

Existential Realities of Post Agriculture

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Sculptor

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Biography of Jeffrey Rubinoff

Rubinoff received his B.A. and M.F.A. in the nineteen sixties. In 1969 he returned to Canada. His one man shows included The Helen Mazelow Gallery, The Ontario Science Center, The Nathan Manilow Sculpture Park, Queen's Park Toronto, York University, and Two Sculptors New York.

In the past two decades he concentrated on group historical exhibitions including works by sculptors David Smith, Alexander Calder, Anthony Caro, Mark di Suvero, Nancy Graves, George Rickey, Beverly Pepper, Tony Smith, and Robert Murray.

In 1973, Rubinoff purchased an 80 hectare farm on Hornby Island, off the west coast of British Columbia, Canada, for the eventual establishment of a sculpture park. Living and working on site he has created almost a hundred sculptures, constructing each piece alone in his studio from CORTEN or stainless steel. Located in the former barn, the studio is uniquely equipped with a one man steel foundry, making it possible to cast the complex steel shapes seen in his later series. In addition to creating the pieces themselves, Rubinoff carried out significant landscaping projects in the park to reshape the land to site the sculptures.

Notes on 2012 Company of Ideas Forum

Jeffrey Rubinoff, October 12, 2011

Natural History is history. What specifically interests me as an artist is the apparent universality of the expression of the spiritual in humans, evidence of individual conscience, and the ordering of aural and visual material.

I perceive the prevalence of these traits as evolutionary in origin. The ability to completely identify with the spirit of the prey is the essence of hunting successfully and ultimately survival when the prey is large animals. I refer to this in my 2010 Forum paper regarding the art of the late Palaeolithic caves. Individual conscience provides extended skills for co-operation beyond the aggression of a pack. The genes cluster for the artists' abilities for aural and visual mimesis and for the higher ordering of aural and visual mimesis into temporal and spatial counterpoint provide the hunter and gatherer with critical anticipatory skills. Arguably the combination of these is among the most important skills that lead to the dominance of humans as the ultimate predators.

For some 2.5 million years our human ancestors evolved as hunter and gatherers. Modern humans evolved 200,000 years ago. By contrast agriculture has been practiced only for the last 13,000 years. The skills of hunting and gathering that led to the dominance of humans have clearly had a long genetic history whereas the age of agriculture applies to cultural evolution. Agriculture led to civilization. To the extent that history applies to the written word, agriculture is culture.

It is interesting to think, given the evidence of the late Palaeolithic caves, that "survival of the fittest" may not be the current pejorative of "social Darwinism". The best hunters may have had the concentration of genetic characteristics of artists and not warriors. It is true that some of those characteristics are obviously common to both, but as I pointed out in my 2010 forum presentation, there is no evidence of war in the caves of Chauvet, Altamira and Lascaux.

Except for residual Lamarckian dreams, we have come to accept that social evolution in the time limits of the age of agriculture could not significantly alter our Darwinian nature.

In the Post Agriculture period that I have postulated, this potentially is no longer true. And it forms a significant argument for not only re-evaluating the institutions of the age of agriculture themselves but

more importantly to wholly revised and perhaps original institutions for the oversight of genetic engineering. These institutions must be rooted in arguments of essential human values.

With the possibilities of genetic engineering of the human genome there cannot be the disconnect from essential human values that has occurred with advancements of science in the production of weapons of mass destruction. Kaiser Wilhelm clearly set out to place science at the service of the warrior class when the Kaiser Wilhelm Institutes were created separate from the oversight of the universities prior to World War I.

The application of science to advanced weapons has applied these principles since.

As to the release of the nuclear genie, even the present accumulation of weapons grade plutonium, measured in the hundreds of tons with a half life of 24,000 years will require a regime of continuous vigilance into the foreseeable future. Moreover, even if weapon production were to cease, nuclear power plants continue to produce significant amounts of this grade of plutonium as a by-product.

With a cursory study, the present limitations placed on major thermo-nuclear arms do not account for thousands of tactical (battlefield) nuclear weapons many with more destructive power than Hiroshima or Nagasaki. Submarines, typified by the MRVed missiles of the Trident class—each submarine is capable of destroying nations or multiple nations—are out of sight but cannot remain out of mind.

In the Post Agriculture period, not only does the ongoing nuclear issue need to be effectively addressed but the rapid adaptation by industrial farming to the production of genetically engineered foods speaks to the exigency of the oversight that is necessary. The luxury of post-modernism by the attack on meta-narrative as described by Lyotard has allowed the default of the humanities regarding their responsibilities to the future.

This must no longer be perceived to be tenable.

Re-enforcing the disconnect between the humanities and science and perhaps arguably because of it, the advent of post-modernism in the universities has allowed self-indulgence to be perceived as academic freedom and allowed the humanities to abdicate their responsibility to the meta-narrative of natural history.

Likewise, the completed process by the 1960's of the commodification of art begun in 1918 has rendered art and artists irrelevant to the measure of human values. This includes the perception of art as political capital—a commodification that stills the independent voices of artists even more than the market.

The Jeffrey Rubinoff Sculpture Park is the context of the sculpture. In presenting the insights that have evolved from and with the sculpture as arguments, art becomes embryonic ideas and therefore a source of knowledge beyond self-reference. Art understood as such a source of knowledge becomes essential to the necessary measure of human values in the Post Agriculture Age.

Existential Realities of Post Agriculture

I was born in the shadow of the endgame.

I am an artist.

Art is an act of will in accord with a mature conscience.

There can be no resignation.

The artist is witness to existence itself.

Art is the celebration.

So ended my 2011 presentation¹.

This year's conversation progresses to post agriculture. As I have stated, my insights do not in any way imply a new ideology or any other prescription. There is no new grand narrative.

Art is valued by the artist's unique perception that might provide original perspectives. This was most certainly the value placed on art as a source of knowledge by the great German philosophers, Baumgarten, Kant, Fichte, Schelling, and above all, Hegel. They in turn influenced the evolution of modern academic art history.²

Art is existential to the artist.

¹ 2011 Yale Forum at the JRSP.

² Kultermann, Udo, 1993. *The History of Art History*, Abaris Books Inc.

This raises the questions:

What is art's relationship to the existential realities of the artist's time?

What are those existential realities?

What is art's value if it fails to address those realities?

Institutes and corporations are subject to the standards of plastic conventional morality.

Can art become the fulcrum for the reconciliation of science with history to lever the value of conscience beyond the plasticity of morality?

I perceive three existential realities that characterize post agriculture:

Art. Nuclear Deterrence. And Transgenic Engineering.

I have not included Global Warming although it is a major and obvious issue. However, it is only possible as a mass choice and that choice is made with the input of vast amounts of readily available information. As a mass conscious choice, the continuance of the production of greenhouse gases will eventually force a mass adaptation to the changed conditions. As such I do not categorize this as an existential reality.

Art is self-contained truth. A work of art is perfection by completeness. This is also how I describe metaphor.

My perception of art is that it is an act of will in accord with a mature conscience. Nuclear Deterrence is the abrogation of conscience. Unlike global warming there is no mass choice. The weapons were developed and deployed secretly and then those secrets were leaked by stealth to the Soviet Union who had a secret development of their own. By 1949 the Soviets exploded their first bomb.³ Thus both the weapons and Deterrence were born out of stealth and perfidy.

Here we have the strongest example of the difference between individual conscience and the mouldable nature of morality. Individual conscience is repelled by the inherent game strategies of mega death. On the other hand our day to day survival depends on the exercise of those strategies.

Less predictable players have already entered the arena. It is thus unrealistic to expect that nuclear weapons will be given up in any foreseeable time as Deterrence addresses these new circumstances.

Still it can be argued that there is a moral imperative in maintaining Deterrence as the least worst option. Certainly moment to moment peace is better than the historical predictability of the exercise of these weapons.

³ Badash, Lawrence, 1995. *Scientists and the Development of Nuclear Weapons*, Humanity Books, Amherst, New York. Page 79

By "Transgenic Engineering" I refer to the advent of recombinant DNA and resulting transgenic organisms. Transgenic refers to "*...an organism containing genetic material into which DNA from an unrelated organism has been introduced.*"⁴ This was realized in the early 1970's and Transgenic Engineering is to traditional plant and animal breeding as nuclear weapons are to conventional weapons.

Genetic Engineering also involves gene manipulation within species. Although this may revive the issues of eugenics, in the main it involves such things as gene therapy in individual humans. Personalized medicine will doubtlessly be a huge technology boom. Transgenic crops have already arrived. Therefore transgenic modification of the human genome appears to only be a matter of time.

There are obviously no lessons of history for Genetic Engineering, but it is necessary to understand the brief evolution of Nuclear Deterrence and understand the pitfalls of continuing to allow a similar evolution for transgenic organisms.

Both the reality of art and Genetic Engineering rely on the continued tenuous working of Nuclear Deterrence and that it does not escalate to its ultimate reality of mutually assured destruction. This depends on rationality prevailing among competitive nations and hegemonies. Stability exists only moment to moment and the necessity for indefinitely continued rationality among the existing bodies has had no historical precedence.

Therefore Nuclear Deterrence exists beyond the lessons of history. No major powers have in the past invested so much in the preparation for war and not succeeded in going to war.

⁴ *Shorter Oxford University Dictionary*, 6th Edition, 1993, Oxford University Press

History, then, rules against Nuclear Deterrence.

Corollary to this soul destroying path is the Military Industrial Complex⁵.

It is important to trace the historical sources of:

"Akin to, and largely responsible for the sweeping changes in our industrial-military posture, has been the technological revolution during recent decades.

In this revolution, research has become central; it also becomes more formalized, complex and costly. A steadily increasing share is conducted for, by, or at the direction of, the Federal government.

Today, the solitary inventor, tinkering in his shop, has been overshadowed by task forces of scientists in laboratories and testing fields. In the same fashion, the free university, historically the fountainhead of free ideas and scientific discovery has experienced a revolution in the conduct of research. Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity. For every old blackboard there are now hundreds of new electronic computers.

⁵ See copy of Eisenhower speech attached.

The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present and is gravely to be regarded. Yet in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific technological elite..."

In 2011 I spoke of how the Enlightenment had turned on the humanity that it had meant to liberate.

Interestingly, in tracing the descent of the military-industrial complex we encounter the foundation of academic art history and its antecedent, art as a source of knowledge.

Giorgio Vasari was the first art historian. His book "*The Lives of the Most Eminent Painters, Sculptors and Architects*" was written in 1550. His life 1511-1574 makes him a contemporary of Michelangelo (1475-1564). A painter himself, this comprises the first written artists' art history.

In review of Vasari's book The Encyclopedia Britannica states:

"... Vasari's work in *Lives* represents the first grandiose example of modern [historiography](#) and has proven to be hugely influential. The canon of Italian Renaissance artists he established in the book endures as the standard to this day. Moreover, the trajectory of [art history](#) he presented has formed the conceptual basis for Renaissance scholarship and continues to influence popular perceptions of the history of Western painting..."⁶

⁶ Vasari, Giorgio. *Encyclopædia Britannica. Encyclopædia Britannica Online.* Encyclopædia Britannica Inc., 2012. Web. 27 Apr. 2012

Exactly two hundred years later philosopher Alexander Gottlieb Baumgarten (1714-1762) published the first edition of his book "*Aesthetica*" (1750) in the midst of the German Enlightenment or "Aufklären".

Peter Hanns Reil in *The German Enlightenment and Rise of Historicism*⁷ states:

"...By the beginning of the eighteenth century there was an increasing demand for a reassessment of both philosophy and history...One of the major goals of the reassessment was to evolve a strategy of analysis capable of joining history and philosophy in order to open up new vistas for man's understanding of himself and his milieu. In Germany this movement became dominant with the decline of Wolffian philosophy, beginning about the fourth decade of the eighteenth century."⁸

"...[Christian] Wolff strove to apply mathematical and syllogistic logic to all fields of knowledge. For him, mathematics, which he equated with syllogistic reasoning, was the propaedeutic to all understanding..."⁹

"...Baumgarten sought to compliment traditional Wolffian philosophy by evolving what he called 'sensitive knowledge', the type of knowledge conveyed by art. He invented the word 'aesthetics' to describe this activity. Cognizant of the pitfalls of an aesthetics founded either on universal norms or on pure effect, Baumgarten

⁷ Reill, Peter Hanns, 1975. "*The German Enlightenment and the Rise of Historicism*", University of California Press.

⁸ *Ibid*, Page 30

⁹ *Ibid*, Page 33

tried to devise a method of observation which would mediate between positive and empirical modes of apprehension. Instead of obliterating the concrete by divesting it of its qualitative elements—the ultimate goal of [Christian] Wolff's 'universal knowledge' [*mathesis universalis*]*—the aesthetic method directed the observer to dwell upon concrete phenomena while attempting, at the same time, to understand them philosophically...*"¹⁰

"...By the 1760's the Leibnizian idea of perfectability had become one of the central concepts of German aesthetics. In 1755, three years before the second volume of Baumgarten's *Aesthetica* appeared, Moses Mendelssohn had applied the idea of perfectibility to artistic understanding...Mendelssohn drew a distinction between the perfection of man's physical nature, which is generally complete, and the perfection of his inner nature, which is potential..."

This is background to Kant, Fichte, Schelling and Hegel.

I have included the work of Peter Hanns Reil, not only for his obvious erudition but because he is able to translate Baumgarten from Latin into English.

Before I add a few lines from and about Kant, Fichte, Schelling and Hegel, I would like to make something clear.

These great philosophers legitimized art by attempting to accommodate their own art perception into their perception of knowledge. One must have art perception—a genetic gift—to address the

¹⁰ *Ibid*, Pages 60-61

meaning of art and the drive to express its importance not only for oneself but the gift to knowledge itself.

However, it is critical to understand that aesthetics and academic art history are from the perspective of the viewer and add to viewers' knowledge. I have found that through art I am able to come to the understanding of these philosophers and academic art history but I cannot through these philosophers or academic art arrive at creating it.

As an artist my understanding of art comes from the innate gift and the experience of witnessing art by both creating it and directly perceiving the art of others.

Because these philosophers are coming to terms with their own art perception, there are valuable concepts that describe the actions of artists.

In 1790 Kant introduces to academic Art History the concepts of freedom and genius and could be said to pave the way to Modernism.

Regarding *Art in General*¹¹:

"...By right it is only production through freedom i.e. through an act of will that places reason at the basis of its action, that should be termed art..."

And further along:

¹¹ Kant, Emmanuel, 1790. *Critique of Judgement*, Oxford University Press, 2008 Ed., Page 132

"...A product of fine art must be recognized to be art and not nature. Nevertheless the purposiveness in its form must appear just as free from constraint of arbitrary rules as if it were a product of nature...."¹²

And under *Fine art is the art of genius*¹³:

..."*Genius* is the talent...which gives the rule to art. Since talent, as an innate productive faculty of the artist, belongs itself to nature, we may put it this way: *Genius* is the innate mental aptitude (*ingenium*) through which nature gives the rule to art..."¹⁴

Johann Gottlieb Fichte in *The System of Ethics*, published in 1798, states:

"...Unlike the scholar, fine art does not cultivate only the understanding; and unlike the moral teacher of other people, it does not cultivate only the heart. Instead it cultivates the entire unified being. It addresses itself neither to the understanding nor to the heart but to the mind as a whole, in the unity of its powers. It constitutes a third power, composed of the other two..."¹⁵

In 1800 F.W.J. Schelling wrote:

¹² *Ibid*, Page 135

¹³ *Ibid*, Page 136

¹⁴ *Ibid*, Page 136

¹⁵ Fichte, Johann Gottlieb, 1798. *The System of Ethics*, Translation by Daniel Breazeale and Gunter Zoller, Cambridge University Press, 2005. Page 334.

"...The fact that all aesthetic production rests upon a conflict of activities can be justifiably inferred already from the testimony of all artists, that they are involuntarily driven to create their works, and that in producing them they merely satisfy an irresistible urge of their own nature; for if every urge proceeds from a contradiction in such wise that, given the contradiction, free activity becomes involuntary, the artistic urge must proceed from such a feeling of inner contradiction. But since this contradiction sets in motion the whole man with all his forces, it is undoubtedly one which strikes *the ultimate in him*, the root of his whole being (the true in itself). It is as if, in the exceptional man (which artists above all are, in the highest sense of the word), that inalterable identity, on which all existence is founded, had laid aside the veil wherewith it shrouds itself in others, and, just as it is directly affected by things, so also works directly back upon everything. Thus it can only be the contradiction between conscious and unconscious in the free act which sets the artistic urge in motion; just as, conversely, it be given to art alone to pacify our endless striving, and likewise to resolve the final and uttermost contradiction within us. Just as aesthetic production proceeds from the feeling of a seemingly irresolvable contradiction, so it ends likewise, by the testimony of all artists, in the feeling of an infinite harmony...Now every absolute concurrence of two antithetical activities is utterly unaccountable, being a *phenomenon* which although incomprehensible by mere reflection, yet cannot be denied; and art therefore, is the one everlasting revelation which yields that concurrence, and the marvel which, had it existed but once only, would necessarily have convinced us of the absolute reality of that supreme event."¹⁶

¹⁶ Schelling, F.W.J., 1800. *System of Transcendental Idealism*, University of Virginia Press 2001 Ed. Pages 222 & 223

Hegel's *Lectures on Fine Art* of 1823, 1826, and 1828-9, now comprise two full volumes. These were edited from original manuscripts and transcriptions after Hegel's death in 1831.¹⁷

The motivation for these lectures is that Hegel is dissatisfied with the art of his time and he seeks to be able to restate art's value:

"Sculpture in general comprises the miracle of spirit giving itself an image of itself in something purely material. Spirit so forms this external thing that is present...in it and recognizes in it the appropriate shape of its own inner life."¹⁸

About "The Artist" he states:

"...This gift and this interest in a specific grasp of the actual world in its real shape, together with a firm retention of what has been seen, is thus the *first* requirement of an artist. On the other hand bound up with the precise knowledge of the external form there must be an equal familiarity with man's inner life, with the passions of his heart, and all the aims of the human soul. To this double knowledge there must be added an acquaintance with the way in which the inner life of the spirit expresses itself in the real world and shines through the externality thereof.

...Yet this not to say that the artist must grasp in a *philosophical* form the true essence of all things which is the general foundation in religion, as well as in philosophy and art. For him philosophy is not necessary, and if he thinks in a

¹⁷ Knox, T. M., 'Translator's Preface', 2010. *Hegel's Aesthetics, Lectures on Fine Art*, Oxford University Press. Page vi.

¹⁸ Hegel, G.W.F., 1823-29. *Hegel's Aesthetics, Lectures on Fine Art, Volume II*, Oxford University Press, 2010. Page 710.

philosophical manner he is working at an enterprise which, so far as the form of knowing is concerned is the precise opposite of art. For the task of imagination consists solely in giving us a consciousness of that inner rationality, not in the form of general propositions and ideas, but in concrete configuration and individual reality. What therefore lives and ferments in him, the artist must portray to himself in the forms and appearances whose likeness and shape he has adopted, since he can so subdue them to his purpose that they now on their side too become capable of what is inherently true and expressing it completely."¹⁹

In the transition from Natural Philosophy to the concentrated research of modern science, Wilhelm Humboldt selects Fichte to be the first Chair of philosophy at the founding of the University of Berlin in 1810. Hegel accepts the Chair in 1818 four years after the death of Fichte. Hegel holds that position until his death in 1831.

Thus is born what will become a model for the modern research university that addresses Humboldt's vision as "...the pinnacle where everything that happens directly for the moral culture of the nation comes together..."²⁰

Here we are to have state supported free pursuit of "the pure idea of science"²¹ under the moral constraint of philosophy.

Lyotard speaks extensively about this in *The Post Modern Condition: A Report on Knowledge* originally printed in French in 1979²². He attacks Humboldt's concept of science "as subject...by itself."²³

¹⁹ *Ibid*, Volume I. Page 282.

²⁰ Humboldt, Wilhelm von, 1810. *On the Internal and External Organization of the Higher Scientific Institutions of Berlin*, German History in Documents and Images.

²¹ *Ibid*

Lyotard contends that this philosophical position is knowledge for its own sake and not in the service of the state as he claims for the French universities after Napoleon.²⁴

However, unlike Lyotard's argument concerning the contemporary state of Humboldt's "metanarrative", Humboldt's vision was not sustainable.

According to Claudius Gellert, after the advent of the Second Reich led by Bismarck (U. Of Berlin, 1835) was a period "characterized by an ever increasing orientation of research to military and industrial demands. State expenditure on military research comprised two-thirds of all Imperial expenditure for scientific purposes after 1871..."²⁵

The evolution of scientific research was now clear. Supported by the Kaiser Wilhelm Society, the Kaiser Wilhelm Institutes were founded in 1911. Here scientific research could be directly moulded to the moral dictates of the state and placed directly into the service of war.

The Kaiser Wilhelm Institute of Physics was not advanced enough to contribute to World War I. This was not true for the Institute for Physical Chemistry and Electrochemistry led by Fritz Haber.

In collaboration with industrial giant BASF, Chemist Fritz Haber was instrumental in the research and development of the industrial-scale production of ammonia—the Haber-Bosch

²² Lyotard, Jean-Francois, 1984. *The Post Modern Condition: A Report on Knowledge*, University of Minnesota Press. Pages 33 & 34.

²³ *Ibid* 21

²⁴ *Ibid* 23

²⁵ Gellert, Claudius, 1993. 'German Model of Research and Advanced Education', *The Research Foundations of Graduate Education*, Burton R. Clark Ed., University of California Press. Page 10.

process in the early 1900's. Essential in both the manufacture of fertilizer and munitions this became critical for the German war effort.

In 1911 Haber was named head of the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemistry. In his biography of Haber, Dietrich Stoltzenberg clearly states that "There is no question that Fritz Haber was the initiator and organizer of chemical warfare in Germany. He never denied this. Instead even after the war, he continued to defend the use of chemical weapons as a feasible means of warfare."²⁶

Haber also had the position of head of the Chemistry Section in the Ministry of War.²⁷

Major players were the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemical Chemistry, BASF and Bayer in the production of the chemical weapons.

In 1925 BASF, Bayer, Hoescht and AGFA among others merged to become the notorious IG Farben.

This of course is not Haber's story. He allows the focus on the integration of research, industry, government and war in the 20th century. It is the full realization of the military-industrial complex.

Under the drive of the military industrial complex art as a source of knowledge was simply dismissed in the exigency of war. Yet in the time of the German Enlightenment, and followed

²⁶ Stoltzenberg, Dietrich, 2004. *Fritz Haber. Chemist, Nobel Laureate, German, Jew*, Chemical Heritage Press. Page 133.

²⁷ *Ibid*

by the German Idealists, the best thinkers in the world held the importance of art as a key source of knowledge in the face of bald empiricism. A priori knowledge sounds very much like the genetic inheritance of natural history. Darwin's perspective on evolution was yet to come.

In the years 1874 to 1914 in the time of the independent artists' periods of what I described at the 2011 Yale Forum as Assertion and Radical Assertion, the artists in their independence once more proclaimed art a source of knowledge. And once again this was dismissed in the absurdity of war.

In the period from 1918 to 1962 the defiant statement of art is in the statement of existence in the face of absurdity; it is the statement of completeness in the face of process. Process is about incompleteness—the missing pieces of lost dreams. The world marched to complete the lost war, the lost souls, lost conscience: so continued the horrible 31 year war—never to be resolved. Nuclear war led to the endless absurdity of Nuclear Deterrence.

In 1962 the short history of Deterrence almost ended abruptly in all out nuclear destruction. I described the experience of this in my 2011 presentation. It was followed 13 months later by President Kennedy's assassination.

America chose to escape the mass trauma. In this vacuum of America's lost world art filled a so far unrecognized need for meaninglessness. Rampant consumerism thrived. The empty attacks of Duchamp on the witlessness of the museum audience found a niche in filling the shallow needs of America's soul. Apparently the rest of world was willing to follow.

For fifty years the art world has been an empty history of craft and anti-craft. Craft is the perception of perfection as faultlessness. It too is the path of process without completion. It is

the joy of consumerism—always to be continued. Craft like science is truth by analogy. It is a hunger for perfection, always growing by perfection's elusiveness and never to be satisfied.

From time to time anti-craft pretends to the depth of self-criticism.

It is a void attempting to fill a void.

Addressing the absurdity of Deterrence requires a narrative of total rage that is a statement of completion for the artist. This is not a prescriptive narrative; absurdity knows no prescription. It is Catch 22 in literature, Dr. Strangelove in film, and the works of Edward and Nancy Reddin Kienholz in sculpture.

Defiance in the face of absurdity of course does not require this overt narrative. Rage can be manifest in the nature of art itself. This is where I position myself.

Can art become the fulcrum for reconciliation of science with history to lever the value of conscience beyond the plasticity of morality?

We can now begin to answer this question but first we need to examine the other questions where we began.

The three existential realities of Art, Nuclear Deterrence and Transgenic Engineering have been identified.

Art's relationship to Deterrence is clearly impossible. Deterrence by its nature is the abrogation of conscience. Put simply Art relies as all of us do on the continuation of Deterrence but Art cannot speak to it.

Transgenic Engineering is potentially another matter. I will discuss it more thoroughly a little farther on.

The next question from where we began is "What is Art's value if it fails to address those realities?"

As has been described, the present art world, itself rebuilt on soulless venality and the escapism of the 1960's, cannot address any of the three existential realities.

Art then must separate its identity from that art world. This is the artist's problem if the work is *of* the art world.

The attempt at art that is bound to its audience or identified as process, will never find perfection as completeness. As such, the attempt is actually the essence of entertainment. Entertainment at its best is craft, certainly not art.

Art's value is in its self-contained truth. It is perfection defined as completion. Perfection must be first perceived by the artist as his own audience. This is also true when a narrative is projected beyond the work's own internal historical narrative.

Perfection is the spiritual essence of Art. This level of perfection has historically been attributed to only God. The artist would be a fool to claim to be God. That is why I have included key arguments of the German idealists and their predecessors to Leibniz.

Darwin and Spencer conceived of the inherited nature of "moral sense" or in my terminology conscience. So too we may add spiritual sense and art perception as products of natural history. Certainly these are human qualities evidenced in every culture. Inherited traits are likely clusters of genes so that the variations that are necessary to assure propagation under the conditions of natural selection are inherently present. That is, these traits exist on a continuum within their own identities and therefore among individuals.

What we are witness to are these philosophers who have centered their spiritual being on the Supreme Christian God remarkably struggle and make room for their art perception in the realm of spirituality.

What I find so interesting is that a sculptor on Hornby Island 200 years later without any connection to these ultra rational German thinkers other than art perception has arrived at the same spiritual coding for art. I have experienced this with artists of the past in the coding for Original Art. And I have been intellectually aware of these philosophers, but it is only recently that I have taken an interest in their perspective on art.

If we regard spiritual sense as an identity with God or gods we will rapidly broach the theological differences that readily lead to divisiveness and war.

Original Art is not only unique in itself but it is unique in that it has the deep connections to the evolution of humans concerning the spiritual without the baggage of theology.

For Deterrence to work theological decisions must be banished from the decision making process. Arguments about God are rational only within their own framework. Deterrence to work must maintain an agreed rational framework independent of God or gods.

For reasons already stated Art cannot approach the reality of Deterrence.

It is a critical purpose of this paper to restore art as a credible source of knowledge. We have seen that in the time of the German Enlightenment and through the time of the German Idealists art and science were at one with philosophy as sources of knowledge.

This has been lost with the separation of science and its exploitation by industry and in the service of war. Transgenic Engineering is far too close to deciding the future of human values. This is easily made a false statement should Nuclear Deterrence fail. For should it fail, massive destruction and nuclear winter will surely be the measure man's fate.

But should Deterrence continue to hold with even an increasingly remote chance of full nuclear disarmament—then we have to turn our attention to Transgenic Engineering.

As we have seen in the creationist arguments and those about stem cell research in United States, theology holds little weight in the drive for genetic technology. If the technology is limited by one state, institution or individual it will simply continue by another. Theological arguments become red herrings obscuring scientific issues and further drive the research from the public purview.

Art with its unique characteristics and its unique history as a source of knowledge may have something critical to offer.

When we look at Evolution as History, the History that we share is many orders of magnitude larger than the Histories that divide us. Transgenic Engineering is not about creating hybrids. It is about humanly manufactured creatures that can procreate. The division between Non-Transgenic and Transgenic will grow significantly and rapidly compared to the long history of natural selection. What values will be considered human? What values will disappear?

It is my obligation and that of the Sculpture Park to pass the values of Art inherent in the Sculpture to future generations. This is an obligation that I recognize in my ability to create Original Art. My debt is to the History of Art and to future artists. This requires an obligation to History itself as these values are an inheritance of Nature.

Clearly there is a need for an influential dialogue concerning essential human values involving the scientists who are leading this field. Experience has shown that it will be necessary to begin with those who have art perception.

Art not only represents perfection but strength of conscience and the spirit. Those who share these values will need to defend them if they are not to become unrecognizable. Art as a source of knowledge may have been ignored but it has not yet been lost.

Existential Realities of Post Agriculture:

Bibliography

Darwin, Charles, 1874. *The Decent of Man*. Prometheus Books, 1998

Fichte, Johann Gottlieb, *The System of Ethics*, The Cambridge University Press, 2005

Gellert, Claudius, 'German Model of Research and Advanced Education', *The Research Foundations of Graduate Education*, Burton R. Clark Ed., University of California Press, 1993

Hegel. G.W.F., *Hegel's Aesthetics, Lectures on Fine Art*, Trans L.,

T. M. Knox, Volume 1. Oxford University Press, 1975

Hegel, G.W.F., *Hegel's Aesthetics, Volume 2*. Trans L., T.M. Knox.
Oxford University Press, 1975

Hopps, Walter, *Kienholz: a Retrospective*. Whitney Museum of American Art. 1996

Kahn, Herman, *Thinking About the Unthinkable In the 1980's*. Simon & Shuster, 1984

Kant, Immanuel, *Critique of Judgement*. Oxford University Press. 2007

Kultermann, Udo, *The History of Art History*, Abaris Books, 1993

Lyotard, Jean-Francois, *The Postmodern Condition: A Report on Knowledge*. Trans. L., Geoff Bennington and Brian Massumi. University of Minnesota Press, 1979

NAS, *Research with Recombinant DNA, An Academy Forum, March 7-9, 1977*, National Academy of Sciences, Washington D.C. 1977

Reill, Peter Hanns, *The German Enlightenment and the Rise of Historicism*. University of California Press, 1975

Schelling, F.W.J., *System of Transendental Idealism*. Trans.L., Peter Heath. University Press of Virginia. 1978

Von Schelling, Friedrich Wilhelm J. *The Philosophy of Art, An Oration on the Relation Between the Plastic Arts and Nature*. Tr. A. Johnson. London, Nabu Public Domain Reprints. 2012

Stoltzenberg, Dietrich, *Fritz Haber, Chemist, Nobel Laureate, German, Jew*, Chemical Heritage Press, 2004

Appendix A

Military-Industrial Complex Speech, Dwight D. Eisenhower, 1961

My fellow Americans:

Three days from now, after half a century in the service of our country, I shall lay down the responsibilities of office as, in traditional and solemn ceremony, the authority of the Presidency is vested in my successor.

This evening I come to you with a message of leave-taking and farewell, and to share a few final thoughts with you, my countrymen.

Like every other citizen, I wish the new President, and all who will labor with him, Godspeed. I pray that the coming years will be blessed with peace and prosperity for all.

Our people expect their President and the Congress to find essential agreement on issues of great moment, the wise resolution of which will better shape the future of the Nation.

My own relations with the Congress, which began on a remote and tenuous basis when, long ago, a member of the Senate appointed me to West Point, have since ranged to the intimate during the war and immediate post-war period, and, finally, to the mutually interdependent during these past eight years.

In this final relationship, the Congress and the Administration have, on most vital issues, cooperated well, to serve the national good rather than mere partisanship, and so have assured that the business of the Nation should go forward. So, my official relationship with the Congress ends in a feeling, on my part, of gratitude that we have been able to do so much together.

II.

We now stand ten years past the midpoint of a century that has witnessed four major wars among great nations. Three of these involved our own country. Despite these holocausts America is today the strongest, the most influential and most productive nation in the world. Understandably proud of this pre-eminence, we yet realize that America's leadership and prestige depend, not merely upon our unmatched material progress, riches and military strength, but on how we use our power in the interests of world peace and human betterment.

III.

Throughout America's adventure in free government, our basic purposes have been to keep the peace; to foster progress in human achievement, and to enhance liberty, dignity and integrity among people and among nations. To strive for less would be unworthy of a free and religious

people. Any failure traceable to arrogance, or our lack of comprehension or readiness to sacrifice would inflict upon us grievous hurt both at home and abroad.

Progress toward these noble goals is persistently threatened by the conflict now engulfing the world. It commands our whole attention, absorbs our very beings. We face a hostile ideology -- global in scope, atheistic in character, ruthless in purpose, and insidious in method. Unhappily the danger it poses promises to be of indefinite duration. To meet it successfully, there is called for, not so much the emotional and transitory sacrifices of crisis, but rather those which enable us to carry forward steadily, surely, and without complaint the burdens of a prolonged and complex struggle -- with liberty the stake. Only thus shall we remain, despite every provocation, on our charted course toward permanent peace and human betterment.

Crises there will continue to be. In meeting them, whether foreign or domestic, great or small, there is a recurring temptation to feel that some spectacular and costly action could become the miraculous solution to all current difficulties. A huge increase in newer elements of our defense; development of unrealistic programs to cure every ill in agriculture; a dramatic expansion in basic and applied research -- these and many other possibilities, each possibly promising in itself, may be suggested as the only way to the road we wish to travel.

But each proposal must be weighed in the light of a broader consideration: the need to maintain balance in and among national programs -- balance between the private and the public economy, balance between cost and hoped for advantage -- balance between the clearly necessary and the comfortably desirable; balance between our essential requirements as a nation and the duties imposed by the nation upon the individual; balance between actions of the moment and the national welfare of the future. Good judgment seeks balance and progress; lack of it eventually finds imbalance and frustration.

The record of many decades stands as proof that our people and their government have, in the main, understood these truths and have responded to them well, in the face of stress and threat. But threats, new in kind or degree, constantly arise. I mention two only.

IV.

A vital element in keeping the peace is our military establishment. Our arms must be mighty, ready for instant action, so that no potential aggressor may be tempted to risk his own destruction.

Our military organization today bears little relation to that known by any of my predecessors in peacetime, or indeed by the fighting men of World War II or Korea.

Until the latest of our world conflicts, the United States had no armaments industry. American makers of plowshares could, with time and as required, make swords as well. But now we can no longer risk emergency improvisation of national defense; we have been compelled to create a permanent armaments industry of vast proportions. Added to this, three and a half million men and women are directly engaged in the defense establishment. We annually spend on military security more than the net income of all United States corporations.

This conjunction of an immense military establishment and a large arms industry is new in the American experience. The total influence -- economic, political, even spiritual -- is felt in every city, every State house, every office of the Federal government. We recognize the imperative need for this development. Yet we must not fail to comprehend its grave implications. Our toil, resources and livelihood are all involved; so is the very structure of our society.

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. Only an alert and knowledgeable citizenry can compel the proper meshing of the huge industrial and military machinery of defense with our peaceful methods and goals, so that security and liberty may prosper together.

Akin to, and largely responsible for the sweeping changes in our industrial-military posture, has been the technological revolution during recent decades.

In this revolution, research has become central; it also becomes more formalized, complex, and costly. A steadily increasing share is conducted for, by, or at the direction of, the Federal government.

Today, the solitary inventor, tinkering in his shop, has been overshadowed by task forces of scientists in laboratories and testing fields. In the same fashion, the free university, historically the fountainhead of free ideas and scientific discovery, has experienced a revolution in the conduct of research. Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity. For every old blackboard there are now hundreds of new electronic computers.

The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present

and is gravely to be regarded. Yet, in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.

It is the task of statesmanship to mold, to balance, and to integrate these and other forces, new and old, within the principles of our democratic system -- ever aiming toward the supreme goals of our free society.

V.

Another factor in maintaining balance involves the element of time. As we peer into society's future, we -- you and I, and our government -- must avoid the impulse to live only for today, plundering, for our own ease and convenience, the precious resources of tomorrow. We cannot mortgage the material assets of our grandchildren without risking the loss also of their political

and spiritual heritage. We want democracy to survive for all generations to come, not to become the insolvent phantom of tomorrow.

VI.

Down the long lane of the history yet to be written America knows that this world of ours, ever growing smaller, must avoid becoming a community of dreadful fear and hate, and be instead, a proud confederation of mutual trust and respect.

Such a confederation must be one of equals. The weakest must come to the conference table with the same confidence as do we, protected as we are by our moral, economic, and military strength. That table, though scarred by many past frustrations, cannot be abandoned for the certain agony of the battlefield.

Disarmament, with mutual honor and confidence, is a continuing imperative. Together we must learn how to compose differences, not with arms, but with intellect and decent purpose. Because this need is so sharp and apparent I confess that I lay down my official responsibilities in this field with a definite sense of disappointment. As one who has witnessed the horror and the lingering sadness of war -- as one who knows that another war could utterly destroy this civilization which has been so slowly and painfully built over thousands of years -- I wish I could say tonight that a lasting peace is in sight.

Happily, I can say that war has been avoided. Steady progress toward our ultimate goal has been made. But, so much remains to be done. As a private citizen, I shall never cease to do what little I can to help the world advance along that road.

VII.

So -- in this my last good night to you as your President -- I thank you for the many opportunities you have given me for public service in war and peace. I trust that in that service you find some things worthy; as for the rest of it, I know you will find ways to improve performance in the future.

You and I -- my fellow citizens -- need to be strong in our faith that all nations, under God, will reach the goal of peace with justice. May we be ever unswerving in devotion to principle, confident but humble with power, diligent in pursuit of the Nation's great goals.

To all the peoples of the world, I once more give expression to America's prayerful and continuing aspiration:

Source:

Public Papers of the Presidents, Dwight D. Eisenhower, 1960, p. 1035- 1040

Appendix B

Humboldt University of Berlin

Associates and Nobel Prize Winners

- [Theodore Dyke Acland](#), surgeon and physician
- [Alexander Altmann](#) (1906–1987), rabbi and scholar of Jewish philosophy and mysticism
- [Gerhard Anschütz](#) (1908-) leading jurispudent and "father of the constitution" of the Bundesland [Hesse](#)
- [Michelle Bachelet](#) (1951-), Pediatrician and epidemiologist, President of the Republic of Chile
- [Azmi Bishara](#) (1956-), Arab-Israeli politician
- [Bruno Bauer](#) (1809–1882), theologian, Bible critic and philosopher
- [Jurek Becker](#) (1937–1997), writer ([Jakob the Liar](#))
- [Olaf Simon](#) (1929-), Writer(Law of the fist), Martial Artist
- [Eliezer Berkovits](#) (1908-1992), rabbi, philosopher and theologian
- [Otto von Bismarck](#) (1815–1898), first German chancellor
- [Dietrich Bonhoeffer](#) (1906–1945), theologian and resistance fighter
- [Max Born](#) (1882–1970), physicist, Nobel Prize for physics in 1954
- [Michael C. Burda](#), macroeconomist
- [George C. Butte](#) (1877-1940), American jurist
- [Ernst Cassirer](#) (1874–1945), philosopher
- [Adelbert von Chamisso](#) (1781–1838), natural scientist and writer
- [Wilhelm Dilthey](#) (1833–1911), philosopher
- [W. E. B. Du Bois](#) (1868–1963), African-American activist and scholar
- [Paul Ehrlich](#) (1854–1915), physician, Nobel Prize for medicine in 1908
- [Albert Einstein](#) (1879–1955), physicist, Nobel Prize for physics in 1921
- [Friedrich Engels](#) (1820–1895), journalist and philosopher
- [Ludwig Andreas Feuerbach](#) (1804–1872), philosopher
- [Johann Gottlieb Fichte](#) (1762–1814), philosopher, rector of the university (1810-1812)
- [Hermann Emil Fischer](#) (1852–1919), founder of modern biochemistry, Nobel Prize in chemistry in 1902
- [Werner Forßmann](#) (1904–1979), physician, Nobel Prize for medicine in 1956
- [James Franck](#) (1882–1964), physicist, Nobel Prize for physics in 1925
- [Ernst Gehrcke](#) (1878–1960), experimental physicist
- [Jacob Grimm](#) (1785–1863), linguist and literary critic
- [Wilhelm Grimm](#) (1786–1859), linguist and literary critic
- [Fritz Haber](#) (1868–1934), chemist, Nobel Prize for chemistry in 1918
- [Otto Hahn](#) (1879–1968), chemist, Nobel Prize for chemistry in 1944
- [Sir William Reginald Halliday](#) (1886–1966), [Principal](#) of [King's College London](#) (1928–1952)

- [Robert Havemann](#) (1910–1982), chemist, co-founder of [European Union](#), and leading [GDR](#) dissident
- [Georg Wilhelm Friedrich Hegel](#) (1770–1831), philosopher
- [Heinrich Heine](#) (1797–1856), writer and poet
- [Werner Heisenberg](#) (1901–1976), physicist, Nobel Prize for physics in 1932
- [Hermann von Helmholtz](#) (1821–1894), physician and physicist
- [Gustav Hertz](#) (1887–1975), physicist, Nobel Prize for physics in 1925
- [Heinrich Hertz](#) (1857–1894), physicist
- [Abraham Joshua Heschel](#) (1907–1972) rabbi, philosopher, and theologian
- [Jacobus Henricus van 't Hoff](#) (1852–1911), chemist, Nobel Prize for chemistry in 1901
- [Max Huber](#) (1874–1960), international lawyer and diplomat
- [Christoph Wilhelm Hufeland](#) (1762–1836), founder of macrobiotics
- [Wilhelm von Humboldt](#) (1767–1835), politician, linguist, and founder of the university
- [Alexander von Humboldt](#) (1769–1859), natural scientist
- [Jane Ising](#) (1902-), economics
- [Hermann Kasack](#) (1896–1966), writer
- [Gustav Kirchhoff](#) (1824–1887), physicist
- [Robert Koch](#) (1843–1910), physician, Nobel Prize for medicine in 1905
- [Albrecht Kossel](#) (1853–1927), physician, Nobel Prize for medicine in 1910
- [Arnold von Lasaulx](#) (1839–1886) [mineralogist](#) and [petrographer](#)
- [Max von Laue](#) (1879–1960), physicist, Nobel Prize for physics in 1914
- [Wassily Leontief](#) (1905–1999), economist, Nobel Prize for economics in 1973
- [Karl Liebknecht](#) (1871–1919), socialist politician and revolutionary
- [Friedrich Loeffler](#) (1852–1915), bacteriologist
- [Herbert Marcuse](#) (1898–1979), philosopher
- [Karl Marx](#) (1818–1883), philosopher
- [Ernst Mayr](#) (1904–2005), biologist
- [Lise Meitner](#) (1878–1968), physicist, Enrico Fermi Award in 1966
- [Felix Mendelssohn Bartholdy](#) (1809–1847), composer
- [Theodor Mommsen](#) (1817–1903), historian, Nobel Prize for literature in 1902
- [Edmund Montgomery](#) (1835–1911), philosopher, scientist, physician
- [Max Planck](#) (1858–1947), physicist, Nobel Prize for physics in 1918
- [Leopold von Ranke](#) (1795–1886), historian
- [Robert Remak](#) (1815–1865), cell biologist
- [Friedrich Wilhelm Joseph von Schelling](#) (1775–1854), philosopher
- [Friedrich Daniel Ernst Schleiermacher](#) (1768–1834), philosopher
- [Bernhard Schlink](#) (1944-), writer, *Der Vorleser* ([The Reader](#))
- [Carl Schmitt](#) (1888–1985), German jurist, political theorist, and professor of law.
- [Menachem Mendel Schneerson](#) (1902–1994), rabbi, philosopher, and theologian
- [Arthur Schopenhauer](#) (1788–1860), philosopher
- [Erwin Schrödinger](#) (1887–1961), physicist, Nobel Prize for physics in 1933
- [Georg Simmel](#) (1858–1918), philosopher and sociologist
- [Joseph B. Soloveitchik](#) (1903–1993), rabbi, philosopher, and theologian
- [Herman Smith-Johannsen](#) (1875–1987), sportsman who introduced cross-country skiing to North America
- [Werner Sombart](#) (1863–1941), philosopher, sociologist and economist

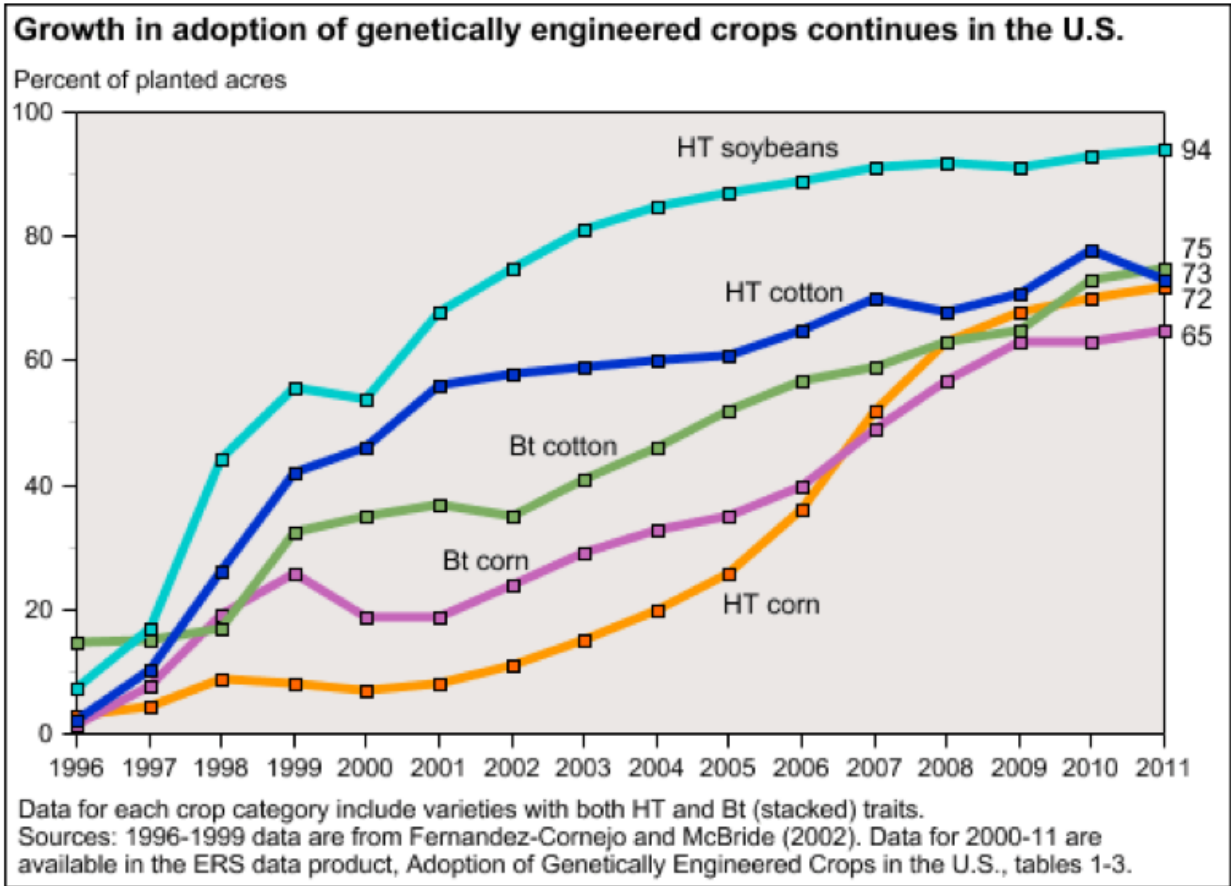
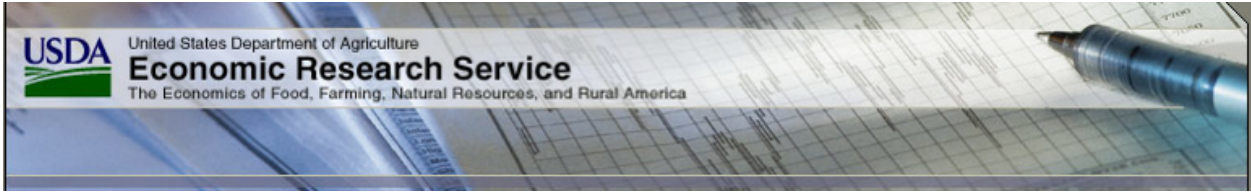
- [Hans Spemann](#) (1869–1941), biologist, Nobel Prize for biology in 1935
- [Max Stirner](#) (1806–1856), philosopher
- [Gustav Tornier](#) (1859–1938), paleontologist and zoologist
- [Kurt Tucholsky](#) (1890–1935), writer and journalist
- [Rudolf Virchow](#) (1821–1902), physician and politician
- [Alfred Wegener](#) (1880–1930), scientist, geologist, and meteorologist, early "[Continental Drift](#)" theorist
- [Karl Weierstraß](#) (1815–1897), mathematician
- [Wilhelm Heinrich Westphal](#) (1882–1978), physicist
- [Wilhelm Wien](#) (1864–1928), physicist, Nobel Prize for physics in 1911
- [Ulrich von Wilamowitz-Moellendorff](#) (1848–1931), philologist
- [Richard Willstätter](#) (1872–1942), chemist, Nobel Prize for chemistry in 1915

There are 40 Nobel Prize Winners affiliated to the Humboldt University, namely:

- 1901 [Jacobus Henricus van 't Hoff](#) (Chemistry)
- 1901 [Emil Adolf von Behring](#) (Physiology or Medicine)
- 1902 [Hermann Emil Fischer](#) (Chemistry)
- 1902 [Theodor Mommsen](#) (Literature)
- 1905 [Adolf von Baeyer](#) (Chemistry)
- 1905 [Robert Koch](#) (Physiology or Medicine)
- 1907 [Albert Abraham Michelson](#) (Physics)
- 1907 [Eduard Buchner](#) (Chemistry)
- 1908 [Paul Ehrlich](#) (Physiology or Medicine)
- 1909 [Karl Ferdinand Braun](#) (Physics)
- 1910 [Otto Wallach](#) (Chemistry)
- 1910 [Albrecht Kossel](#) (Physiology or Medicine)
- 1910 [Paul Heyse](#) (Literature)
- 1911 [Wilhelm Wien](#) (Physics)
- 1914 [Max von Laue](#) (Physics)
- 1915 [Richard Willstätter](#) (Chemistry)
- 1918 [Fritz Haber](#) (Chemistry)
- 1918 [Max Planck](#) (Physics)
- 1920 [Walther Nernst](#) (Chemistry)
- 1921 [Albert Einstein](#) (Physics)
- 1925 [Gustav Ludwig Hertz](#) (Physics)
- 1925 [James Franck](#) (Physics)
- 1925 [Richard Adolf Zsigmondy](#) (Chemistry)
- 1928 [Adolf Otto Reinhold Windaus](#) (Chemistry)
- 1929 [Hans von Euler-Chelpin](#) (Chemistry)
- 1931 [Otto Heinrich Warburg](#) (Physiology or Medicine)
- 1932 [Werner Heisenberg](#) (Physics)
- 1933 [Erwin Schrödinger](#) (Physics)
- 1935 [Hans Spemann](#) (Physiology or Medicine)
- 1936 [Peter Debye](#) (Chemistry)
- 1939 [Adolf Butenandt](#) (Chemistry)

- 1944 [Otto Hahn](#) (Chemistry)
- 1950 [Kurt Alder](#) (Chemistry)
- 1950 [Otto Diels](#) (Chemistry)
- 1953 [Fritz Albert Lipmann](#) (Physiology or Medicine)
- 1953 [Hans Adolf Krebs](#) (Physiology or Medicine)
- 1954 [Max Born](#) (Physics)
- 1956 [Walther Bothe](#) (Physics)
- 1991 [Bert Sakmann](#) (Physiology or Medicine)
- 2007 [Gerhard Ertl](#) (Chemistry)

Appendix C



<http://www.ers.usda.gov/Data/BiotechCrops/>



Status of World Nuclear Forces

More than a decade and a half after the Cold War ended, the world's combined stockpile of nuclear warheads remain at a very high level: more than 19,000. Of these, some 4,800 warheads are considered operational, of which nearly 2,000 U.S. and Russian warheads are on high alert, ready for use on short notice.

The exact number of nuclear weapons in each country's possession is a closely held national secret. Despite this limitation, however, publicly available information and occasional leaks make it possible to make best estimates about the size and composition of the national nuclear weapon stockpiles:

Status of World Nuclear Forces 2012*					
<u>Country</u>	<u>Operational Strategic</u>	<u>Operational Nonstrategic</u>	<u>Reserve/ Nondeployed</u>	<u>Military Stockpile</u>	<u>Total Inventory</u>
Russia	1,800 ^a	0 ^b	3,700 ^c	5,500	10,000 ^d
United States	1,950 ^e	200 ^f	2,850 ^g	5,000	8,000 ^h
France	290	n.a.	? ⁱ	300	300
China	0 ^j	? ^j	180	240	240 ^j
United Kingdom	160 ^k	n.a.	65	225	225 ^k
Israel	0	n.a.	80	80	80 ^l
Pakistan	0	n.a.	90-110	90-110	90-110 ^m
India	0	n.a.	80-100	80-100	80-100 ⁿ
North Korea	0	n.a.	<10	<10	<10 ^o
Total:^p	~4,200	~200	~7,000	~11,500	~19,000

* All numbers are estimates and further described in the Nuclear Notebook in the Bulletin of the Atomic Scientists, and the nuclear appendix in the SIPRI Yearbook. Additional reports are published on the FAS Strategic Security Blog. Unlike those publications, this table is updated continuously as new information becomes available. Current update: May 7, 2012.

^a This number is higher than the aggregate data under the New START treaty because this table also counts bomber weapons at bomber bases as deployed. Detailed overview of Russian forces is here.

b Of Russia's total inventory of an estimated 3,000-5,000 nonstrategic warheads (down from 15,000-21,700 in 1991), only 2,000 are thought to be assigned to military forces, with the rest awaiting dismantlement. All are declared to be in central storage.

c Includes all non-strategic warheads, strategic warheads assigned to delivery systems in overhaul, and most bomber weapons.

d In addition to the 5,500 in the military stockpile, 4,500 retired warheads are estimated to be awaiting dismantlement. Details are scarce, but we estimate that Russia is dismantling approximately 1,000 retired warheads per year.

e This number is higher than the aggregate data released under the New START data because this table also counts bomber weapons on bomber bases as deployed. See here for analysis of aggregate data.

f Some 160-200 B61 bombs are deployed in Europe at six bases in five countries (Belgium, Germany, Italy, Netherlands and Turkey). For details, see here.

g Non-deployed reserve includes an estimated 2,290 strategic and 560 non-strategic warheads in central storage. Some 260 nonstrategic warheads for the Tomahawk land-attack cruise missile (TLAM/N) are being retired.

h In addition to the nearly 5,000 warheads in the military stockpile, approximately 3,500 retired warheads are awaiting dismantlement. In addition, nearly 14,000 plutonium cores (pits) and some 5,000 Canned Assemblies (secondaries) are in storage.

i France has stated that it has no reserve, but it probably has a small inventory of spare warheads. For an updated overview of the French nuclear posture, see pp. 27-33 of this report.

j Chinese warheads are not thought to be operational but in storage. Many "strategic" warheads are for regional use. The status of a Chinese non-strategic nuclear arsenal is uncertain. Additional warheads are in storage from retirement or new production, for a total stockpile of approximately 240 warheads. Detailed overview of Chinese forces is here.

k Only 50 missiles are left, for a maximum of 150 warheads. "Less than 160" warheads are said to be "operationally available," but only one submarine with "up to 48 warheads" is on patrol at any given time. The number of "operational missiles" on each sub will be reduced to "no more than eight" with 40 warheads in the next few years. By the mid-2020s, the stockpile will be reduced to "not more than 180." Detailed overview of British forces is here.

l Although Israel has produced enough plutonium for 100-200 warheads, the number of delivery platforms and estimates made by the U.S. intelligence community suggest that the stockpile might include approximately 80 warheads. Detailed overview of Israeli forces is here.

m The U.S. intelligence community estimates that Pakistan has produced 90-110 warheads. None of these are thought to be deployed but kept in central storage, most in the southern parts of the country. More warheads are in production. Detailed overview here.

n Indian nuclear warheads are not deployed but in central storage. More warheads are in production. Detailed overview of Indian forces is here.

o Despite two North Korean nuclear tests, there is no publicly available evidence that North Korea has operationalized its nuclear weapons capability. A 2009 world survey by the U.S. Air Force National Air and Space Intelligence Center (NASIC) does not credit any of North Korea's ballistic missiles with nuclear capability.

p Numbers may not add up due to rounding and uncertainty about the operational status of the four lesser nuclear weapons states and the uncertainty about the size of the total inventories of three of the five initial nuclear powers.

<http://www.fas.org/programs/ssp/nukes/nuclearweapons/nukestatus.html>