The Second Nuclear Age: How Much has Changed, How Much Remains the Same?

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Introduction

The second nuclear age is a loose term coined to describe events of the last ten years that involve the spread and possible use of nuclear weapons. In this paper we will use the term more precisely in order to explore the issue of the ways the current environment is structurally different from the Soviet-American cold war competition, the first nuclear age. At one level the purpose of this paper is analytical: to describe how much has changed when it comes to the spread and possible use of these weapons, how the second nuclear age differs from the first.

But there is another purpose that is important to get on the table at the outset because it answers the question of what difference the distinctions raised in this paper make. In focusing on how much has changed we are dealing with transformation in the structure of military world power. Periods of transformation pose grave threats to incumbent powers, and major opportunities for new powers. Established powers risk being unseated, perhaps not to be replaced but to have their strengths curtailed in important ways. At the same time, periods of transformation provide the impetus for new powers to take advantage of the changes to increase their own position.

Most major shifts in international position come at times of such transformation, not from better or worse mastery of a stable structure.[1] The really key point in thinking about how the second nuclear age differs from the first is that by looking

[1] A similar argument is advanced in political science. For one form of it see Karen A. Rasler and William R. Thompson, War and State Making (Boston: Unwin Hyman Inc., 1989).

at structural changes we will better understand the reaction dynamics that it has already sparked.

At the present moment we are seeing these reaction dynamics enfold, and I do not think they can be fully understood, or defined in policy terms, without considering how much the second nuclear age differs from the first. The United States, for example, does not imagine Iraq -- or North Korea or Iran -- to be another Soviet Union about to embark on a world revolution using the threat of nuclear weapons to back up its cause. Rather, it sees these small weak countries exploiting the circumstances of a breakdown of a once solid structure of non-proliferation of nuclear weapons that was established in the late 1960s.

The non-proliferation regime worked longer than any of us had a right to believe it would. I can remember many times hearing prominent figures in the field say that the non-proliferation treaty (1970) would buy us five years, or ten if we were lucky. In fact, it bought nearly thirty years. Compared to most government actions, this isn't bad.

But by the 1990s the NPT and the entire non-proliferation regime was wearing thin. The detonation of Indian and Pakistani bombs in 1998 was a marker -- what William James would have called a 'coercive fact' -- that it was broken. This regime was in an advanced state of atrophy. The addition of nuclear programs in Iraq, North Korea, and Iran added to the stress and contradiction of the non-proliferation structure.

The point of going over this well known ground is to make the case that what we are now seeing in the world is a basic transformation whose consequences are so negative that they have forced a counter reaction on the United States. Washington is vigorously using the threat of military force to disarm Iraq because it finds the basic features of the second nuclear age intolerable.

In examining this question further an analogy with industry structure in business will be used. The "industry" in question here is one of the nuclear weapons business, rather than

automobiles or consumer products.[2] In industry structure analysis relatively long lasting factors are considered, such as the number of competitors in the industry, deterrents to entry and exit from the industry, and the bargaining power of suppliers. It should be noted that industry structure analysis is not restricted to situations where market competition predominates. It is useful in markets, but especially in oligopolistic and monopolistic competition. In fact, much of the research in this field is concerned with just these kinds of competition rather than with pure markets. Like any analogy, the comparison between the structure of the nuclear age and business structure can be pushed too far. However, the language of industry structure is used because it reveals many significant insights that are not otherwise developed in more qualitative accounts of the changing structures that follow from the proliferation of weapons of mass destruction.

For example, the nuclear weapons industry is new. It has existed only since 1945, and it started out with a small number of competitors and gradually spread to a larger number as more countries crossed the nuclear threshold. It is very typical of the evolution of industry structure to have few competitors when it begins. For example, the number of computer makers or automobile manufacturers was one or two when these industries started in the 1950s and 1900s respectively. As industries "take off" more competitors join in. The number of competitors increases. Eventually, there is a "shakeout," wherein the industry for any number of reasons cannot sustain a large number of competitors. This has happened in everything from computers to autos. And it may be about to happen in the nuclear weapons field as well.

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[2] This paper concentrates only on nuclear weapons, and not on chemical or biological weapons. In my judgement the structural issues involved are not greatly changed with this focus, but I allow that this could be wrong on further analysis.

The nuclear weapons "industry" has had two basic structures, which we refer to as the *first* and *second* nuclear ages. This is how we make the definitions of the second nuclear age more precise. In the first nuclear age the two superpowers went into the industry full bore. In the second, several other states have gotten the bomb. This fact changes the structure of the industry, just as the auto industry in the United States was changed as Japanese and Korean car producers entered the market, or just as Apple and Dell joined in to make computers.

Periods of structural change, which I argue we are now in, give nations unusual latitude because the old rules do not apply with the same force. Most attention, at the moment, focuses on short range problems associated with the spread of these weapons. But regardless of what happens between the United States and Iraq, or the future of the Comprehensive Test Ban Treaty, we are entering an era where revolutionary changes are increasing in likelihood. Changes in national security, international order, and arms control are likely to be more wide ranging than currently imagined because of these structural changes.

The Second Nuclear Age

The second nuclear age is hard to date precisely.[3] China's 1964 test of the first Asian atomic bomb is one way to mark its beginning. But the West saw the Chinese test as part of the cold war. India's 1974 test was perhaps a better indicator of the start of the second nuclear age.

The second nuclear age may be hard to date precisely, but its key defining feature is the spread of these weapons to countries for reasons that had little or nothing to do with the Soviet-American rivalry of the cold war. The second nuclear age, as it were, is adjoint to the first. It may have arisen from cold war policies of the superpowers, but after that its dynamics had little to do with the cold war. The Israeli program was

shaped by her regional interests. Likewise, the programs in North Korea, Iraq, Iran, and increasingly China may have been initially shaped by cold war politics, but soon took on dynamics, both domestic and international, that had virtually nothing to do with the cold war.

How Much Has Changed?

Before launching into answering this question it is useful to clarify it. Of interest here are the distinctive structural differences between the first and second nuclear ages. The exercise undertaken here may seem excessively academic, but the distinctions are important because we are arguing that since nuclear weapons were first invented two basic "industry structures" have existed, the first and the second. It is important to understand what these are. International politics, arms control, and invasions have been, and are being played out on these structures.

For example, it is often said that problems of command and control are different between the first and second nuclear ages. In fact, just this argument, about command and control has figured as one of the prominent reasons in a debate about why the spread of nuclear weapons is dangerous.[4] But problems of command and control existed during the first nuclear age, as they do now in the second. India, Pakistan, and others confront large problems in controlling their arsenals. They are almost surely worse at it than the United States and the Soviet Union were. The danger can't be discounted that this condition could lead to unintended escalation or accidental nuclear war.

But pointing this out says nothing distinctive about the second nuclear age. Deterrence, command and control, escalation

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[3] This section draws on Paul Bracken, Fire in the East (new York: HarperCollins, 1999), pp. 109-24.
[4] Scott D. Sagan, Kenneth N. Waltz, The Spread of Nuclear Weapons: *A Debate* (New York: W.W. Norton, 1995).

thresholds, and many other variables were important in the first nuclear age, and they are important in the second. They are not structural features, by which is meant the distinctive features that distinguish one era from the other.

What are these distinctive features that most sharply delineate the new industry structure of proliferation in the second nuclear age?

Six features seem to me to characterize the most salient differences in the structure of the second nuclear age compared to the first.

1. An n-player game

The Soviet-American rivalry was a bilateral contest. This is so obvious that the dynamics of competition in "n," or multiple player situations, though widely acknowledged, are not appreciated. The carry through of the conceptual architecture of the first nuclear age to the second is evidenced by the ready reference to non-zero sum games, deterrence, and escalation with little appreciation of the complexity of these concepts when applied to n-players contests.

The emerging strategic landscape in the Middle East is one where these dynamics could be played out. The India-China relationship, with nuclear Pakistan on the side is another example.

It is true than Britain and France possessed nuclear weapons in the first nuclear age. But it is difficult to argue that they made much difference in cold war dynamics. Both superpowers treated the two as if they were almost irrelevant to the central contest.

Game theorists have done a useful service by pointing out the pathological strategic dynamics of n-player games. Martin Shubik, for example, uses a very simple three player game called the "truel" (a three-player duel) wherein three competitors are in direct opposition to each other. The truel could describe countries with missiles aimed at each other. What the players

have to decide is which country to shoot at first. In a two player contest this is simple. The problem completely goes away and the decision is either to shoot at the enemy, or wait and not shoot.

The three player case is much more complicated. What passes for an optimal strategy in the two person contest can be quickly shown to produce utterly irrational and destabilizing behavior in the three person case.[5] For example, "waiting" to fire has a completely different connotation than in the two player case. Waiting in a three-player game has to be seen as a tactic to allow the other two players to finish each other off. The player who waits may then sit out the first round of missile strikes, and use his residual arsenal to finish of the greatly weakened survivors who shot early.

A 'waiting strategy' in a missile exchange was idealized in the conceptual architecture of the first nuclear age by pointing out the reckless dangers of having nuclear forces that created a reciprocal fear of surprise attack. This simple construct had an enormous impact on driving the U.S. and Soviet forces over the decades to secure second strike postures. Its very simplicity contributed to its power of persuasion, overcoming the objections of hawks in both countries that stability questions should be subordinated to pure war fighting purpose. Liberal and conservative American administrations bought the stability argument wholesale, measured by the dollars they spent to achieve it.

But with three players the situation is far more complicated. In fact there are no known satisfactory solutions to the problem that do not take account of communication, trust, and commitment. It can be shown that these factors become decisive is a three player contest, much more so than in a two player game.[6]

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[5] Martin Shubik, Game Theory in the Social Science (Cambridge: MIT Press, 1982), pp. 20-26.
[6] Shubik, p. 24.

Of course, international security is not reducible to the theory of mathematical games. But there are some key points that game theory suggests about the structural differences that follow when a multiple player situation arises. These have not received the attention they deserve.

Strategic calculations become impossibly complex compared to the two player case. It is likely that no country or leader is equipped to approach this decision in a rational way for the simple reason that there is no definition of what it even means to be rational in the multiple player case.

This conclusion follows with perfect command and control, and perfect and information about what one's opponents are doing. Introducing noise, uncertainty, or more players drives up the strategic complexity geometrically.

Notions of strategic stability, bluffing, and war avoidance take on an entirely new and largely unexamined complex character with an n-player contest. Strategic stability is likely to decrease in many cases. Worse, notions of stability and deterrence from the conceptual architecture of the first nuclear age are likely to be a poor guide for avoiding surprise when more than two players are involved.

2. Nuclear Weapons and State Making

The atomic bomb is central to the state making project of countries who, unlike the superpowers, are not confident in their national identity. Consider any country who has acquired nuclear weapons in the second nuclear age and one will find that possession of the bomb is central to the existence of the state.

Israel's bomb is much more than a military instrument to protect her territory. The bomb is deeply embedded in the formation of the state of Israel in a way that was never the case for the United States and the Soviet Union. Indeed recent research shows that the decision to go nuclear came so early on in Israel's history that it is difficult to separate it from the Israeli state making process.

In Pakistan, India, China, and North Korea the first major state making symbol of their post colonial history was the army. In each case, the army was colossal in size. In part this was for military reasons, but importantly it also was to use the army to create a school of statehood that would give everyone who passed through it a sense of political identity and allegiance.

Asia today is well beyond its post colonial era. Today the problem is how to dismantle the large army institution, how to get it out of business and politics. But these countries still need concrete national projects to demonstrate state prowess in order to secure allegiance and create a national political identity. Their nuclear weapon programs have become important institutions, replacing the army, as the symbol of state capacity.

The move to acquire nuclear weapons in each country may have begun with a political decision, but it produced a system wide phenomenon. The emerging military industrial complex in India, China, Israel, Pakistan and North Korea involves many institutions that did not exist when the original decision to go ahead with a bomb was made. While the same thing happened in the United Sates and the Soviet Union in the 1950s and 1960s, in the second nuclear age these institutions themselves have become symbolic of national capacity. For this reason it would be exceedingly difficult to dismantle them, tied up as they are with issues of political identity.

3. Historical Timing

The timing of the second nuclear age, the fact that it followed the first, makes an important difference. Most obviously, there were no countries or international institutions to retard the two superpowers in the expansion of their arsenals. There was no arms control regime to govern them. Rather, their actions created these institutions.

But the emerging nuclear states today face a major challenge in getting the established nuclear powers off of their backs. In some cases they have been unable to do this. Taiwan and South Korea were once considered to be likely nuclear powers. United States action foreclosed this possibility.

4. Asian Roots

It is surprising how little attention is given to the subject of strategic culture in shaping the two nuclear eras. Without getting in to the subject of whether there is a clash of civilizations, it doesn't take much insight to recognize that with the exception of Libya (if they can even be counted as a serious proliferation prospect), all of the emerging nuclear states have been Asian. In the first nuclear age, all were European.

The bomb grew out of World War II. It was invented by European physicists to solve a European problem. That it was first used against Asians was an unlucky consequence of the early collapse of Nazi Germany.

The Asian bomb grew in a climate of nationalism, needed to secure the future of the new states in Asia after the end of colonialism. The United States and the Soviet Europe had many problems to be sure. But intense nationalism wasn't one of them. When the two superpowers thought about nuclear weapons it was with the cool detachment of the medical doctor diagnosing a problem. National emotion played very little role in any of the cold war crises where war was considered. In showdowns over Cuba, Berlin, and elsewhere there were no hysterical crowds in Times Square or Red Square screaming for blood, and demanding that national honor be upheld.

The icy rationality that governed nuclear weapons, wherein college professors and think tanks experts lectured on the analytical theory of blackmail and threat, irritated many people. They found it dangerous and illusory precisely because of its excessive rationality. Nonetheless, this approach likely was a

constraint on the range and audacity of the strategic options considered by the two superpowers. It was also a cultural artifact of European society.

It is hard to imagine the same kind of strategic culture developing in the emerging nuclear states. Their heritage is quite different, and their attitudes and beliefs about dealing with opponents is far removed from the European pattern.

There is more. Asia is involved in globalization and modernization at the same time. Their internal development problems dwarf anything the superpowers experienced in the first nuclear age. For example, modernization is seen in Asia as playing catch up with the West. And the notion that they are behind is irritating to them, regardless of whether they blame the West or themselves for their current economic condition.

Globalization is seen in highly asymmetric terms, as benefiting the West because globalization's key institutions, international capital markets, multinational corporations, and the WTO are designed to benefit the incumbent powers. The attempt to rid these states of nuclear weapons is seen in this larger pattern of power imbalance. It becomes part of a larger struggle. Even states who decide not to go down this road see a basic unfairness.

5. The Cost of Defense

The emerging nuclear powers are less rich than the principal actors of the first nuclear age. The "first movers" (see below), the United States and the Soviet Union, could afford to make enormous investments in both conventional and nuclear arms.

It was often said in the 1960s that India and Pakistan would never go down the nuclear path because they couldn't afford it. The retort to this was the most famous quote in the history of

the entire nuclear non-proliferation field, that of Zulfikar Ali Bhutto in 1965, when the then foreign minister of Pakistan said that if India got the bomb "we will eat grass or leaves, even go hungry, but we will get one of our own."

The implications of this quote have been often used to describe the fundamental drive to get nuclear weapons when one's enemy got them. But it also revealed a feature of the second nuclear age: that these weapons programs are undertaken by impoverished countries relative to the two superpowers of the cold war. Nuclear weapons come at a much higher marginal cost. What needs to be considered is what is being marginalized as they get these weapons.

What is being marginalized as much as anything else are their conventional forces. The problem is that nuclear forces are cheap compared to conventional forces, and this option becomes attractive for countries short of capital (see the discussion below also). They also do not require the high levels of technological sophistication required for, say, building an air force capable of ground attack and support of army operations.

The statement that nuclear forces are 'cheap' is controversial. Those with an analytical bent can rebut the point that the long term costs haven't been properly calculated. But what is happening in China, India, Pakistan, North Korea, and even Israel is using the conventional forces as a cash cow to fund the nuclear programs. The capacities of these forces measured by traditional metrics of capability and readiness are decreasing as they shift their military acquisition momentum to their nuclear and related forces.

6. Second Mover Advantages

In his *Imperial Germany and the Industrial Revolution* (1915) Thorsten Veblen described why German economic growth was greater

than Britain's. The answer, according to Veblen, was that Germany could look to Britain to see what worked and what didn't. In the same way, the countries of the second nuclear age know the limitations of laser separation processes, calutrons, and the best way to make zirconium rods.

In short, they have second mover advantages that the United States and the Soviet Union did not possess.[7] This allows them several benefits. They know what are the blind avenues, the most promising opportunities, and probably most importantly, they don't have to reproduce the basic research on the atomic and hydrogen bombs.

The simple dynamics of first and second mover advantages help to explain important aspects of the spread of nuclear weapons. Going down the nuclear path first involved a great deal of uncertainty, and only the countries with the biggest GDPs could afford to take this on. Absent this knowledge it is highly unlikely that Iraq, for example could ever build a bomb on her own. There are great cost savings in being an efficient second mover, and this is clearly a driver in the spread of nuclear weapons.

The first movers -- the United States and the Soviet Union didn't recognize the full value (i.e. the proliferation danger) of many of the strategic resources that they had some control over. Access to university programs, Atoms for Peace, critical technologies, specialized scientific reports, etc. were loosely controlled. The story of the non-proliferation regime which began in the 1960s is one of gradually learning the full value of these resources and how other countries could use them to establish their own nuclear weapon programs. Over three decades the system was tightened up as monitoring and control of flows of critical technologies and people were increased.

However, in many cases it was too late to stop the spread of the programs to the emergent states. This raises a sensitive

issue, namely whether the utility of such control regimes would have worked better if the superpowers had started earlier to implement an effective version of it.

It also raises the question of whether it is a good strategy to re-establish this old system of controls after the counter proliferation against Iraq is completed. At one level it is clearly better to have controls than not to have them. But their effectiveness may be quite different in the future, now that so much of this knowledge already is out in the world, and also because the industrial complexes of the emerging nuclear states seem quite willing to amortize their own development costs through exports. Some significantly tougher and more assertive measures may now be required to make this control system functional.

Second mover actions can be interpreted in terms of options. Second movers observe their environment and build certain capabilities that allow them to move down paths should they opt to do so in the future. Thus, if there is a triggering event which creates opportunities for them, or problems for their enemies, they can act using the stored up knowledge. They have what in finance theory is termed a *call option* - the capacity, but not the obligation, to acquire a particular asset, an atomic or hydrogen bomb.

Business competition with significant second mover advantages tends to be "lumpy," that is, there are significant moves and countermoves as competitors strike their options, and periods of stability where they merely watch what is happening.

Unfortunately this has major strategic consequences for incumbent powers. It means that they can't resolve once and for all the structure of the game, because the second movers can always exercise their call options. The tendency in the United States is to search for one big counter proliferation act that will solve the problem for all time. An invasion to rid Iraq of

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[7] Technically Moscow did have some of these garnered from her espionage

its nuclear program is seen as a penultimate action. But this is unlikely to be the case because so many countries retain their options. Moreover, it means that if for some reason the United States fails in an effort to disarm Iraq there could be a blizzard of states exercising their options to take advantage of this opportunity.

Conclusions

None of this discussion is intended to belittle the standard debate about the spread of nuclear weapons. Command and control is likely to be much shakier than it was for the United States and the Soviet Union in the cold war. And deterrence could be quite different in the new environment, perhaps even necessitating a switch to a preemptive strategy. These are all valid and useful debates that should continue on both sides of each question.

But the analysis presented here does have a number of distinctive consequences, even if it provides no additional insight on topics like changes in deterrence or command and control.

First, it is often said that you can't know if you have arrived at a good outcome if you don't know where you're going. To this should be added that you can't know where you are on a map if you don't know where you have come from.

For over half a century the world basically had two nuclear regimes, here dubbed the first and second nuclear ages. The second nuclear age began slowly in the 1960s and 1970s, and for a long time it was slowed in development by the non-proliferation regime created by the dominant powers of the first nuclear age. To assert as some have that this regime had little material effect on the actions of even the states most interested in going

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effort directed against the Manhattan project.

nuclear seems to me to fly in the face of a vast body of evidence to the contrary. Arms control worked. It may have worked for "only" some thirty odd years, but this is a lot longer than most U.S. government policies have ever performed.

This regime began to weaken and unravel slowly, but in a major way in the 1990s. Its defenders tried to argue that it wasn't unraveling at all, and that it should be held on to at all costs. Their view was that each additional treaty strengthened the regime. Radical departures from the regime, whether in counter proliferation strategies or missile defense were resisted for too long, given the erosion of the system. Importantly, in this model, the momentum path of the first nuclear age in controlling the spread of nuclear weapons was unable to hold that system together. Whether the breaking point was the discovery of what Iraq was up to in the 1980s, North Korea, or the tests by India and Pakistan is less important than the overall assessment that a structure which had worked for decades couldn't work any longer by tightening up its basic features. More radical actions were required.

A way of depicting this map of the past, the present, and possible futures is shown in figure 1.

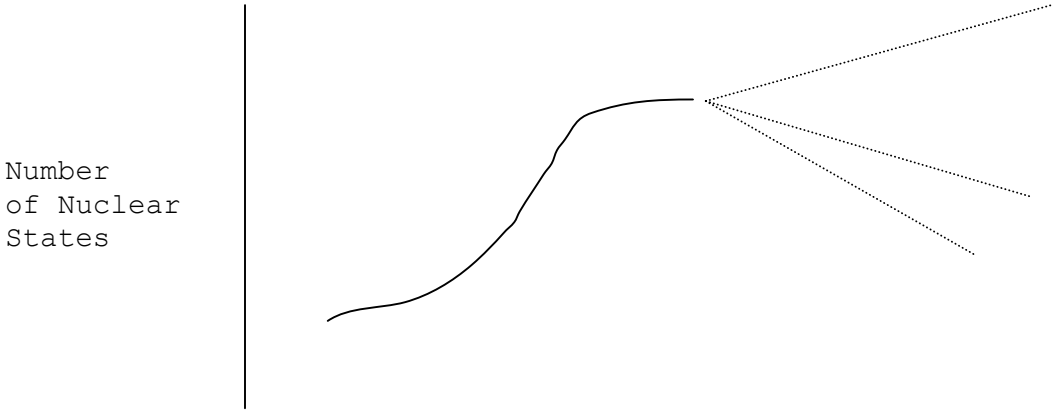

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Figure 1 Number of Nuclear Weapon States

What figure 1 suggests is that we could be in for a shakeout in the number of nuclear powers, as the United States looks at a world of continuing spread of proliferation and acts to forcibly and diplomatically reduce the number of states possessing these weapons. This is represented by the bottom two dotted lines.

Alternatively, if the United States, and its allies, fails to reduce the number of countries with the bomb we could get an increase in the number of states exercising their "call option." This negative outcome could arise in any of a number of different ways, for example, a failed military action against Iraq or a split in the coalition which sought to hold Baghdad responsible, led to delays and inaction which allowed Iraq to climb back on its bomb making program.

The impending military action against Iraq is one example of such a radical move. This isn't the place to get into a policy debate about this action, other than to say that looked at in structural terms it is an effort to staunch the spread of nuclear weapons caused by the erosion of the old regime.

A second conclusion deals with the differences between the two nuclear ages. For the reasons outlined in this paper, the second nuclear age is fraught with far more uncertainties than the first nuclear age. This applies to <u>all</u> actors in it, including the United States. That the second nuclear age is intrinsically a multiple player game; that its development programs are rooted in state making; that there are enormous cultural differences between the actors; and that there are

significant options retained by second movers introduces levels of uncertainty that are greatly unappreciated.

Put in concrete terms, the U.S. confrontation with Iraq, or North Korea or Iran does not only involve a regional disagreement. To use the Iraq example, this confrontation can be looked at in terms of its impact on Saudi Arabia, oil, or Israel. But there's a lot more going on than this. There is a structural conflict over whether the United States is going to allow a basic change in international order that it sees as following from the continued spread of nuclear weapons. The United States sees a country like Iraq, with a GDP of less than twenty percent of the annual revenues of the General Electric corporation being able to exploit low cost nuclear weapons to alter a system of international order that has existed for decades. Allowing Iraq or other small states to accomplish this is unlikely to be tolerated by the United States.

Aside from the technical military aspects of any confrontation with Iraq or the other proliferating states, the enormous strategic uncertainties of living with a world of many nuclear powers are so negative, and so offset the tremendous conventional military advantages that the U.S. now possesses that it is not surprising to me that military action is being taken. One doesn't have to posit ruthless dictators like Saddam Hussein or Kim Jong Il to have such a system be extremely dangerous to the United States. The structural differences with the first nuclear age are almost all negative as far as the United States is concerned.

A third conclusion is to recognize how badly in need of theorizing these issues are. Broadly speaking, most strategy and non-proliferation debate focus on topics like preemption and the weakness of Pakistani command and control. Good enough. But there should be a much more sophisticated debate on the long term consequences of living in a second nuclear age that maintains the structural features identified here. Likewise, better alternatives to it, either completely different structures or

modifications to some of its most dangerous features need much more consideration than has been given them so far.

A common reaction to the many uncertainties present is to abandon the effort to devise a package of long term strategies. The argument is that it is a waste of time to consider these when conditions on Iraqi inspection and U.N. support for the United States fluctuates daily.

My conviction, on the contrary, is that it is more important than ever to develop an arms control strategy during periods of transformation. Without such a strategy policy will be dictated in the heat of the moment. Local factors will dominate, just as they did when the first Gulf War was terminated early in the euphoria of the victory. If there is ever to be improvement to the dangers of the second nuclear age, in the way that the first nuclear age accomplished many order enhancing improvements, a package of long term strategies has to be identified and studied.

Imagine that the U.S. successfully disarms Iraq. The implications of this for countering the proliferation of all kinds of weapons of mass destruction are momentous. But only if they are intelligently thought through in advance. Many of what today would be considered wildly unrealistic arms control proposals, ones that never were seriously considered could suddenly become relevant and feasible. Weapons that looked highly counterproductive to national security and international order could take on an entirely new complexion.

Whether the U.S. proceeds to undertake an "Iraq II," a disarming attack against other countries, how it handles the multilateral coalition that supports it, whether it establishes a global inspection regime and many other issues will soon become highly relevant. But absent a long term strategy what is likely to happen is the reproduction of the Comprehensive Test Ban Treaty debate. The same old stale charges for and against will be exchanged. The debate will center on whether computer simulations are adequate to the task of verification of

compliance, rather than on how a new international structure can be created to lock in the gains achieved after ridding the world of a dangerous nuclear regime.

It is important that the United States, and all responsible powers react to new developments by trying to structure a replacement regime for the second nuclear age. This means much more that outlining military reactions to violations. It also means more than going back to a regime which once worked, but which no longer does. Absent more sober thinking about structures of a kind that developed in the first nuclear age, an enormous opportunity could be lost for changing the second.