

The Atom in the New World Order:
The Changing Role of Nuclear Weapons and Nuclear Power

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This is such a beautiful area. I grew up in Pennsylvania but never realized how beautiful it was until I moved away. It's that way with a lot of things: it's hard to be objective observer when your immersed in a place or time.

It's that way with recent history. It's cliché to say that the world has changed fundamentally, that we've entered a "new world order." But we have: between 1989 and 1991, fall of Berlin wall and breakup of the USSR, the world has changed dramatically, a change as significant as the end of WW-II. No matter what happens in the next decade or two, we will remember this period as a turning point in humanity's journey.

We may now have enough distance to begin to reflect on this change and ask "what/where are we journeying to?" This evening, I would like to focus on one aspect of this journey: things nuclear. Reflect on our changing attitude toward nuclear weapons and nuclear power: an ambivalent relationship, evoking deep feelings of hatred from some, respect—even reverence—from others.

Since the early 1900s, scientists knew that tremendous amounts of energy were stored in the nuclei of atoms, but few imagined that there would ever be any practical way to release this energy. There was speculation: novel by H.G. Wells.

A remarkable article appeared in Scientific American just after turn of century; author describes the amount of energy—millions of times that released in chemical reactions; he goes on to say that this energy probably will never be released, but that, if it is, whether this will be good or bad will depend on the moral development of humanity at that time.

That time came much sooner than the author could have imagined, and at one of the worst moments in the moral development of the species: on the eve of WW-II. The neutron—a particle which, because it lacks electrical charge, could enter the positively-charged nucleus and split it—was discovered four months before Hitler assumed dictatorial powers in Germany. The splitting of uranium by neutrons, and the accompanying release of nuclear energy, was discovered just two months before Hitler invaded Czechoslovakia, which started WW-II.

What a coincidence! Physicists, off in their own world, making their most significant discovery—in terms of its potential impact on humanity—at such a dark moment in history.

Imagine that you were alive in Europe in 1939. You would have lived through the most senselessly destructive war in history, in which 20 million people were killed. Now another war is breaking out, a war that would kill another 30 million people. Imagine that someone told you a bomb powerful enough to destroy whole cities would be invented during the war. What would you have guessed would happen?

Now suppose that the same person told you that only two such bombs would be used during the war, and that none would be used thereafter, even though two implacable rivals—the US and the USSR—would build 50,000 of them, and a dozen other countries would build or try to build thousands more.

Unbelievable, right? And yet that is exactly what happened.

The period we are living in—the period since WW-II—is the longest period of peace in 400 years, the longest peace since the emergence of the modern nation-state in Europe. It sometimes doesn't seem very peaceful; millions of people have died in hundreds of conflicts around the world.

What is unique, however, is the complete absence of war between great powers. This didn't happen because the great powers saw eye-to-eye, either; rather, for most of the period we witnessed a bitter ideological struggle between the superpowers. This “cold war,” as it became known, threatened to boil into a hot war over crises in Korea, Berlin, Taiwan, Cuba, and the Middle East. Proxy wars were fought in Asia, Africa, and Central America, but the superpowers never came directly to blows, and neither did any other great power.

What was responsible for this long peace? Most people believe that nuclear weapons were responsible. Nuclear weapons, as demonstrated so vividly in Hiroshima and Nagasaki, put unprecedented destructive power in human hands—hands that had (metaphorically speaking) so recently killed 50 million souls. But that great destructive potential greatly sobered our political leaders. They realized that, no matter what they did, no matter what defensive preparation they made or clever strategies they devised, they could not prevent the complete destruction of their society—of civilization. The only antidote to destruction was to tolerate the existence of their enemy—which they did, thank God.

Thus the Cold War resulted in a long peace, but a cold peace—but at a terrible price. The U.S. alone spent 4 trillion of dollars building up its forces, the whole world lived in fear of instant destruction, and the peoples of the Soviet Union and Eastern Europe were deprived of basic civil liberties.

The Cold War is over. When President Clinton and President Yeltsin met two weeks ago, U.S.–Russian relations were at an all-time high, with the two leaders talking about building a lasting partnership, in which the two countries would work together to keep the peace and expand democracy throughout the world.

The Cold War may be over, but its nuclear legacy is still with us. Even after all the arms control agreements that have been signed are fully implemented—a process that will take nearly a decade, by the way—the two countries will still have about 10,000 weapons between them. England, France, and China together have another thousand or so, and Israel, India, and Pakistan add a few hundred to the total.

What should we do about all these nuclear weapons? This question is made all the more urgent by the economic chaos and breakdown of civil authority in Russia, which raises the real possibility that nuclear weapons or weapon materials will be stolen or sold on the black market, the so-called “loose nukes” problem. Already we know that small amounts of bomb-grade

plutonium and uranium have been smuggled out of Russia—amounts far too small for a bomb, but worrisome nonetheless.

And Russia isn't the only area of concern. I have already mentioned India and Pakistan, who now stand on the brink of a nuclear arms race. Both are able to build nuclear weapons, but until now, neither appears to have stockpiled them. Within the next few years, both countries will be capable of putting nuclear-tipped missiles on alert, which would greatly increase the chance that a border skirmish could escalate into a nuclear war.

And we must not forget the North Koreans, who have enough plutonium for a bomb, and the capability to produce much, much more. This prospect is especially worrisome given North Korea's propensity to sell missiles to renegade countries such as Iran, Syria, and Libya. And if North Korea goes nuclear, how long will it be before South Korea, Taiwan, and even Japan follow suit?

There are no easy answers, no ready solutions to these problems. Of course we should work to tailor policies for each of the situations: to work with Russia to accelerate the destruction of its weapons and to improve the security of those that remain; to foster arms control and disarmament in South Asia, and to persuade North Korea to give up its bomb program. But as vital as regional strategies are, they won't be enough.

We must begin at home, with our own attitudes. We no longer need to nuclear weapons to deter a Soviet invasion, but our continued adherence to Cold War thinking undermines our ability to deal with the new nuclear threat.

A perfect example is the Clinton administration Nuclear Posture Review, which was released three weeks ago. This so-called review, which I would call "Cold War Lite," advocated basically the same force structure, counterforce targeting, and declaratory doctrine as the Bush and Reagan administrations. The world has changed dramatically, but we cling to old ways of thinking.

What can be done? In the short term, we must do everything we can to further delegitimize nuclear weapons as instruments of national power. The U.S. should make a binding pledge that it will never use nuclear weapons against nonnuclear countries, and that it will never use nuclear weapons first against countries that do have them. After all, if the United States—the most powerful country on earth—can't forswear the use of nuclear weapons against countries that don't have them, then what message does that send about the utility of such weapons? Yet the Clinton administration has refused to do this.

In addition, we should abandon counterforce targeting, eliminate the option of launching missiles on warning of attack, lower the alert status of our forces, and encourage Russia to do the same. We should open our nuclear facilities to Russian inspectors, in order to gain similar access to Russian facilities and thereby respond to the "loose nukes" problem. These moves would indicate a clear break with the past, and a commitment to delegitimize nuclear weapons.

But I don't want to talk only about short-term policy prescriptions. These are important, but I want to get us thinking about bigger, longer-term issues. Should we, for example, try to abolish nuclear weapons? This question would have seemed foolish just a few years ago, but I think its time to begin serious consideration of such a proposal.

A case can be made that the U.S. would be better off today if nuclear weapons didn't exist. In fact, former Secretary of Defense Les Aspin said that, if we could disinvent nuclear weapons, we would. But we can't disinvent the nuclear weapons. Even if we managed to eliminate all the weapons, the knowledge of how to build them would remain. (We could, I suppose, get rid of all the physicists, but I wouldn't be in favor of that.)

We could, however, do for nuclear weapons what we have already done for chemical and biological weapons—to make their possession illegal. This would make it easier to institute and enforce denuclearization elsewhere (South Asia, Korea), and would avoid the threat of “loose nukes” when a nuclear nation falls apart.

Many people, maybe most people, believe that nuclear weapons are obsolete, a relic of the Cold War. This belief is so strong that its hard to get people to focus on the problems that remain.

During the Cold War, nuclear weapons helped prevent another world war by making the consequences of war so terrible, so surely terrible for the victor as well as the vanquished that no country dared start a war. Have we, as a civilization, outgrown our need for nuclear weapons? Have the spread of democracy and liberal economic structures made the possibility of another world war so unlikely that we no longer need the threat of instant annihilation to deter the start of one?

Some believe so, and I wish I could believe it, too. Global conflict seems remote now, but will it always seem so remote? Is democracy and economics strong enough, especially in the East, to keep it remote? I don't know. I am reminded of confident statements made by European political leaders in 1917 that a war in Europe could not happen, because it would destroy the prosperity that global trade made possible. I am also reminded, more recently, of the wars in Yugoslavia, where people who lived as one nation for 45—really 70—years have turned on each other—in many cases, on their own in-laws.

Maybe it isn't time, just yet, to get rid of nuclear weapons; maybe we should keep them around a bit longer, until we are more sure of the results of change in Russia and China. But that doesn't mean we can't move now to make their use more unthinkable while we hold these weapons in a sort of sacred trust for humanity. In 10 or 20 years, perhaps we can move to internationalize this trust—to remove nuclear weapons and the ability to use them from nation states altogether.

This is, after all, what the U.S. proposed to do in 1946. Under the so-called “Baruch Plan,” which was developed by the Truman administration and presented to the UN in that year, all nuclear weapons, facilities and materials would be placed under international control and inspection. Of course, the Soviet Union—which did not then have nuclear weapons but was racing to get them—didn't agree to the Plan, and a historic opportunity to eliminate the spread of nuclear weapons was lost. As we enter the 21st century, perhaps its time to begin the conversation again.

While protecting against the development of nuclear weapons, the Baruch Plan envisioned fostering the development of the peaceful uses of the atom under international auspices. I would also like to explore with you tonight our changing attitudes toward nuclear power as well as nuclear weapons.

Soon after the end of World War II, many of the scientists who had worked on the atomic bomb devoted themselves to harnessing this new force for the good of humanity—in basic science, medicine, and especially for the production of electricity. For some scientists, this was their way for atoning for their role in the bombing of Hiroshima and Nagasaki.

With massive government support (massive by pre-WW-II standards), rapid progress was made. In those days, no distinction was made between military and civilian uses of nuclear energy—nuclear research was secret. Indeed, the common type of nuclear reactor—the light-water reactor—was adapted from the design of reactors developed for Navy's nuclear submarines.

And there was a good reason for keeping all nuclear research secret: the very same knowledge and skills that are required to build reactors as very useful in building bombs, as well. There is no nice, clean separation between peaceful and military uses; folks who are able to build reactors will be able to build bombs.

In the late 1950s, the Eisenhower administration changed this reasoning. In large part to deal with the clamor around the world for nuclear disarmament—a movement that was fueled by fallout from above-ground nuclear tests, and by the stream of U.S.-Soviet crises that threatened nuclear war—Eisenhower launched the “Atoms for Peace” program.

Instead of simply denying access to all nuclear technology, “Atoms for Peace” sought to dissuade countries from building nuclear bombs through a sort of constructive engagement: if you forswear the development of nuclear weapons, you will be provided with peaceful nuclear technology. Thus, the International Atomic Energy Agency was born with two missions: to promote the peaceful uses of the atom, and to verify that countries were using nuclear materials only for peaceful purposes.

This bargain—forswearing the bomb in exchange for nuclear reactors—was the basis for the Nonproliferation Treaty, which was signed in 1968.

By some standards, our nuclear nonproliferation efforts have been widely successful. President Kennedy feared that there would be 15 or 20 nuclear-armed countries by now, and there are only half that number. Most importantly, the countries we were most worried about in the 1960s—Germany and Japan—did not go nuclear.

But others question whether the basic deal in the NPT was a good one. As a result of the Atoms for Peace program and a similar Russian program, research reactors and other nuclear facilities spread rapidly throughout the world. The overwhelming majority of these were used only for peaceful purposes, but in some countries—India, Israel, Iraq, and North Korea—research reactors were used to launch nuclear weapons programs.

The connection between bombs and reactors is so strong, in fact, that for this reason alone many people oppose the expansion of the nuclear industry, especially into developing countries. Although we don't advertise the fact, the U.S. has selectively reneged on the reactors-for-bombs bargain: in the case of Iran, for example, which is fully inspected by the IAEA,

Of course, nuclear power has had other problems. Three Mile Island and the Chernobyl disaster have highlighted the dangers of poorly designed and operated reactors, and the U.S. has been unable to make political decisions about the disposal of nuclear wastes. Although nuclear power continues a slow expansion in other parts of the world, nuclear power is dead in the U.S. and several other industrialized countries.

Were it not for another consideration, this might be the end of the story. That other consideration is global warming. Today, 85% of the world's energy is supplied by fossil fuels: oil, natural gas, and coal. When fossil fuels are burning, carbon dioxide is emitted. There is no way to prevent these emissions; no clean-up technology exists.

Carbon dioxide is a greenhouse gas, which means that it traps heat energy on its way from the warm Earth into space, much as a greenhouse traps heat, or a blanket traps the warmth of a sleeping person. The carbon dioxide that we emit when we burn fossil fuels is like adding an extra blanket to the Earth's atmosphere.

The best estimates are that, if we keep burning fossil fuels at the current rate, and irreversible and potentially catastrophic warming of the Earth's atmosphere will result in as little as 50 years. The best estimates of the warming—several degrees Centigrade—don't seem very impressive until you note that during the ice age, in which the area you are now sitting in was covered with a thick layer of ice, the Earth was only several degrees cooler than at present.

Over the last few million years, climate change occurred slowly enough so that natural systems could adapt. But a warming of just a few degrees in a century could lead to rapid and widespread disruptions in the natural systems upon which human well-being depends. The resulting changes in temperature and rainfall patterns could have disastrous consequences for modern agriculture.