

Preface

This book is to communicate the new research results on two major public issues—greenhouse warming and nuclear hazards—to the interested and affected citizens, who, without specialized technical knowledge, care and follow the issues for their own and for the nation. The research is carried out according to the august regimen of theoretical and experimental physics, seared in crucible, tempered by contention. The results are iron-clad against the prevailing views. The advocates of greenhouse warming and nuclear hazards must confront the challenge—to rebut or to quit, lest they be classified as fraudulent and dishonest.

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The issue of global *warming* can be settled by three smoking-gun evidences experimentally (see the first paper hereafter). They show that the greenhouse *heat* is entirely dissipated to outer space by the cloud generated by the greenhouse *effect*. Therefore there is no greenhouse heat left on earth to generate global *warming*. That is the end of the line. For practical purposes any further discussion is needless. The commander-in-chief is ready to send the order of attack without hesitation. On the other hand from the *theoretical* point of view much is needed to explain and establish the scientific basis of the experimental truth and to explicate the misleading ideas that are prevalent.

All basic principles of science on the problem are well known. What is missing is a branch of science that is dedicated to a specific category of phenomena covering the problems concerned, such as elastic body dynamics for elasticity problems. Both global warming and the ice age are climate problems of the *Pleistocene* epoch, which are characterized by two global *thermostats*: one is the permanent ice in the polar regions, the other is the clouds in the sky. By ice-water, and water-vapor *phase equilibrium* respectively they tend to maintain a constant temperature in a *neutral equilibrium*, and thus get rid of all multifarious

and complicated intruding influences, making possible to reach a crisp, simple conclusion. This is the way to reach the conclusion of no global warming.

This overriding fact determines all climate problems in Pleistocene, which can be treated likewise. Therefore a new branch of science *Pleistocene climatology* is called for, analogous to *dynamics of elastic bodies* to deal with a special category of phenomena in a clearly defined domain of scientific study.

The *canonical formulation* of a branch of science of mechanics is to set up an *equation of motion* which consists of 3 parts: 1, the *universal laws* of Newton, 2, the *branch laws* of the *specific branch*, such as Hooke's law for the elasticity branch, and the neutral equilibrium law in Pleistocene climatology. 3, the *specific laws of force* for the multifarious specific problems within the branch, such as the various forms of the potential term $V(\mathbf{x})$ in the Schroedinger equation. The specific forcings for the greenhouse and the ice age problems are the *greenhouse heat forcing* and the *Milankovitch forcing*. These two problems have been solved independently in history. All other problems in Pleistocene are traceable to a specific forcing, for example, the *Heinrich events* may be traced to comet impacts. While the ice age is not our problem, it was brought up for relevance.

In *Pleistocene climatology* all climate problems in the ice age epoch can be treated *systematically* (not *haphazardly*) like elastic problems in dynamics of elastic bodies from a general equation of motion of this branch and specific forcings for specific problems under consideration. All climate problems of human concern are limited to the last few millennia of this epoch. For practical purposes we need to search no further for climate studies.

For the climate problems there is a *new* 4th part of the equation of motion in addition to the above three, the *feedback effects*, such as the *albedo* and *infrared* feedbacks. These are forces not previously existent in the system but induced by the phenomenon once it is underway and must be included in the

Newton's second law to solve the problem. This complicates the matter. Worse still, the feedbacks, as in ice ages, could be two orders of magnitude greater than the original forcing, which completely mess up the strategic outlook of the problem. Even more traumatic is that the feedbacks are so numerous and mutually interacting, like the contestants entering the Thirty Years War, that they completely messed up the war plan and ended up in complete ruin of all participants in the *Deutschereich*. As a matter of fact, for our interest, it is the *cloud feedback* that gets rid of the greenhouse *heat*, suggesting no *warming*. But that is not yet the end of the problem because all the other feedbacks have not been accounted for.

The past performances of the greenhouse and ice age studies are modern examples of such a disaster. The greenhouse warming problem involves dozens of feedbacks, only a few have been studied. A few new ones raised by Richard Lindzen are enough to cast doubt on the current conclusion. This line of work now stands still awaiting the arrival of super-computer ten years hence to save the impotence of the current generation of computers to tackle the complex problem.

In *Pleistocene climatology* most feedbacks are overwhelmed by the equilibrium condition already contained in part 2 and need not be considered separately again, greatly simplifying the problem. The part 4 on feedbacks can be treated neatly and conclusively. For our interest, it can be shown that only the cloud feedback needs to be considered and all others have no part to play. That solves the problem. No super-computer is needed. Save \$1 billion.

Just as in the canonical theory of mechanics, *canonical generalized variables* may be introduced which can be solved more readily. In the greenhouse problem the canonical variables are the *mass of precipitation increase* m_1 , the *mass of the cloud increase* m_2 , and the *global temperature increase* T . They can be solved from the *canonical equations*. m_1 and m_2 are sizable

quantities and can be compared with experiments. The results of comparison are perfect, proving the theory and the reality of the greenhouse *effects*. The result of T happens to be *zero* up to 3000 years hence, which is the limit of the theory. Empirical result is *zero now* and whatever happens in the future is relevant only for the next 300 years, after which fossil fuels will be completely depleted and the issue becomes moot. In the next 300 years, which is a blink in the Pleistocene time scale, only a charlatan can make a mountain out of a molehill (pp.79, 100). Thus any and all discussions of greenhouse warming are moot. The Kyoto Protocol is thus as realistic as Ponce de Leon's search for the Fountain of Youth.

That the canonical variable T is a constant is not at all unusual. The *angular momentum p*, as a cononical variable, is a constant. Like other *constants of the motion*, the conservation of angular momentum implies a "*symmetry*" property of the space with respect to *rotation*. The constancy of T as a canonical variable, also implies a global "*symmetry*" property of the climate system, that is, the neutral equilibrium condition. In the ice age case the Melankovitch forcing acts as "*symmetry breaking*,"—a notion fundamental in high energy physics.

Thus Pleistocene climatology has reached the ultimate canonical destination, leaving all the roundabout, grotesque detours to the wasted history.

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With the greenhouse warming issue out of the way, a canonical *energy policy* emerges naturally thus: (1), *First*, fossil fuels should be banned for energy production use, not because it generates carbon dioxide and greenhouse warming but because of the double reasons as follow: (a), It generates air and water pollution, which are our foremost concern. (b) It depletes unrenewable natural resources of *organic carbon*, which, in the form of plastics, is the main source of supply of necessary material to sustain modern civilization after most mineral resources, including all metals, will be depleted in a century. To burn the fossil

fuels for energy generation is as horrible as burning a copy of Gutenberg Bible to warm a cup of coffee.

(2), *Second*, without the fossil fuel energy supply, what will be the main energy source for the future? Hydraulic, wind, geothermal, bio-mass, tide, deep ocean energy sources have all been explored. Most of them can supply only about 1% of the energy needs except the hydraulic, which can supply a little more, a few percent. Thus the bulk of the energy needed must be supplied from the only energy resource remaining—the *nuclear power*, which has already supplied about 10% of all energy consumed (20% of all electricity generated). [For details see my book on energy and environment by *Macmillan*.] This leads to an anathema to the general public that is indoctrinated to the notion of nuclear catastrophe. The second part of this book is dedicated to alleviate this fear.

It must be stated first of all that the objective of an energy policy is to guarantee the full development, economic and social, of the nation, not to pursue specific objectives, such as "the nuclear free homestead" for its own sake. Since pollution is a major social issue, it ranks as a top priority in energy considerations. In our energy advocacy environmental preservation is always an overriding concern.

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Before addressing the nuclear hazards it is to be noted that the greenhouse warming and nuclear hazards are two major issues in modern times, involving environmental, economic, social, political and spiritual aspects. Both in all aspects have been discussed in the public with myriads of unresolvable issues. Those aspects that are well known and uncontroversial will not be repeated here. What will be done here, as in the greenhouse problem, is to strike at the heart of the scientific issue. The rest will follow naturally. The heart of the nuclear issue is the *health effects of low level nuclear radiation*.

Low level radiation is defined as radiations of a strength comparable to *natural background radiation*, which is omnipresent, created by God before humans came to the earth, and thus no one can question its *raison d'etre*, and thus is a natural standard to use for comparison. Its strength is *100 millirem per year* at the sea level, which every body is exposed to. It is a natural standard for comparison with other sources of concern, such as dental X-rays, nuclear plant emissions, etc.

Besides the normal background radiation, every body is exposed to higher background radiation from high altitude (Denver has a level twice larger than at sea level), from medical diagnosis and treatment, from all sorts of nuclear technologies (including wrist watches and smoke alarms), from nuclear power plants (in normal operation and in accidents) and from nuclear bombs (in tests and in war). No one can escape these and it behooves everybody to learn the scientific facts affecting human health which will be summarized in the following.

The conclusions obtained are based on *vital statistics* of the United States populations of the 50 states in the past 50 years, which are contained in a truck load of government publications that is available in any good-sized library. This data set is enough to settle all important questions conclusively. Nothing more is needed (unless U.S. have annexed 50 more States and have lived 50 more years to necessitate an updating of a few percent). No further experiments are needed, necessary, desirable, and possible. No question on the veracity of the scientific truth is justified. This is it. No one had, have, can have, and will have different conclusions from what is obtained from this data set described in the following.

However, this job has not been done by the establishment, by the energy industries for their self interest, by the academe for scholastic studies, and by the counter-culture for their Quixotic and rebellious pursuits. It does not need new august laws as Newton's and Hooke's, and new epoch making formulations as in

the greenhouse problem. It just needs hard spade work to go through the dry as saw dust statistics to sift out the missing diamonds. It does not need super-genius; it just needs super-handyman. Without such a knowledge there is no way to set technical standards to guarantee health and safety while maximizing efficiency and benefits. Failure to do that is irresponsibly delinquent at best and criminal negligent at worst. What actually happened was that nothing has been done. No truths emerged. Illusions overflow. Fallacies abound. This is a *mad, mad, mad World*, as in the movie of that title.

[“Everybody is drunk and I only am sober. But I will not chew up the mash and suck up the alcohol” said *Chiü Nüan* before committing suicide 2500 years ago. This is the same for the global warming issue and the Kyoto Protocol.]

The conclusions of the nuclear hazards issues we obtained are: (1). A doubling of the background radiation (such as moving to live in Denver) has the effect of *reducing cancer death rate by 25%*. (2) Similar results are obtained for *heart diseases, stroke, and most of the leading diseases* causing death. (3) As a result low level radiation has an effect to *extend life span*. In fact, in Kerala, India, *life expectancy is increased 10.7 years* due to an increase of background radiation of 20-fold due to the thorium mine deposits there. (4) The reduction of cancer and the increase of radiation level of the 8 mountain states of the Rocky Mountain region as functions of the altitudes of the 8 states *follow the same exponential curve*, thus establishing the *causal* relation of the radiation and cancer reduction beyond *circumstantial correlation*. (5) Cancer study of Rocky mountain region agrees with longevity study of Kerala quantitatively. The above results are related to *natural* low level radiation.

(6) *Artificial* low level radiation from nuclear bomb tests in air in the 1950s in Nevada, instead of increasing cancer as first expected and feared, has actually *reduced cancer deaths in the U. S. by half a million*. (7) *Nevada* cancer

death rate was *reduced by 25% in 4 years* after tests began and continued for a decade. (8) *Other states* have less cancer reduction, the farther the lesser. (9) The farthest states *Alaska and Hawaii* have no reduction. Comparing these iron-clad conclusions with the prevailing sentiment against nuclear power, you now can realize what a mad, mad, mad world we are in.

(10) The quantitative law relating *radiation and cancer death reduction* is the same in bomb radiation (created by humans) as in natural radiation (created by God). Thus bomb radiation is not particularly *evil* as many had in mind. A repeat of Newton's work in showing that the laws of mechanics are the same in Heaven as on earth, thus ushering in the modern world and leaving medieval age behind. Now the same with the medieval view of nuclear hazards.

The 50 States provide 50 independent observers monitoring the same experiment for 50 years on both natural and bomb radiations. No experiments can be more comprehensive. And it did not cost a penny of research funds (which would run into millions of dollars in comparable projects) from the government and others except my research time and the work of my student David Bovi whose color charts for this work enhance the appearance of the book. His calculation of the *population weighted average altitudes* of the 8 mountain states, as shown in 4 digit figures in the color charts, is an indication of the extent of spade work that has gone into the project.

It is ironic that the *Airborne Nuclear Test Ban Treaty* was promulgated expeditiously and put into effect in the middle 1950s for humanitarian reasons. In retrospect it was an re-enactment of the *Chicken Little* story of sky-is-falling. The fallen sky is actually an apple and is good for eating. Nuclear tests after the Test Ban Treaty had gone underground and 1500 bombs were exploded. If exploded in air it would have saved 1.5 million American lives from cancer deaths. And increased life span for every Americans except Alaska and Hawaii.

Suggested high school science project: How many millions more lives would be saved from heart diseases and strokes due to the bomb tests? Use government published statistic cited and the information in paper (C) later. Establishment! Vacate the driver's seat for the high school project makers.

It is worth mentioning that the Conference *A Decade after Chernobyl* sponsored by United Nations, European Union, World Health Organization, Russia, White-Russia and Ukraine has declared that there was no increased cancer deaths after the Chernobyl accident. Ten years before, right after Chernobyl, thousands of European women have aborted their unborn children for fear of giving birth to deformed babies. An evil doctrine of a cult has left thousands of murders of the unborn in their trail. This is truly a mad, mad, mad world.

While the cancer fear is declining, one last obstacle still remains against the acceptance of nuclear power—the issue of *nuclear waste disposal*. Nuclear radiation is indestructible. Once created it lasts forever. It pollutes the pristine earth for eternity and cannot be accepted for humanitarian and spiritual reasons, so the argument goes. However, once we learn, this time with respect to the *nuclear waste*, that its low level radiation is not only *not harmful* but also *beneficial* to health and can *prolong life*, then it is no longer a problem to be feared. In fact it will be a billion dollar gold mine to develop health improving equipment. By folklore, people in Brazil and Chekoslovakia have already taking advantage of the nuclear radiation available from their beach sand and uranium mines for health improving uses. Truly it is from *trash to treasure*.

The basic principle controlling the nuclear health effect is simple. The background radiation is the first *antigen* on earth before life has arrived. Therefore the first *immune system* the evolution process endowed upon life is to generate resistance to radiation, mainly by producing *anti-oxidants* to counter the *free radicals* produced by radiation. It so happens that free radicals are also the

natural products of metabolism and are the aggravating factors of most diseases and the main cause of aging due to the decline of the innate ability to cleanse the body of the waste products through aging. Therefore, happily, *radiation immune reaction* happens to be the *right antidote against most disease and aging*. An extra amount of low level radiation by whatever sources will stimulate the immune system to generate more anti-oxidants to relieve suffering and prolong life.

A few hour's exposure to the radiation from the Brazilian beach sand or the Chekoslovakia or Colorado uranium mine tunnel would act as a vacuum cleaner to sweep away the metabolic waste products and make one *feel fresher and younger* after the experience. Thus the origin of the nuclear folklore.

The low level radiation can come from any source, even from the atomic bomb exploded in Hiroshima at a large distance from ground zero. Such a result has been reported by Japanese scientists, and published in *Time*, at a conference in New York on the occasion of the 50th anniversary of Hiroshima and the birth of nuclear medicine that people in such a condition have a longer life span. Similar results are found among the *radium watch dial painters*, most of them caught lung cancer because of exposure to *strong radiation*, but a small group with *low radiation* exposure achieved longevity. This radiation effect on longevity is truly a special Grace from God beyond expectation, a dream pursued by emperors, kings, alchemists without avail, now realized serendipitously. But the age of foolishness took it as a scourge created by humans.

During the height of nuclear hysteria after the major nuclear plant accidents it was fashionable to speak of *nuclear free homestead*. Anything nuclear is untouchable. It is often forgotten that the human body is a nuclear radiation emitter due to the radioactive potassium-40 in the body. In Los Alamos National Laboratory there is a machine, which one can walk in to have his body's radiation strength measured. It usually accounts for one-third of the natural

background radiation. In a nuclear free homestead such human body is untouchable. The advocates will have to commit self-immolation to support their argument.

Thus it was an age of wisdom; it was an age of foolishness. We were going straight to Heaven; we were going straight to Hell. So said Charles Dickens more than a century ago. And so it remains to this today. This applies not only to the energy issues of greenhouse warming and nuclear hazards but also to many prevailing controversies in politics, economy, society and spiritual life. All of us should strive to turn the age of foolishness to the age of wisdom.

To begin with energy. Plentiful and clean energy is the life line of civilization beyond the cave culture. To achieve this goal two innovations stand out above all as high priority. First, to convert fossil fuels from energy resources to organic carbon resources for industrial use in the next century. Second, to re-build the American nuclear power industry as substitute of fossil fuels, which is depleting rapidly and requires replacement anyway. Revive the 100 aborted nuclear plants abandoned two decades ago. Go back to *nuclear industry standards* of the 1950s. Then, a nuclear plant, such as the one outside Rochester, New York, was built in 3 years (the same as in Japan now). Today in U.S. it takes 13 years to build. The mere increase of interest costs is enough to double the investment cost and thus double the cost of electricity generated. The increased time and costs are for environmental wrangling and stricter regulations to control the nuclear genie (forgetting it to be the nuclear angel). It is ~~truly~~ a mad, mad, mad world. [Others have been discussed in my book by *Macmillan*.]

The double chastity belts of global warming and nuclear hazards must be liberated, lest Humpty Dumpty had a fall—all the establishment, all the vested interest, all the academe and all the counter-culture could not put Humpty Dumpty back again.

Addendum: A Challenge to the Establishment

This concerns the "Position Statement on Climate Change and Greenhouse Gases" of *American Geophysical Union* dated Dec. 1998. Its gist is that: (1). The complexity and variability of the climate system limited the progress of the work. (2). Some accomplishments are at hand nevertheless. (3). The problem is far from reaching a definitive solution. (4). Sustained efforts should continue.

The current climate study is in a stage of the time of the 19th century after Newton but before Euler, Laplace and Boltzmann. Newton's success of few particle mechanics has been applied and succeeded in the study of the *weather* and our accomplishment is displayed in good prediction of weather for a few days.

Once beyond a few days for a longer time we deal with *climate* and are faced with the problem of complexity and variability due to a large number of degrees of freedom. Following the success of weather, the attempt is to extend the Newtonian treatment by super-computer but the success has been limited.

Mechanics of a large number of particles are of course complex and unwieldy. If totally orderless then there is no hope, and not a penny should be spend on the research which is destined to be in vain. However, if some regularity appears out of the chaos, then a systematic treatment can be done to simplify the complexity. Thus in the 18th and 19th century Euler and Laplace developed the dynamics of rigid bodies, elastic bodies and fluids, which are extremely fruitful. The work showed that only a few degrees of freedom (6 for rigid body) are significant, all others are side-tracked. The study of the spinning top would have impressed Newton. There is no need to study the dynamics of every particle of the spinning top by Newton's laws to trace out the motion of all individual particles through super-computer. 99.99% of the information so obtained is a useless quagmire. The only significant information can nevertheless be obtained by solving the Euler's equation without computer. Finally came

Boltzmann with the study of equilibrium, in which only the equilibrium condition is the meaningful physical information, all others are obviated.

Climate study has not gone through such a revolution. The reliance on super computer to exhaust the study of all degrees of freedom of the climate is like that of the study of the spinning top by super computer. Yet we just have a breakthrough. In spite of the complexity of climate there is strict regularity as seen in the ice ages, indicating the existence of simplifying principles to establish a new science *Pleistocene climatology* like rigid body dynamics. This time the special condition is the presence of a permanent body of ice (thus Pleistocene), with the specific simplifying principle embodied in the neutral equilibrium condition of phase transition of ice and water. As Boltzmann has done, the equilibrium condition staffs off all trivial degrees of freedom and simplifies the complexity of the problem. The very fact that in the past century no decent theory of ice ages has been developed means that the climate study has not gone beyond 19th century until recently. With the new work the *complexity issue* is resolved.

The *variability issue* can be resolved in another manner, like a jigsaw puzzle, also demonstrated in the ice age problem. There is only one way to piece a jigsaw puzzle together—there can be no other way. Once it is done, that is it.

With the main issues resolved, the climate problem can be solved crisply. Concerning greenhouse warming whatever fragmentary successes obtained so far are meaningless; all yet unsolved points are irrelevant. There is no more holy grail to be pursued. Only a few moping actions remain, such as the study of the merits and demerits of increased precipitation and cloudiness. The old-time *position statement* is out-dated. At one time, position statements on the issue of round-or-flat earth were periodically issued to review the progress, but the last one has concluded the matter long ago. Now we can sail west bravely without having to worry about reaching the end of the world and then dropping into Hell.