

Technology to Cope with the Impending Global Issues



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Thank you very much for your invitation of me as the luncheon speaker here on the occasion of Holding such an important arena like this international conference today.

It is my understanding that a good luncheon speech should be like a young lady's dress: So that it must be long enough to cover the most crucial parts, and, at the same time, it must be as short as possible so as to be made interesting to the on-lookers or audience. I'm sure, however, that this speech is not designed in a Bikini-style. Sorry for it

1. Time Changes

Time flies like a hypersonic rocket in the infinite space : As time goes by, it gradually gains momentum, and is enriched with its weight and density exponentially. Time is converged into the aeon to my observation. Although time is indiscrete and is always continuous in nature, we are fond of chopping it into a certain segments in terms of mundane units such as second, day, year, century and millennium.

These days people prefer talking about 50 years perhaps with some latent perceptions as a magic number : 50 years since the end of WW-II, 50 years after the A-bomb dropping onto Hiroshima and Nagasaki, 50-year nuclear era so far, and even the next 50 years and the like. During this half a century, a lot of changes have taken place especially in our way of thinking and external molding. Let me give you some examples in this regard:

In 1948, a US military deputy governor named Charles Helmick said : "Korea can never attain a high standard of living. There are virtually no Koreans with technical training and experience required to take advantage of Korea's resources and effect on improvement over its present rice economy status." Helmick also amplified on his remark with that "when the US occupation forces withdrew and stopped sending in supplies that South Korea needed, it would be reduced to a bull-cart economy and some nine million non-food producers would face starvation."

After this statement, North Korea abruptly cut the power supply to the south, and it caused almost blackout or brownout throughout South Korea, because the power generation facilities and electricity generated in the south accounted for only 12.4% and 4.0%, respectively, as of the end of WW-II, and, because of such crippled situation, the southern part used to rely on power supply at the mercy of the North Korean temper. That power supply

cut was just a prelude prior to the main discourse.

After successfully making the south paralysed, North Korea struck a critical blow at the vitals of the south by means of all-out aggression, and the remaining industrial facilities for our survival were totally destroyed during the Korean War.

As a result, economic analysts at that time quoted a simile to explain the Korean economy as a "basket case." When we say basket case, it refers to as a severely wounded soldier who lost both arms and legs so that he needs daily nursing care for eating, changing clothes, bathing, moving and even waste disposal. Such comment was correct and right on the whole in view of the fact that the nurse was the United States in those days. Thus, 40-50 years ago, there was almost nothing on this soil, except perhaps for ashes, turmoil and a great deal of frustration. I myself have experience of having slept on a snowy mountain and once starved for almost two weeks.

In the course of time, we have gone through thick and thin with lots of pros and cons as well as trials and errors, and have finally ended up with having developed something valuable in the midst of hunger and shiver with cold.

Some of outcomes out of the previous bull-cart economy are manifested in the form of free and unconditional aid of our surplus rice and the supply of twin units of Korean Standard 1000 MWe PWRs to the north. My personal suggestion is to fuel the proposed PWRs to North Korea with military fissile materials to be dismantled from Russian nuclear warheads, that were once targeted at us, as a wherewithal of symbolic realization of plowshare project (They shall beat their swords into plowshares, their spears into pruning hooks ---- Isaiah 2:4 and Micah 4:3). It is my honor to report to you that this idea has been well received by high authorities of IAEA and the United States.

On the contrary, since we drove the contemporary vehicle even at violating the speed limit after hitchhiking on it, history is obliged to witness its negative side effects such as the collapse of tunnel, bridge and department store as well as the sinking of passenger ships, crash of airplane and so on, sacrificing many thousand lives, for which we feel awfully shameful and very sorry.

2. Climate Changes

The world population at the starting year of anno

Table 1 Doubling Time of World Population

Year	A.D. 1	1650, Post-Renaissance	1850, Late Year of Industrial Revolution	1930	1975	1995	2017	2050
Population in Billion	0.25	0.5	1	2	4	5.7	8	10
Doubling Time in Years	1650	200	80	45	42			

Table 2 Number of Commodities for Maintaining Daily Life

Commodities	100 Years Ago	Nowadays
Total No. of Commodities for Maintaining Daily Life	200	33,000
No. of Commodities for Making Life Convenient	72	484
No. of Requisite Commodities	16	94

Domini is believed to have been about 0.25 billion, and it became doubled or reached 0.5 billion in the post-Renaissance era. It then passed one billion mark in the late year of Industrial Revolution, and then two and four billion in 1930 and 1975, respectively, as shown in Table 1. In a summary, it spent 1650 years for the global population to get doubled at the beginning of A.D., 200 and 80 years after that, but it requires merely 40 odd years these days. Will it be possible for the planet Earth to feed, clothe and shelter all these greedy and extravagant mankind in the years to come? If so, then for how long?

About 100 years ago, our great-grandparents led their lives very simply by making use of only about 200 kinds of daily commodities. But the number of commodities in contemporary age amounts to about 33,000 kinds as listed in Table 2. Now problem lies not only in the rapid increase in its number but also in the tremendous quantity of each item. Let me give you an example of Korea.

The Republic of Korea launched into her formal econo-social development in 1962. During this past 32 years, Korean population has increased by about 1.66 folds, while the increase of total electricity consumption has been recorded at 137.5 times as described in Table 3.

Table 3 Changes in Korean Population and Electricity Consumption

Year	Population, Million	Total Electricity Consumption, GWh/yr	Per-Capita Electricity Consumption, kWh/yr
1962 (1)	26.5 (1)	1.2 (1)	46 (1)
1992	43.5 (1.64)	131 (109)	2700 (59)
1994	44.5 (1.66)	165 (137.5)	3807 (80.6)

The consumption of water, energy, paper, plastics, metals, fabrics, and all other industrial products has been similar pattern to that.

A keynote speaker at the plenary session of Solid State Physics Society meeting in the United States mentioned a few years ago that the number of papers and reports submitted to his Society increases so much that, should the same trend go on in the future, the total weight of all such academic publications within his Society alone would become heavier than the weight of earth per se within 150 years.

Could it be plausible? Even if so, how about the environmental devastation due to the production and handling of those materials and commodities? One impending gloomy phenomenon is the intemperate emission of so much CO₂, SO₂, NO_x and dust by fossil fuel combustion, which is seen as critical drawback to the environment and human life. Although the increase in carbon dioxide concentration in the atmosphere, ozone depletion in the stratosphere, acid rain, etc. are recognized as suicidal to human being, there is no remedial measures for it, except for the use of nuclear energy.

The year 1992 marked the 50th anniversary of celebrating the man's first controlled nuclear chain reaction, and an estimate of the global electric power demand was presented there and then that it would triple by the year 2042 on its 100th anniversary.

At present, an average per-capita GNP of 5.7 billion populace throughout the world is known to be about US \$4,000 a year, and it is estimated at US \$11,000 in 2042 that is about 40% of the current American per-capita GNP. Nowadays, an input of 0.6 kWh of electricity is supplied on the global average for producing one US dollar GNP. It will, however, be reduced down to 0.3 kWh by that time as a result of the continued research and development as well as the improvement in machineries and burners. If so, the 9.5 billion world population in 2042 would have to be supplied with 30 trillion kWh of electric power in total, being roughly triple the current annual worldwide consumption of 9 trillion kWh, under the assumption that per-capita electricity consumption would be 3,300 kWh per annum. Since this figure is based on a rather conservative estimate, it would fall within the ballpark range, I presume. Now the problem remains as how to meet such huge amount of energy demand and with what kind of energy resources.

First of all, coal will not be widely used in extenuation

of acid rain's cause, except for probable application by its gasification. Nonetheless, carbon dioxide emission from coal combustion may hardly be avoided. On the other hand, petroleum and natural gas may have to be utilized as energy source for transportation sector and as raw material for petrochemical industry. The remaining energy resources will be trivial in respect of their quantity and timely supply in addition to inferior economics and reliability.

Consequently, it is considered a historically inevitable to make use of nuclear energy for keeping the civilizational wheels continuously running. Furthermore, nuclear power is the best option when environmental conservation is taken into account in the long haul. The success of achieving excellent nuclear safety, radwaste management and public acceptance campaign is prerequisite to the wide utilization of nuclear energy.

The weekly magazine, "Time," carried an article in its March 20th issue of 1995 that a mega-scale iceberg in the size of 180 m thick, 37 km wide and 77 km long, roughly the size of Luxembourg, started floating out to sea off the Antarctic Peninsula, and it is undoubtedly due to unusual rise of atmospheric temperature.

The Antarctica accounts for 9% of the total land area of earth, and is covered with 2250 m thick ice layer. If and when all this iceberg should melt, then all the green-colored land plain in the world atlas would be submerged. Because of this ice layer melting, the huge Antarctic continent would gradually upheave itself, resulting in sinking of an equivalent land mass down under water somewhere. In such case, the opposite side of earth from Antarctica would be prone to undergo sinking, and the corresponding region could be such place like Far East consisting of China, Japan and Korea.

Who knows? The best way to deter this mishap is to reduce the carbon dioxide emission into the atmosphere, and it seems to be partially achievable by the introduction and safe operation of as many nuclear power plants as possible.

3. Population Control

Up until a few years ago, the world intellectuals presumed that Armageddon would be unavoidable, and such disaster would be made into being by an allout nuclear war. With the collapse of the Soviet Empire, however, the so-called inevitable Coming of the Last Day is becoming somewhat evitable, but it is being

gradually replaced by another form of explosion; namely, population explosion and consequent dumping of pollutive substances into the environment.

Unless drastically reducing population and suppressing skyrocketing industrial production in particular, mankind will be eventually encountered with gradual sentence of his own death. Man's inherent instinct to multiply his offspring and his intensive desire to expand his workscope domain are nothing but digging his own grave by means of discharging detrimental substances into the biosphere. There is no stopping power in this regard.

Since some while ago, however, a reverse phenomenon has been looming on the historical horizon, and the message has come from Pasteur Research Institute in France: That is nothing but a prospective statistical record on the number of spermatozoon in human semen. The report says, its number was 120 million per c.c. semen in 1945, and 80 million in 1980 but is only about 60 million in 1995 on an average. Such sharp decrease of spermatozoon is believed to have resulted from the excessive uses of insecticides, weedicides, sterilizing agents, preservatives, narcotics, all kinds of drugs, tobacco, heavy metals, and many other chemical agents.

Needless to say, the absorption, intake and inhalation of these chemicals into human body will be certainly accelerated with time, which will then induce the eventual decrease of human spermatozoon density.

Consequently, the invisible hands of Mother Nature will turn out a lot of sterile women, thus reducing the world population. The propensity of modern lady's evasion of giving birth to child will also be conducive to this end. Thus the Nature is endowed with self-adjusting capability which is built-in within itself.

4. Nuclear Technology for Saving the World

From July 17 to 22 last year a chain of 21 comets called Shoemaker-Levi fell down on the surface of Jupiter in sequence, which had been exactly predicted by many astronomers two years earlier, including their size, collision time, falling location, and the like. The head-on collision of the biggest comet in the size of 3.5 km in diameter on the gaseous surface of Jupiter resulted in 2600 km high fire column and a crater larger than 3 times the diameter of earth together with a dreadful earthquake accompanied with it. Since the earth crust is solid, any comet collision with earth would rise to far

more terrible effect than that on Jupiter, and its aftermath means the end of this planet Earth with multi-megadeaths.

The extermination of dinosaurs was attributed to the falling of a big asteroid onto Yucatan Peninsula, Mexico 65 million years ago, which also induced the ice age causing the extinction of 70% creatures on earth at the same time. It is, therefore, more than clear that the falling of a comet or asteroid in the range of Shoemaker-Levi size on earth would result in an ultra-Armageddon effect therefrom.

There are countless flying objects in orbit which may be subject to falling down on earth as shown in Table 4.

The asteroid No. 4179 is approaching the earth at the interval of every 3.97 years, and fortunately it passed our planet at the distance of 350 km on December 8, 1992. It is scheduled to come close to earth at 1000 km on October 31, 2000, and again at 180 km on September 29, 2004. The asteroid that has the greatest probability of collision with earth is the one that may fall down on earth on August 15, 2126, according to authoritative astronomers. Please note that numerous craters on the moon like pockmarks are the collided scars of asteroids and comets, and earth will be more than it.

Let us look back to the days of the Old Testament when the Big Flood inundated the land after the continuous rainfall for 40 days and nights. At that time, the living creatures were saved by an excellent naval architect, Mr. Noah, who designed and constructed a huge ark, of which dimension is known to be 330 m long, 25 m wide and 13 m in height.

Now how could we, mankind and womankind at large, get rid of the second catastrophe resulting from the horrible falling of huge solid or gaseous matters from outer space in the future? This crucial mission may be implemented not by naval architect like earlier but by the brain and hands of nuclear architect next time, for he is gifted with technology for saving the planet Earth.

His work will be to design and build hyper-nuclear bomb, possibly super-megaton hydrogen bomb, to be

Table 4 Number of Asteroids and Collision Probability with Earth

Diameter (km)	Number of Asteroids	Collision Probability with Earth (Years between Collisions)	Collision Energy (Equivalent to the No. of A-Bombs)
10	10	10^3	10^9
1	1,000	10^6	10^6
0.1	100,000	10^4	10^3

laden into a powerful rocket so as to shoot the incoming target in an attempt to change the direction of approaching object. If one shooting is not sufficient, then repeated firings may have to be implemented. In this connection, I would like to christen this nuclear architect as Mr. Noah, Jr.

In conclusion, let me tell you that a man can neither be an optimist nor a pessimist about the future of mankind. Man is fond of tragedy only from the standpoint of observing it as an audience or reading it as a reader but never as its sufferer or actor per se. Shakespeare once said in his work as follows : "To be or not to be; that is the question." However, the most impending issue in the future may be the following

monologue which reads : "To survive or not to survive; that is the global question." One thing for sure is that our future hinges on the level and timely application of technology, inter alia, nuclear technology. To be more effective and enhance quick decision-making, mankind may have to establish the United States of World or Global Nation of Earth. I would rather like to urge you to be rational and futuristic in dealing with this global issue, in possession of full-fledged efforts for the future by squeezing sweat and enriching wisdom.

In order to save the world from the probable celestial destruction, let us sharpen our pencil, polish the key technologies and concentrate our insight. Thank you.