science-based regulations for forty years.

Bowing to intense pressure from scientists, clinicians, and all major health organizations in the U.S., the FDA in 2010 released Draft Guidance #209: "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals." This was an important step, but the Guidance lacks urgency and time- lines, and the ambiguous language will promote "loopholes" in regulation. (What does "judicious" mean?)

To health experts, the FDA's actions have been weak-kneed and subservient to industry's interest. In a "dark of the night" announcement last Christmas, FDA cancelled a 34 year effort to limit two antibiotics in livestock feed, despite research linking them to "superbugs". Yet days later, in the limelight of a press conference, FDA hailed new restrictions on cephlosporins. This was good news, but the FDA acknowledged that cephalosporins are one of the least used animal antibiotics: only 54, 207 pounds were used in livestock in 2010, compared with 14.2 million pounds of penicillin and tetracycline.

Next Steps:

In 2012, there is a critical need for new antimicrobial agents to prevent and treat increasingly dangerous infections associated with high- tech medicine. Demand is high but our supply is nil, for two reasons: first, we lose effective antibiotics from proliferation of antimicrobial resistant microbes, and second, new drugs are not being produced by the pharmaceutical industry— money is made on Viagra or drugs for chronic illness, not on antibiotics taken for a few days. We are in a "perfect storm" with no clear end in sight. James Russell Lowell said:

"Not failure, but low aim, is crime".

We have been denying problems and aiming too low for years. Is it time to raise the bar with new vision? Bertrand Russell put it this way:

"Whether science- and indeed civilization in general-can long survive depends upon psychology, that is to say, it depends upon what human beings desire."

To move forward in the short term, we need leadership, a functioning Congress that can intensify research and development for new drugs and create legislation that promotes reduction in inappropriate use of antimicrobial agents in clinical medicine and elimination of routine antibiotics on industrial food farms. But, these steps may not be enough.

Today, prominent scientists and clinicians are seeking to change the paradigm for how society, researchers and clinicians consider the very nature of the host-microbe relationship. They have called for new strategies and new language using non-war metaphors for thinking about the human-bug relationship in the 21st c.

Ending the war metaphor: Rethinking Host-Microbe relationships. (M 1-5)

Our relationship with the microbial world has long been cast as a host-microbe war: from Thucydides' vivid accounts of the Peloponnesian War plague, to historians, such as Edward Gibbon, and to Florence Nightingale, who showed during the Crimean War that soldiers fought two enemies: guns and disease: with disease, not war trauma, causing most deaths.

Robert Koch and Louis Pasteur, in the late 19th c., proved that many illnesses were caused by bacteria. The language of disease became martial rather than romantic: Humans were at war with microbes. Oliver Wendell Holmes, Sr., called consumption "The Great White Plague," and Public Health launched a Crusade against the dreaded invader. Researchers sought "weapons" (antibiotics) to fight the "enemy." Today, clinicians still refer to "Big Gun" antibiotics for dangerous infections.

From the 1950s-1980s, clinicians, empowered by the miracle antibiotics, had forgotten the cautionary findings of Fleming and others who documented that human host-microbe interactions were complex and that microbes had great capacity for defending themselves.

In 1967, at a White House meeting of health officers, U.S. Surgeon General, William H. Stewart, echoed sentiments of researchers and clinicians that the war against infectious diseases had been largely won: "...it was time to close the book on infectious diseases and shift all national attention (and dollars) to what he termed "the 'New Dimensions' of health: chronic diseases, heart disease, cancer and psychiatric disorders." President Nixon launched another war, the "War on Cancer" in 1971; many felt that cancer would soon join infectious diseases as vanquished invaders. Today, neither has been vanquished.

But, complacency, hubris, and over-optimism of the 1960s & 70s faded as headlines featured new and old bugs: Ebola and Hanta viruses; Avian influenza; Legionnaire's disease, Toxic Shock Syndrome; AIDS; Lyme disease; West Nile encephalitis, monkeypox, and SARS. The myth that infectious diseases had been conquered was crumbling.

In 1970, Nobel Laureate, Joshua Lederberg, sounded the clarion call and pointed to the threats of antimicrobial resistance and the naïve, inadequate and dangerous ideas conveyed by simplistic war metaphors. Lederberg pointed to the selection pressure of antibiotics arising, in part, from medical prescriptions and, "in part, from unregulated sales and use in feed for crop animals." He said poignantly:

"The future of humanity and microbes likely will unfold as episodes of a suspense thriller that could be titled "Our Wits versus Their Genes."

He called for ending war metaphors, to drop the Manichaeon view of microbes—"We good; they evil". Lederberg suggested the war metaphor be superseded by an ecologically informed one, "which includes a germs'-eye view of infection." As humans, we live with bugs and they

derive benefit from us as we benefit from them. The creation of a host-microbe ecological metaphor is consistent not only with modern science but also culture, including the values and philosophy of Albert Schweitzer's, "Reverence For Life" or "Ehrfurcht vor dem Leben" --"to be in awe of the mystery of life." Instead of "bombing the bugs", negotiate a settlement with mutual advantage.

By 2006, Lederberg's ideas had been enjoined by the Institute of Medicine. In a publication titled: "Ending the War Metaphor: The Changing Agenda for Unraveling the Host-Microbe Relationship" the authors stated: the metaphor is

"..a limiting mental shortcut that distracts from abundant opportunities to improve human and animal health. At worst, it represents a dangerous influence on disease control practices that have accelerated the development of antimicrobial resistance..."

They commented that human hosts are "far better served by recognizing microbes as the allies they (mostly) are, and by making the best of our intimate alliances with them." This makes sense when you consider how outnumbered we humans are. Our gut contains 800 species of bacteria- ten trillion microorganisms- which, as an aside, is the approximate public debt of the U.S. in 2012.

Suggesting a new paradigm is easy, the change is difficult, as Thomas Kuhn, author of the: "Structure of Scientific Revolutions" pointed out in 1962. But, what to do now as Rome burns. Stall warnings are sounding. Is it time to take a deep breath and "let go the stick"? Unfortunately, while this is a good first step in a J-3 Piper Cub, just letting go the stick alone will not right America's Ship. As Goethe said:

"Knowing is not enough; we must apply.

Willing is not enough, we must do."

The Iron Triangle

To address what we must do, let me return to the "triangle equation" I mentioned at the outset, the "Iron Triangle" or as William Safire once called it: "one of the metallic metaphors." ***(The handout David is passing around is a cartoon of the triangle whose meaning will become clearer.)***

Today, some, with tongue in cheek, refer to the "Iron Triangle" as a "Carbon Fiber Triangle", given its seeming indestructible qualities, stubbornly resistant to all internal and external forces to dismember its three angled pillars.

One of the first U.S. Presidents to describe the “Iron Triangle” was Dwight D. Eisenhower. In his 1961 Farewell Address, he said:

“In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted.” (David is passing out another handout: from Eisenhower Library with Eisenhower’s own notations)

Much has been written by scholars, pundits and politicians about the “Industrial – Government Complexes” or ‘Iron Triangles.’ Most agree the “Iron Triangle” exists and has pernicious effects on policy-making; but, few have proffered plans for dismantling it.

William Kristol, a Republican thought leader and Editor of the Weekly Standard, in a paper in Harvard Journal of Law and Public Policy in 1993 concluded that the “Iron Triangle” had “changed the character of Congress and, indeed, the entire political system.” An “Iron Triangle” exists when a “regulated industry captures both its regulating agency and that agency’s congressional oversight committee.” This often serves as a barrier to rational decision-making and promotes either “crony capitalism” or “crony socialism.”

The pernicious effect of the “Iron Triangle” is that it concentrates power of the government, usually behind closed doors, in the hands of a few, whose ethical and financial interests are often conflicted. Mr. Kristol suggested “term limits” for policy makers, though others are dubious. Would “term limits” disentangle the Gordian Knot as Shakespeare (Henry V, Act 1 Scene 1.45-47) suggested in Henry V?

“Turn him to any cause of policy,

The Gordian Knot of it he will unloose,

Familiar as his garter”

Whether “term limits” or other strategies, an Alexandrian “bold stroke” at the DNA of the “Iron Triangle and its cancerous effect on democracy is required soon.

As for the problem of antimicrobial resistance, the structure and function of the “Iron Triangle” offers insights into how, in light of the enormous evidence of the hazards of antimicrobial resistance, evidence, reason, and ethical decision-making have not prevailed. Eisenhower’s words 50 years ago were prophetic.

Since the “Iron Triangle” is simply an administrative-political “organism,” a stage on which people or let’s say protagonists of one of Shakespeare’s darker plays interact, one might ask: What inspires people to seemingly irrational behavior? Is it ignorance? Or stupidity? Genetic (perhaps a gene for irrationality)? or is it simply contrariness or rebellion against authority? Or perhaps anti-science ideation? Or is it simply greed and power as portrayed by Gordon Gekko, (played by Mike Douglas) in the 1987 movie “Wall Street: Money Never Sleeps.” Gekko’s memorable lines: “Greed, for lack of a better word, is good. Greed is right. Greed works. Greed clarifies, cuts through, and captures, the essence of the evolutionary spirit. Greed, in all of its forms; greed for life, for money, for love, knowledge, has marked the upward surge of mankind and greed, you mark my words will not only save Teldar Paper, but that other malfunctioning corporation called the U.S.A.”

Such protagonists of the “Iron Triangle” seem not to subscribe to purer reason such as Keats’ admonition in “Ode on a Grecian Urn”:

“Beauty is truth, truth beauty,” that is all

Ye know on earth, and all ye need to know.

Nor have protagonists embraced Jacob Bronowski’s philosophy, “The Habit of Truth”:

“When we discard the test of fact in what a star is, we discard it in what a man is...”

(Bronowski continues): “This is the habit of truth, always minute yet always urgent, which for four hundred years has entered every action of ours; and has made our society and the value it sets on man, as surely as it has made the linotype machine and the scout knife, and King Lear and the Origin of Species and Leonardo’s Lady with a Stoat.”

Cynics might add that our players in the “Iron Triangle” are proponents of anti-enlightenment sentiments of Dostoevsky’s Underground Man, who denounces liberal, optimistic, common-sensical and rationalist ideas. To Underground Man: reason, science and rationality—be damned.

In an elegant essay in 1950 entitled, “The Science To Save Us From Science,” Bertrand Russell, raised a troubling idea:

“There are considerations of quite a different sort which might lead to an expectation of scientific retrogression. It may be held that science itself generates explosive forces which will, sooner or later, make it impossible to preserve the kind of society in which science can flourish.”

Today, with many science deniers and anti-science sentiments widely expressed in America, one wonders (and I shudder), whether Russell’s premise has merit.

Is the expression of such seemingly irrational ideas a fatal flaw in the human genome? Or a transient trait or tendency amenable to education; enlightenment; and a resetting of the moral compass? On a lighter note, Mark Twain had his ideas:

"When we remember that we are all mad, the mysteries disappear and life stands explained."

Conclusion:

We are reminded that in the tragedy of Flight 743, 228 lives were lost; but, the lives lost daily from the onerous health impacts from America's problem list are incalculable. The annual mortality in the U.S., just from "Superbug" infections, is the equivalent of losing daily, 400 fully loaded Airbus 330s, with no survivors.

Homer, in the 9th c. BCE, said in the Iliad:

"Injustice, swift, erect, and unconfined, sweeps the wide earth, and tramples o'er mankind."

Today, we need new ideas to "confine" injustice and limit its sweep.

If you are as unsettled by this essay as I was in preparing and presenting it, I have accomplished something, but let me conclude on a less depressing but still bittersweet note of nostalgia from A.E. Housman: ("A Shropshire Lad")

*Into my heart an air that kills
From yon far country blows:
What are those blue remembered hills?
What spires, what farms are those?
That is the land of lost content,
I see it shining plain,
The happy highways where I went
And cannot come again."*

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January 23, 2012

Stephen J. Jay M.D.

References: (Note: Technical references for antimicrobial resistance may be found in ref # 7 Industrial Farming and Antimicrobial Resistance below. Accessible at:

http://saveantibiotics.org/resources/Stephen_Jay_statement.pdf. This statement was submitted to the U.S. House Energy and Commerce Committee during Hearings on the topic of antimicrobial resistance 14 July 2010.

Quotes:

1. Alfred Edward Housman, *A Shropshire Lad* New York: Mitchell Kinnerely, 1908. Electronic Text Center, University of Virginia <http://etext.lib.virginia.edu/toc/modeng/public/HouShro.html>
2. Bronowski J. *Science and Human Values*. Rev. Ed. Two: *Habit of Truth*, pp 25-48. New York: Harper & Row 1956 (1972).
3. *Three Short Novels of Dostoevsky*. Trans Constance Garnett. Rev and Ed. By Avrahm Yarmolinsky. Garden City, New York: International Collectors Library, 1960. Notes from the *Underground*, pp. 133-223.
4. Eliot TS (Thomas Stearns), 1888-1965. *The Cocktail Party*. Ed Nevill Coghill. London: Faber and Faber, 1974.
5. *Bartlett’s Familiar Quotations*, 14 ed. Revised. By John Bartlett. Emily Morison Beck (Ed.) Boston: Little, Brown & Co., 1968. Quotation by Benjamin Disraeli (1804-81) From *Speech*, July 24, 1877. *The health of the people...* p. 613 a.
6. Alexander Fleming Nobel Prize Speech, Penicillin. December 11, 1945. http://www.nobelprize.org/nobel_prizes/medicine/laureates/1945/fleming-lecture.pdf.
7. Albert Schweitzer Nobel Peace Prize Lecture, 1952. http://www.nobelprize.org/nobel_prizes/peace/laureates/1952/schweitzer-lecture.html
8. Schweitzer A. *The Philosophy of Civilization*. (trans. C.T. Campion) New York: Prometheus Books, (1949; 1987). Chapter 26. *The Ethics of Reverence for Life*, Chapter 27. *The Civilizing Power of the Ethics of Reverence for Life*. pp. 307-344.
9. Schweitzer A. *Out of My Life and Thought: An Autobiography*. (trans. A.B. Lemke) New York; Henry Holt and Company.1933.
10. Twain M. (Samuel Langhorne Clemens) 1835-1910. *Notebooks and Journals*. Quote: “When we remember that we are all mad, the mysteries disappear and life stands explained.” (Note: several online sources ref this quote to Twain *Notebooks* from 1898 but I was unable to verify this source.)
11. Homer *The Iliad*. (Alexander Pope) http://en.wikiquote.org/wiki/The_Iliad_of_Homer_%28Alexander_Pope%29. Also Google Books: *Homer’s Iliad*, Translated by Alexander Pope. New York: The World Publishing House,

1877, Book IX, Line 628.

http://books.google.com/books?id=iRlyAAAAIAAJ&pg=PA207&lpg=PA207&dq=Homer+Injustice,+swift,+erect,+and+unconfined,+sweeps+the+wide+earth,+and+tramples+o%27er+mankind&source=bl&ots=7hsm42_77b&sig=WUir3mgG9Q6iKTLEWYZj5m6rn3o&hl=en&sa=X&ei=z8waTDvNoG90AHc3bnkCw&ved=0CDQQ6AEwAw#v=onepage&q&f=false

12. Poems: A Fable for Critics. The unhappy lot of Mr. Knott... Poems III by James Russell Lowell. Under the Willows & Other Poems, "For an Autograph", p. 175. Boston and New York: Houghton, Mifflin & Co., 1848 (1896). Russell, B.

<http://books.google.com/books?id=MmQRAAAAYAAJ&printsec=frontcover&dq=%22james+russell+lowell%22&lr=#v=onepage&q=%22james%20russell%20lowell%22&f=false>

13. Bertrand Russell. The Science To Save Us From Science; If we are to, attain a stable society we must understand people's minds, says a philosopher. New York Times. 19 March 1950. Available at NYT's Archives online.

General:

1. Wolfgang Lutz, Warren C. Sanderson, Sergei Scherbov. The end of world population growth in the 21st century: new challenges for human capital formation and sustainable development. London: Earthscan, 2004.
http://www.styluspublishing.com/resrcs/frontm/1844070999_index.pdf
2. Olshansky, SJ, Passaro DJ, Hershow RC, et al. A potential decline in life expectancy in the U.S. in the 21st c. New Engl J Med 352 (11): 1138-45, 2005
<http://www.nejm.org/doi/pdf/10.1056/NEJMSr043743>
3. Rifkin J. The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World. New York: Palgrave Macmillan, 2011.
4. Lewis K, Burd-Sharps S. (Foreword, Jeffrey D. Sachs). The Measure of America 2010-2011. Mapping Risks and Resilience. American Human Development Project/Report. New York and London: New York University Press, 2010.
5. Friedman TL, Mandelbaum M. That used to be us. Farrar, Straus and Giroux. 2011.
6. A World in Denial of What it Knows. By Geoffrey Wheatcroft. New York Times, January 1, 2012.
7. Diamond J. Collapse: How Societies Choose to Fail or Succeed. New York: Viking, 2005.

Education in crisis:

1. Vest CM. President Emeritus, MIT. Rising Above the Gathering Storm Revisited: Rapidly Approaching Category 5. President's Council of Advisors on Science and Technology. November 4, 2010. <http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-nov-vest.pdf>
2. Hockfield S. Restarting America's job Creation Engine. Keynote Address by President of MIT, Susan Hockfield, National Governor's Association, Salt Lake City, July 15, 2011.
<http://web.mit.edu/newsoffice/2011/nga-conference-hockfield-0715.html>.
3. Can't Keep a Bad Idea Down. By Thomas Friedman. New York Times, Oct. 26, 2010
4. Davidson A. When the Idea Machine Stops. New York Times Magazine, Jan 1, 2012.

Gulf oil disaster:

1. New York Times. An environmental disaster unfolds. May 27, 2010.
http://www.nytimes.com/interactive/2010/05/27/us/201005_oil-spill-photo-gallery.html.
2. Malakoff D. Panel Draws Ambitious Road Map for Gulf Restoration. Science 2011;334:163-164.
<http://www.sciencemag.org/content/334/6053/163.full.pdf>
3. Khatchadourian R. The Gulf War: Were there any heroes in the BP oil disaster? The New Yorker. 14 March 2011.
4. Rudolf J. Department of Justice Investigates BP for Faulty Oil Spill Estimates. Huffington Post (Huff Post Green). http://www.huffingtonpost.com/2011/08/21/bp-flow-rate-estimates-un_n_932425.html?view=print&comm_ref=false.

Health care crisis:

1. The Commonwealth Fund. October 2011. Why not the best? Results from the National Scorecard on U.S. Health System Performance. The Commonwealth Fund Commission on a High Performance Health System.
http://www.commonwealthfund.org/~media/Files/Publications/Fund%20Report/2011/Oct/1500_WNTB_Natl_Scorecard_2011_web.pdf.
2. Woolhandler S, Himmelstein D. Healthcare Reform 2.0. Social Research 2011;78(3):719-30.
http://www1.cuny.edu/mu/sph/files/2011/11/783_Woolhandler-Himmelstein_719-730.pdf
3. Siegel B. Health care crisis in America: How to avoid it. http://www.huffingtonpost.com/bernie-siegel-md/health-care-crisis_b_769846.html.
4. Christie L. Number of people without health insurance climbs. CNNMoney.com. Sept. 13, 2011.
http://money.cnn.com/2011/09/13/news/economy/census_bureau_health_insurance/index.htm.

Climate change:

1. U.S. Environmental Protection Agency (EPA). Climate Change.
<http://www.epa.gov/climatechange/>
2. NASA. Global Climate Change. Vital Signs of the planet. <http://climate.nasa.gov/>.
3. New York Times. Global Warming and Climate Change. (2011 Durban Conference).
<http://topics.nytimes.com/top/news/science/topics/globalwarming/index.html>.
4. Pearce F. Dangerous Decade. What follows the Durban climate deal? New Scientist. December 13, 2011. <http://www.newscientist.com/article/dn21278-dangerous-decade-what-follows-the-durban-climate-deal.html?full=true&print=true>.
5. Fahey A. Heated debate: public opinion on climate and weather. Grist.
<http://www.grist.org/climate-change/2011-08-09-public-opinion-on-climate-and-weather>.
6. Oreskes N, Conway EM. Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming. New York: Bloomsbury Press, 2010
7. Rifkin J. The Third Industrial Revolution: How Lateral Power is Transforming Energy, The Economy, and the World. New York: Palgrave Macmillan, 2011.

8. Epstein PR, Ferber D. (Foreword, Jeffrey Sachs). *Changing Planet, Changing Health*. Berkeley, Los Angeles: University of California Press, 2011.
9. A Tempestuous Year. *New York Times*. Jan 1, 2012.

Industrial Farming and Antimicrobial Resistance:

1. PEW Charitable Trusts. Human Health and Industrial Farms. <http://www.saveantibiotics.org/>.
2. *New York Times*. Antibiotics in Animals Need Limits, F.D.A. Says. By Gardiner Harris. June 28, 2010.
3. Couric, K. Denmark's Case for Antibiotic Free Animals: Katie Couric Reports on Denmark's Ban on Antibiotics in Livestock. CBS News. Accessed Aug 26, 2011 at: <http://www.cbsnews.com/stories/2010/02/10/eveningnews/main6195054.shtml>
4. Keiger D. Farmacology. *Johns Hopkins Magazine*. 2009. Accessed online July 7, 2010 at: <http://www.jhu.edu/~jhumag/0609web>
5. Rather D. The Antibiotic Crisis. *Huffington Post* January 12, 2011. http://www.huffingtonpost.com/dan-rather/the-antibiotics-crisis_b_807887.html.
6. Citing Drug Resistance, U.S. Restricts More Antibiotics for Livestock. By Gardiner Harris. *New York Times*, Jan 4, 2012
7. Stephen J. Jay M.D. Antibiotic Resistance and the Use of Antibiotics in Animal Agriculture. Statement Submitted for the Hearing Record. U.S. House Committee on Energy and Commerce, Subcommittee on Health. July 14, 2010. Accessed August 26, 2011 at: http://saveantibiotics.org/resources/Stephen_Jay_statement.pdf.

Air France 447:

1. Wise J. What really happened aboard Air France 447? *Popular Mechanics*. Accessible at: <http://www.popularmechanics.com/technology/aviation/crashes/what-really-happened-aboard-air-france-447-6611877>
2. Air France Flight 447. <http://www.airfrance447.com/>
3. Air France Flight 447. *New York Times*, Jan 7, 2012. (Updated Aug 1, 2010). http://topics.nytimes.com/top/reference/timestopics/subjects/a/airplane_accidents_and_incidents/air_france_flight_447/index.html.

Metaphors: Microbes and Hosts

1. Lederberg J. *Infectious History*. *Science* 2000;288 (5464):287-93.
2. Keiger D. Why Metaphor Matters. *Johns Hopkins Magazine*. 1998. Accessible at: <http://www.jhu.edu/~jhumag/0298web/metaphor.html>.
3. Forum on Microbial threats. Ending the War Metaphor. *The Changing Agenda for Unraveling the Host-Microbe Relationship: Workshop Summary*. Washington D.C.: National Academies Press. 2006.
4. De Grandis G. On the Analogy Between Infectious Diseases and War: How to Use it and not to Use it. *Public Health Ethics* 2011, pp 1-14.

5. Sontag S. *Illness as a Metaphor (1977-78) and AIDS and Its Metaphors. (1988-1989)*. New York: Farrar, Straus and Giroux.

Metaphors: The Iron Triangle

1. Kristol W. Debate: the Federalist and the Contemporary Debate on Term Limits. *Term Limitations: Breaking up the Iron Triangle*. Harvard J of Law and Pub Policy. 1993;16:95-100. (Accessible at: HeinOnline (<http://heinonline.org>))
2. Saffire W. The way we live now: 3-12-00: On language; Iron Triangle. *New York Times* 12 March 2000. Accessible online at: <http://www.nytimes.com/2000/03/12/magazine/the-way-we-live-now-3-12-00-on-language-iron-triangle.html?pagewanted=all&src=pm>
3. Janger EJ. The FDIC's fraudulent conveyance power under the crime control act of 1990: bank insolvency law and the politics of the Iron Triangle. *Conn. L. Rev.* 1995-96; 28:67-106. (Accessed from HeinOnline (<http://heinonline.org>))
4. Transcript of President Dwight D. Eisenhower's Farewell Address (1961) Accessible at: <http://www.ourdocuments.gov/doc.php?flash=true&doc=90&page=transcript>