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## Heading for the Fourth Nuclear Age

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*In collaboration with the Atomic Energy Commission (CEA)*

**Ariel E. Levite**

*Winter 2009*



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ISBN : 978-2-86592-450-9

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## *Proliferation Papers*

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Though it has long been a concern for security experts, proliferation has truly become an important political issue over the last decade, marked simultaneously by the nuclearization of South Asia, the weakening of international regimes, and the discovery of fraud and trafficking, the number and gravity of which have surprised observers and analysts alike (Iraq in 1991, Libya until 2004, North Korean and Iranian programs or the A. Q. Khan networks today).

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# Introduction

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It has been commonplace to look at history since 1945 as the “nuclear age”, distinct in many important ways from the “pre-nuclear age” that preceded it. The pivotal importance of the introduction of nuclear weapons in 1945 has been extensively discussed.<sup>1</sup> No less interesting, however, have been the attempts to categorize or divide nuclear history after 1945 into discrete temporal blocks. One of the most significant efforts in this domain was by Paul Bracken<sup>2</sup> who argued that the Cold War was the “first nuclear age”, defined by a strategic nuclear balance between the two superpowers, and that the end of the Cold War triggered a “second nuclear age”, characterized by the spread of nuclear weapons to Third World countries for reasons other than Soviet-American Cold War rivalry. Bracken’s analysis shed considerable light on the structural changes that have occurred as a result of the dissemination of nuclear weapon technology since 1945.

Nevertheless, it does seem potentially useful to revisit the 60 plus years of nuclear history for a different purpose. Not in order to track the changes in this sphere, but rather to explore the evolution of *stability of the nuclear order* and the factors and dynamics surrounding it. The focus of the analysis is, therefore, on developments that have either enhanced or undermined the nuclear order over the years along three main dimensions: (1) expansion (or contraction) of the “nuclear club” (through dissemination of nuclear weapon or dual-use nuclear technology or its arrest, reversal, and the related fortunes of arms control arrangements); (2) diminution or

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Earlier versions of this paper have been presented in the course of 2007-08 at several settings: the Herzliya Conference, IFRI, the Stimson Center, and CISAC, Stanford University. I am hugely indebted to James N. Miller, Jr., George Perkovich, Michael Quinlan, David Holloway, and Bruno Tertrais for their insightful comments and suggestions on drafts of this paper, and to Nima Gerami for his invaluable research assistance.

<sup>1</sup> Beginning with Bernard Brodie (ed.), *The Absolute Weapon: Atomic Power and World Order*, New York, NY: Harcourt, Brace and Company, 1946, and later refined in Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospects of Armageddon*, Ithaca: Cornell University Press, September 1989.

<sup>2</sup> See Paul Bracken, “The Second Nuclear Age”, *Foreign Affairs*, Vol. 79, No. 1, January-February 2000; Bracken, “The Structure of the Second Nuclear Age”, Foreign Policy Research Institute, September 25, 2003, <http://www.fpri.org/enotes/20030925.americawar.bracken.secondnuclearage.html>; and Ariel E. Levite, “The Strategic Implications of the Changing International Order in the Second Nuclear Age”, Paper delivered at the Herzliya Conference, January 21, 2007.

intensification of anxieties regarding the viability of the nuclear deterrence relationship (and/or the vulnerability of the nuclear arsenal or parts thereof to attack) and its impact on the arms race; and (3) manageability of crisis in conflicts that have the potential or already evident (either implicitly or explicitly) nuclear overtones.

This stability-oriented analysis of these analytically distinct periods could help refine our understanding of the nuclear trajectory between 1945 and the present. But more importantly, it could also lay the ground for generating some insights into what the nuclear future may have in store by looking afresh at the nuclear predicament we are currently facing and tracing its historical roots. Specifically, this analysis aims to shed light on what it would take to propel us towards a new (fourth) nuclear age. This new age may not only be dramatically different from the present one, but quite possibly no less frightening than the earliest one.

Tracking the evolution of the nuclear order since 1945 through the stability prism reveals *three analytically distinct nuclear periods or “ages”* which represent key milestones in the evolution of the global nuclear order to date. Each of these ages lasted roughly twenty years. But before proceeding to discuss these so-called three “nuclear ages”, a cautionary note is in order. Any serious analytical effort to condense such a rich *global* history of the nuclear era since 1945 into a just few pages of narrative cast into some analytical straightjacket is bound to prove methodologically challenging. Worst still, assigning chronological cut-off points between the “nuclear ages” inevitably involves some arbitrary decisions which might make more than a few historians and political scientists uncomfortable. Some of this discomfort would inevitably be warranted. Yet, the true yardstick to assess the merits of such an exercise would not be whether it offers an “authoritative concise history of the nuclear age” (which it does not aim to be), but rather whether it constitutes a useful heuristic that does not cause any gross injustice to the historical record. Put differently, the saving grace of this analysis would be in its degree of success in generating valuable insights, hopefully a few having some policy relevance as well, on the evolution and changing dynamics of the nuclear era.

# The First Nuclear Age 1945-67: Surviving and Learning Through Crises

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The first nuclear age obviously starts with the appearance of nuclear weapons on the world stage. It began its demise in the aftermath and to an important degree as a result of the Cuban Missile Crisis. But it only ended in 1967, with the dawn of strategic nuclear arms control at the US-USSR (Johnson-Kosygin) Glassboro Summit<sup>3</sup> and on the eve of the largely consensual codification of comprehensive ground rules for the nuclear age, in the form of the Nuclear Non-Proliferation Treaty (NPT). This was a period of over 20 years mainly characterized by an effort to survive the advent of nuclear weapons and gradually develop the unique (in fact, counterintuitive) logic of nuclear deterrence and associated concepts. During that time, deterrence revolved mainly on the threat of punishment rather than on denial, as embodied by the well-known notions of “Assured Destruction” and subsequently “Mutual Assured Destruction” (MAD). The latter are themselves the result of twenty years of debate and controversies, during which time key concepts of nuclear deterrence such as “first and second strike capability”, “countervalue”, and “counterforce” targeting, or “extended deterrence” developed. These concepts have since become the cornerstone of the strategic deterrence parlance.<sup>4</sup>

An even more important development than the aforementioned conceptual breakthroughs that occurred during this period was the parallel realization by the political elites of the fundamental transformation brought about by the emergence of a nuclear order. Starting in the mid-1950s, the leaders of both superpowers have come to comprehend (rather reluctantly, at least in the US case) and eventually even admit to each other that nuclear weapons were unlike other instruments of war, and that a nuclear war between them could not be won.<sup>5</sup> Subsequently they would also incrementally go on to learn, largely through a series of severe crises (most prominently over the Taiwan Straits, Berlin, and ultimately Cuba) and an

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<sup>3</sup> On the nuclear significance of the Glassboro Summit see John M. Clearwater, “Johnson, McNamara, and the Birth of the SALT and the ABM Treaty 1963-1969”, Ph.D. dissertation, Dissertation.com, 1999, pp. 112-121.

<sup>4</sup> See Brodie (ed.), *The Absolute Weapon*, *op. cit.*; Brodie, *Strategy in the Missile Age*, Princeton, NJ: Princeton University Press, 1965; and Albert Wohlstetter, “The Delicate Balance of Terror”, *Foreign Affairs*, Vol. 37, No. 2, January 1959.

<sup>5</sup> I am grateful to David Holloway for drawing my attention to the centrality of this historical turning point.

intense arms race what nuclear weapons could achieve short of war, but also what they could not. It witnessed their growing understanding (through elaborate analysis as well as trial and error) what it takes to survive and achieve a modicum of stability thanks to, or at a minimum in the presence of, nuclear weapons.<sup>6</sup> Perhaps most importantly, this “age” has seen the inhibitions on the actual use of nuclear weapons growing to the point of becoming a taboo.

This “first nuclear age” subsequently saw a gradual expansion of the nuclear club to five official powers, so defined because they all tested nuclear weapons before January 1967. But it also witnessed an intense concerted effort (that was beginning to yield results) to develop a nonproliferation norm. This norm was initially intended to lock in the US nuclear monopoly. Later, after the Soviets conducted their own nuclear tests, and especially after the US failed to secure a significant advantage by developing the H-bomb, the US still sought to retain a strategic preponderance over the Soviet Union. But it also reached out to the Soviet Union to ensure a basis for a superpower duopoly over nuclear weapons and collaboration to dissuade all or at least most others (including the scores who actively contemplated doing so) from following suit, partially by extending to them the nuclear umbrella.

During this period there was a dramatic quantitative and qualitative scaling up of the arsenals of the main protagonists, with the introduction of thermonuclear weapons and the development of ICBMs, and numerous nuclear tests above and below ground. But the period was also characterized by the first serious attempts at building (missile) defenses against some nuclear weapons as well as some formal arrangements and treaties for reduction of tensions, and managing deterrence relationship and the arms race through arms control.<sup>7</sup>

Lastly, this was a time in which the inherently dual-use nature of nuclear technology became quite apparent. Early attempts to strike a balance between the dividends of peaceful uses of nuclear energy and nonproliferation (while also retaining a US advantage) emerged as early as 1946, initially in the form of the Acheson-Lilienthal Report<sup>8</sup> and the subsequent Baruch Plan<sup>9</sup>, and later as the 1953 Eisenhower Atoms for

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<sup>6</sup> For an excellent new review of the evolution of nuclear learning see David Holloway, “Nuclear Weapons and the Escalation of the Cold War: 1945-1962”, *Cambridge History of the Cold War*, Vol. 1 (forthcoming).

<sup>7</sup> The treaties concluded in the “first nuclear age” include the Antarctic Treaty (1959), the Limited Test Ban Treaty (1963), the Outer Space Treaty (1967), and the Treaty of Tlatelolco (1967), as well as other accords such as the Hot Line Agreement (1963), which established a direct communications link between the US and USSR in the wake of the Cuban Missile Crisis.

<sup>8</sup> “A Report on the International Control of Atomic Energy [the Acheson-Lilienthal Report]”, Prepared for the US Secretary of State Committee on Atomic Energy, March 16, 1946, <http://www.learnworld.com/ZNW/LWText.Acheson-Lilienthal.html>.

<sup>9</sup> “The Baruch Plan”, Presented to the UN Atomic Energy Commission, June 14, 1946, <http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml>.

Peace Program.<sup>10</sup> The latter has led to the establishment of the International Atomic Energy Agency (IAEA) in 1957 and the development of its Safeguards system.

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<sup>10</sup> "Atoms for Peace", Address by US President Dwight D. Eisenhower to the 470<sup>th</sup> Plenary Meeting of the UN General Assembly, December 8, 1953, [http://www.iaea.org/About/history\\_speech.html](http://www.iaea.org/About/history_speech.html).





# The Second Nuclear Age 1968-1992: Building and Managing Stability

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The “second nuclear age” begins with the conclusion of the NPT in 1968 (which went into effect in 1970), and shortly thereafter the 1972 ABM Treaty. It ends in 1992 with a series of positive developments: the accession of France and China to the NPT, the conclusion of the agreement between North and South Korea over the denuclearization of the Korean Peninsula, the signing of the Lisbon Protocol regulating the accession of CIS states Belarus, Kazakhstan, and Ukraine to the NPT as non-nuclear states, the entry into force of the US nuclear testing moratorium, and the conclusion of START II. These were preceded shortly before by several other important events in rapid succession in the same vein. The list includes the INF Treaty (1987), the rollback of the South African nuclear weapon program (1989-91) and its subsequent accession to the NPT, progress in South American disarmament between Argentina and Brazil, the forcible disarming of Iraq (1991), and the launching of an arms control process for the Middle East (ACRS Working Group) in its aftermath (1991).

While the first nuclear age was mainly about survival, the second nuclear age largely revolved around enhancing stability. Building stability by codifying the ground rules (first and foremost in the context of the NPT) and then endeavoring to make almost everybody accept them (starting with the critical signature of Germany in 1969) to lend it the aura of a universal norm. Considerable efforts and resources were expended on nonproliferation to prevent others from following the Indian 1974 example. This nonproliferation campaign also included, beyond bilateral diplomacy with many pertinent states, the establishment of a nuclear supplier regime (“London Club” and the “Zangger Committee”) and the expansion of the standard IAEA regime from a facility-based approach (INFCIRC/66) to Full-Scope Safeguards (INFCIRC/153). Naturally, the promotion of stability encompassed the extensive use of arms control measures, ranging from ever more ambitious arms control treaties on both nuclear weapons and their delivery capabilities<sup>11</sup> to elaborate ways and means to reduce the prospects of uncontrolled escalation.

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<sup>11</sup> Some of the treaties concluded in the “second nuclear age” include the NPT (1968), SALT I Interim Agreement (1972), ABM Treaty (1972), Threshold Test Ban Treaty (1974), SALT II (1979), CFE Treaty (1990), and START (1991).

Accordingly, additional measures to enhance stability were introduced into the nuclear arsenals themselves, designed to make them safer, more secure, and more reliable. These involved the development of ever more elaborate early warning systems, diversified nuclear basing modes and delivery systems designed to make them robust enough to withstand a nuclear strike and still allow massive retaliation. More elaborate measures against unauthorized launches of nuclear weapons were also developed during this period and incorporated into major powers' nuclear arsenals.

These efforts did bear fruit. Indeed, this "second nuclear age" has seen remarkable gains in building nuclear stability, many of which evolved through the blossoming, refinement, and expansion of concepts and practices whose roots have been planted in the "first nuclear age". These made it possible to avert not only a catastrophic nuclear exchange but also the dreadful nuclear proliferation future envisaged by President Kennedy in the early 1960s of a world with scores of nuclear states.

Yet, the period has also witnessed the appearance of a few early cracks in the evolving nuclear order whose true significance would not be fully appreciated for some years to come. One of them involved the widespread dissemination of nuclear technology (which had been largely confined to the major powers), including the clandestine transfer of weapons relevant to nuclear technology (through, for example, the AQ Khan network). The seeds of trouble to come were also growing increasingly evident with the emergence of a few rather stubborn nuclear holdouts, initially in the form of "threshold" states. Most of these (Israel being a notable exception) would not only elect to remain outside the regime but would also gradually come to challenge it outright. They would deny the legitimacy and viability of the regime (DPRK, India, and Pakistan) or (at a minimum) its relevance to their particular circumstances. Furthermore, a few of these as well as some others (such as Iraq, Iran, and Libya) would even take advantage of their regime credentials and rather lax IAEA Safeguards to gain access to nuclear technology and enjoy a political cover under which they could embark on ambitious nuclear weapon programs. Still others would draw on the same environment to legitimately develop or retain a posture of "nuclear hedging" (e.g., Japan).<sup>12</sup>

Finally, the "second nuclear age" saw both nuclear power and missile defense gain briefly in saliency and attract extensive resources and political interest. This was most dramatically evident in President Ronald Reagan's ardent advocacy of the Strategic Defense Initiative (SDI). But it also saw a reincarnation of the nuclear disarmament sentiment manifest in the meeting of minds between Presidents Reagan and Gorbachev at the 1986 Reykjavik Summit.<sup>13</sup> The most notable feature of visions of both

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<sup>12</sup> For an introduction to the concept of "nuclear hedging" and its application see Ariel E. Levite, "Never Say Never Again", *International Security*, Vol. 27, No. 3, Winter 2002-03.

<sup>13</sup> For background on the nuclear dimension of the Reykjavik Summit see the Nuclear History Project website, <http://www.nuclearsecurityproject.org/site/c.mjXJbMMloE/b.3534715/>. See also George P. Schultz, Sidney D. Drell, and James E. Goodby (eds.), *Reykjavik*

“defense-dominance”<sup>14</sup> and abolition is that they proved infeasible. Both would subsequently diminish in importance for a whole array of political and technological reasons. Yet none of these issues would die out, nor would the sources of their original appeal go away. Remaining superficially buried under the surface, they continued to attract interest and modest resources, and would wait for an opportune moment to make a comeback. And their reemergence in due course would be one of the challenges to come back to undermine the established nuclear order.

In fact, in retrospect the most worrisome aspect of the otherwise positive legacy of the “second nuclear age” appears to have been *the paradigm for nuclear stability* it has left behind. This paradigm was predicated on several pillars that not only papered over some of the most acute long-term challenges to the nuclear order, but also created a false illusion of stability and continuity. None of these would prove tenable over the long term. But their mere existence would make future adjustments to the nuclear order seem anywhere between the unnecessary and the impossible.

What were the most salient among these premises? One was that US-Soviet nuclear deterrence predicated on offensive nuclear dominance and acceptance of mutual vulnerability to attack would remain the cornerstone of the post-WWII international system. This premise ended with the collapse of the Soviet Union. True, mutual US-Russian vulnerability remained, and nuclear weapons continued to occupy an important role in the Russian mindset and became ever more central to their claim to be a major power. But the nuclear equation between the major powers no longer dominated considerations of the global balance of power.

The second salient premise was that the highly asymmetrical nature of the nuclear order, especially US preeminence in the maintenance of this order, would remain unchallenged. Furthermore, it also largely took for granted that the US would remain willing and able to invest heavily in the maintenance of that order, and would be inclined to do so in the same manner – namely predominantly through a combination of intelligence, bilateral diplomacy, and multinational instruments (from treaties to suppliers regimes) but not the actual use of force.

A third set of premises maintained that the sustainability of the nuclear order was predicated on its rigidity. No new member would be allowed into the nuclear club. And it was thought to be both necessary and possible to uphold this tenet indefinitely, even if profound changes in the

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*Revisited: Steps Toward a World Free of Nuclear Weapons*, Stanford: Hoover Institution Press, 2008, <http://www.hoover.org/publications/books/online/15766737.html>.

<sup>14</sup> Understood as a relative gain in effectiveness of defensive means relative to offensive ones, meaning in this context the improvement of missile defenses and therefore the reduced saliency of traditional nuclear deterrence based on offensive retaliation.

global distribution of power and dissemination of nuclear weapons would occur in the interim.

A fourth set of premises pertained to the focus of the nonproliferation regime and the issue of the nuclear fuel cycle. Notwithstanding the regime's global orientation and the efforts to universalize adherence to it, in practice many of the regime's attributes reflected its early orientation toward countries in Western Europe, and to a lesser extent North Asia, Oceania, and Latin America. This was the case because these countries either already had an advanced nuclear weapon program underway at the time the nonproliferation norm was developed or at least manifested strong aspirations to that end. To win these countries' consent to join the NPT as non-nuclear states it was deemed necessary at the time to grant them, at least in principle, the right to develop a civilian nuclear fuel cycle, presumably solely in order to service their nuclear energy requirements.

Subsequently, the regime has largely taken for granted (a premise reinforced after the Indian test of 1974) that the greatest threat to proliferation stemmed from diversion of fissile material from declared facilities. Consistent with this line of thinking, it has marshaled a variety of means to diminish the likelihood of this particular scenario. These ranged from policy restrictions on foreign dissemination and use of enrichment and reprocessing technology to tight US controls over the nuclear fuel it provided others to multinational means. The latter included the Nuclear Supplier Group (the reinvigorated descendent of the "London Club") and the Zangger Committee, IAEA Safeguards system and UN Security Council (UNSC) referral of troubling cases to constrain and deter diversion of fissile material, detect clandestine activity, and enforce of arms control and nonproliferation obligations. A related premise held that whatever these mechanisms lacked could be effectively taken care of by US intelligence, diplomacy, or (if need be as a last resort) its military might.

# The Third Nuclear Age 1993-2010(?): Complacency and Disillusionment

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By the early 1990s there were hardly any reasons to suspect that a transition to a “third nuclear age” was actually underway. Quite the contrary: the impression at the time was that the nuclear order had in fact been irrevocably consolidated through the aforementioned series of political breakthroughs at the end of the “second nuclear age”. This impression did hold out for a while, fed by the successful implementation of the agreements managing the nuclear legacy of the disintegrating Soviet Union, the diffusion (albeit militarily) of the Iraqi nuclear crisis, the accession of China and France to the NPT (1992), the signing of the “Agreed Framework” between the US and North Korea (1994), and ultimately in negotiating a Comprehensive Test Ban Treaty (CTBT), getting approval for an improved IAEA Safeguards arrangement – the “Additional Protocol” or INFCIRC/540, and even gaining consensus for launching negotiations on a Fissile Material Cutoff Treaty (FMCT) in the Conference on Disarmament (1993-95). The crowning event of the period was undoubtedly the 1995 agreement to indefinitely extend the NPT.

The end of the Cold War has similarly precipitated a marked diminution in the overall saliency and abundance of nuclear weapons through separate national actions. The US and Russia significantly downsized their nuclear arsenals. And both the UK and France have similarly cut back on their own nuclear arsenals, but also went further by eliminating one or more legs of their Triad. Additionally, all four powers have ceased producing new fissile material for nuclear weapons, imposed national moratoria on nuclear testing, and have implemented some modest forms of de-alerting or de-targeting.<sup>15</sup> And while China did not take part in most of these initiatives, it did, like France, finally accede to the NPT and showed few signs of challenging the nuclear order. The sole exception was perhaps its lax attitude at the time toward nuclear export controls that was

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<sup>15</sup> For a review of the changes introduced to the nuclear armories of the major nuclear powers see, for example, House of Commons Defence Committee, “Factsheet 1: Summary: Maintaining the UK’s Nuclear Deterrent”, December 2006, [http://www.acronym.org.uk/docs/0612/Cm6994\\_Factsheet1.pdf](http://www.acronym.org.uk/docs/0612/Cm6994_Factsheet1.pdf); Gerard Errera, Secretary General of the French Foreign Ministry, Speech delivered at the Global Zero Conference, Paris, December 8, 2008; and Alexei Arbatov and Vladimir Dvorkin (eds.), *Nuclear Weapons After the Cold War*, Moscow: R. Elinin Publishing House, 2008, and the references contained therein. See footnote 17 for nuclear posture documents.

mostly a matter of omission rather than commission (massive assistance to Pakistan being a notable exception).<sup>16</sup>

Even India and Pakistan did not appear at the time to pose a grave threat to the established nuclear order. While both elected to stay out of the NPT and continue to develop nuclear weapons, it appeared at the time that they were content with suppressing their formal nuclear weapons ambitions. And while they were not able to bury the hatchet over Kashmir, it did seem for a while that they were on a positive learning curve in managing their nuclear relationship, beginning in 1992 to annually exchange their nuclear site information as part of a 1988 accord to refrain from attacking each other's nuclear installations.

In retrospect, though, it seems clear that the greatly reduced numbers of delivery vehicles and diminished saliency of nuclear deterrence in the major powers relationship during the “third nuclear age” did not signal a walk away from the core logic underlying nuclear deterrence. In fact, the reemergence of strategic missile defenses during this period came about merely as a complement to nuclear deterrence, designed to address threats from those (such as Iran and DPRK) who it was feared could not be reliably deterred by the threat of nuclear retaliation. Nor did the US and Russian nuclear force structures, deployment patterns and targeting policies undergo a fundamental transformation during this period. In fact, the core stated roles of nuclear weapons in the hands of the P-5 (as well as in NATO) remained roughly the same throughout this age, and were even expanded (explicitly or at least implicitly) either to the dissuasion of either non-nuclear WMD attacks or those by state-sponsored terrorists, or both, and to offsetting its growing conventional inferiority (by Russia).<sup>17</sup>

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<sup>16</sup> Thomas C. Reed and Danny B. Stillman, *The Nuclear Express: A Political History of the Bomb and Its Proliferation*, Osceola, WI: Zenith Press, 2009.

<sup>17</sup> The roles and objectives of key nuclear powers have been expressed in various forms and venues. On the US see, for example, Robert Gates, “Nuclear Weapons and Deterrence in the 21<sup>st</sup> Century”, Speech delivered at the Carnegie Endowment for International Peace, October 28, 2008; Chair of the Joint Chiefs of Staff, *National Military Strategy to Combat Weapons of Mass Destruction*, February 13, 2006, <http://www.defenselink.mil/pdf/NMS-CWMD2006.pdf>; and Senate Armed Services Committee, *Briefing on Results of the Nuclear Posture Review*, S. Hrg. 103-870, 103<sup>rd</sup> Cong., 2<sup>nd</sup> Sess., Washington, DC: GPO 1994, <http://www.nukestrat.com/us/reviews/sascnpr092294.pdf>. On the UK see Des Browne, “Laying the Foundations for Multilateral Disarmament”, Statement to the Conference on Disarmament, Geneva, February 5, 2008, <http://www.mod.uk/DefenceInternet/AboutDefence/People/Speeches/SofS/20080205LayingTheFoundationsForMultilateralDisarmament.htm>; House of Commons Defence Committee, *The Future of the United Kingdom's Nuclear Deterrent: the White Paper*, Ninth Report of Session 2006-07, [http://www.mod.uk/NR/ronlyres/AC00DD79-76D6-4FE3-91A1-6A56B03C092F/0/DefenceWhitePaper2006\\_Cm6994.pdf](http://www.mod.uk/NR/ronlyres/AC00DD79-76D6-4FE3-91A1-6A56B03C092F/0/DefenceWhitePaper2006_Cm6994.pdf); and Select Committee on Defence, “Minutes of Evidence”, Questions 220-238, March 20, 2002, <http://www.parliament.the-stationery-office.co.uk/pa/cm200102/cmselect/cmdfence/644/2032008.htm>. On France see Jacques Chirac, Speech delivered at the Ninth French Ambassador's Conference, August 27, 2001, <http://www.ambafrance-uk.org/Ninth->

Furthermore, for all the diminished visibility of nuclear weapons, their symbolic value for Russia as measure of its superpower stature and guardian of key interests (witness its professed anxiety about US missile defense deployment in Poland and the Czech Republic) may have actually grown during this “age”. The same holds true of the significance of nuclear weapons to several US allies as tools of extended deterrence. This is the case both for Japan (as a result of DPRK nuclearization) and some of the new NATO members from Eastern Europe (in response to their intimidation by Russia).

All of these manifestations of a more mature, stable nuclear order and diminished salience of nuclear weapons and nuclear deterrence among the P-5 seem have to distracted attention from the grave problems undercutting the nonproliferation regime. These were brewing at the time beneath the surface. And while occasional bright spots would continue to recur from time to time in the years to come (such as the Libyan nuclear rollback in 2003), on balance the 1995 nuclear euphoria appears to have been no more than a brief, largely illusory, peak from which a precipitous avalanche would occur. This is why I consider the “third nuclear age” to have begun sooner, at least as early as 1993.

Part of this undoing came about as a result of the euphoria following the end of the Cold War, where the (nonproliferation) guard was let down prematurely, and the diminished overall centrality of nuclear weapons. The latter manifested itself, among other things, in dramatic cutbacks in the superpowers’ nuclear arsenals. Another part of it may have been the result of a collective failure to recognize the gravity of the challenges that were growing beneath the radar screen, perhaps due to the long string of aforementioned nonproliferation successes. And some of it was perhaps due to the very effort to formally lock in the highly asymmetrical nuclear order indefinitely, with the P-5 only paying lip service to the calls to amend the established nuclear order by disarming in line with Article IV of the NPT. This seemed especially pronounced in the US, as it had emerged from the Cold War victorious. The US has seen itself become the sole remaining superpower and enjoy unprecedented freedom of action thanks to the awesome combination of its own inner strengths (including in conventional capabilities and missile defense) and the weaknesses of its adversaries, which, it was widely believed at the time, could no longer meaningfully constrain the US through mutual strategic deterrence.

Either way, soon thereafter it would transpire that the established nuclear order was, nevertheless, being severely challenged from many

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[French-Ambassadors.html](#); Chirac, Speech delivered at the Strategic Air and Maritime Forces at Landivisiau/L’Ile Longue, January 19, 2006, [http://www.elysee.fr/elysee/anglais/speeches\\_and\\_documents/2006/speech\\_by\\_jacques\\_chirac\\_president\\_of\\_the\\_french\\_republic\\_during\\_his\\_visit\\_to\\_the\\_strategic\\_forces.38447.html](http://www.elysee.fr/elysee/anglais/speeches_and_documents/2006/speech_by_jacques_chirac_president_of_the_french_republic_during_his_visit_to_the_strategic_forces.38447.html); and Nicolas Sarkozy, Speech delivered at the presentation of SSBM [sic] Le Terrible, Cherbourg, March 21, 2008, [http://www.ambafrance-uk.org/President-Sarkozy-s-speech-at\\_10430.html](http://www.ambafrance-uk.org/President-Sarkozy-s-speech-at_10430.html). On Russia see Arbatov and Dvorkin (eds.), *op. cit.*, pp. 38-51.

directions. And many of the gains of preceding years would turn out to have been either illusory or short-lived.

The early signs of trouble came with the realization that the US-DPRK 1994 “Agreed Framework” had far from settled the latter’s nuclear challenge. The DPRK would go on to unilaterally withdraw from the NPT, build a larger unsafeguarded fissile material stockpile, and ultimately export sensitive nuclear technology to dubious foreign regimes and conduct a nuclear test. Iran would show early signs of (re?) embarking on a nuclear weapons program (partially as a response to its Iran-Iraq war trauma<sup>18</sup>), and Iraq would be widely suspected to go at it again. The US would become wary of arms control arrangements, especially given that new accords would be increasingly predicated on its willingness to make genuine concessions in areas it disliked, and with limited guarantees on reciprocity and verification. It adopted an increasingly pronounced posture favoring missile defense, and the US Senate refused to ratify the CTBT (1999), which then languished for a decade.

India and Pakistan would test their nuclear weapons and declare themselves nuclear states (1998). A series of acute nuclear crises would then follow (both after the Kargil 1999 incursion and in 2001-02 after the terrorist attack on the Indian parliament) attesting to the precarious nature of the bilateral nuclear order. Iran would emerge by 2002 as a full blown nonproliferation time bomb, developing a nuclear weapon capability under the false guise of a civilian nuclear power program. Libya would be caught red handed in a similar act (2003), though later constrain its efforts. Al Qaeda would be found to have expressed interest in developing nuclear weapons, and Pakistan to have exported widely and repeatedly (directly to DPRK and Libya, and over many years via the AQ Khan network) sensitive nuclear technology and nuclear bomb making knowhow. These and other cases would combine to prove the IAEA time and again as an outstanding nuclear detective agency, with respect to its ability to investigate a crime after it was exposed. But they would also reveal the Agency to be a truly poor nuclear watchdog, ironically manifesting rather similar pitfalls to those that bedeviled the FBI prior to September 11. In the process it would become painfully clear the Agency’s capacity to perform its Safeguards role effectively is also severely handicapped by the failure of at least 90 of its members, including scores with significant nuclear activity, to accede to the Additional Protocol, well over a decade after its introduction. The same cases in which the IAEA performance would prove wanting would also end up demonstrating that the UNSC fares no better as the ultimate designated arbiter of cases of nuclear proliferation brought to its attention. The initiative to negotiate a FMCT would languish for years at the CD, the Middle East arms control process would come to a screeching halt in 1995, and the

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<sup>18</sup> Post-revolutionary Iran apparently (re)started its nuclear weapon program as early as 1985, quite possibly as a reaction to its sense of vulnerability after it was attacked by Iraq, exposed to Iraqi chemical weapons, and disillusioned with the five NWS’ reaction toward Iraq (the P-5 members did nothing to help Iran or punish Iraq; in fact, some did just the reverse).



nuclear “Action Plan” consisting of “13 practical steps toward disarmament” agreed upon at the 2000 NPT Review Conference would go nowhere.<sup>19</sup>

The hallmark of the “third nuclear age” has thus become above all complacency and disillusionment. The previous momentum toward stabilization of the nuclear order has largely given way to a strong sense of pessimism over its gradual disintegration. While the nuclear arsenals of the two former superpowers have undergone dramatic downsizing during this period, and a de facto nuclear test moratorium has taken hold, much of it has occurred under a much weaker and looser formal framework. And it would come at a time in which Russia, China, India, and Pakistan are modernizing and the latter three also expanding their nuclear arsenals.<sup>20</sup> The US during this period became disillusioned with formal nuclear arms control treaties, IAEA Safeguards and the ability to verify and enforce them (including by the UNSC). These would manifest themselves in a new and far more assertive US declaratory policy toward WMD proliferation (2002)<sup>21</sup> that would advocate a preemptive strategy, and promotion of regime change over the more traditional approaches of arms control and diplomatic engagement toward the most difficult nonproliferation cases. The September 11 shock, coupled with the post-Iraq war trauma over the utility (as well as political legitimacy) of using national intelligence to check nuclear proliferation would serve as a catalyst for an even more vigorous intelligence effort, and re-emphasis on nuclear security measures, intelligence, preemption, and missile defenses.

Subsequently, nonproliferation would fall victim to the global realignment of power, the growing pessimism over the ability to stem the proliferation of nuclear technology (especially on the enrichment side), and more recently to the new priorities in the “global war on terror”. These would combine to produce *inter alia* an abandonment of the rollback zeal versus the “nuclear holdouts” led by India and Pakistan. First would come the trumping of nonproliferation concerns versus Pakistan’s nuclear program. Just as was done during the Afghan war of the 1980s, after 9/11 concerns would once again be largely brushed aside not only over Pakistani domestic nuclear activities but also over the massive export of sensitive nuclear technology. Then the sanctions imposed after the nuclear

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<sup>19</sup> For details on the “Action Plan” see “The Promises of the 2000 NPT Review Conference”, Reaching Critical Will. <http://www.reachingcriticalwill.org/legal/npt/13point.html>.

<sup>20</sup> For a review of the developments in these nuclear arsenals see Stockholm International Peace Research Institute, *SIPRI Yearbook 2008: Armaments, Disarmament and International Security*, Oxford: Oxford University Press, 2008; and Arbatov and Dvorkin (eds.), *op. cit.* See also Robert S. Norris and Hans M. Kristensen, “Russia Nuclear Forces, 2008”, *Bulletin of the Atomic Scientists*, May-June 2008, Vol. 64, No. 2, pp. 54-57, 62; Norris and Kristensen, “Chinese Nuclear Forces, 2008”, *Bulletin of the Atomic Scientists*, July-August 2008, Vol. 64, No. 3, pp. 42-45; Norris and Kristensen, “Indian Nuclear Forces, 2008”, *Bulletin of the Atomic Scientists*, November-December 2008, Vol. 64, No. 5, pp. 38-41; and Norris and Kristensen, “Pakistan’s Nuclear Forces, 2007”, *Bulletin of the Atomic Scientists*, May-June 2007, Vol. 63, No. 3, pp. 71-74.

<sup>21</sup> “National Strategy to Combat Weapons of Mass Destruction”, December 2002, <http://www.whitehouse.gov/news/releases/2002/12/WMD>.

tests of 1998 against both countries would be phased out. And finally came the US-India nuclear engagement of 2005 that led to the India-US nuclear agreement of 2007-08.

The deal itself would be inspired both by commercial interests and strategic ones (belief in key US administration circles in building up India as a strategic counterweight to China). But the US-India nuclear deal would not only repeatedly win in 2007 and 2008 the approval of the heretofore proliferation minded US Congress but would also be consensually endorsed in 2008 by the dozens of members of the IAEA Board of Governors and the NSG. This development would signal for all to see that the sanctity of the established nuclear order has finally been *formally* compromised and in turn would further contribute to its disintegration. Since the ramification of the deal on the nuclear order were extensively discussed before it was approved, we can only surmise that for some of its supporters it looked liked a deal still worth having because of what India had to offer in return. But for others we can only speculate that the ramifications looked less objectionable because they perceived the established nuclear order to unravel in any case, so why not turn the inevitable into a virtue?

Be it as it may, at the time of writing, the “third nuclear age” seems to be rapidly drawing to an end, amidst mounting conflicting pressures over what might take its place – nuclear anarchy and an arms race or a gradual process leading toward the abolition of nuclear weapons. Both of these scenarios seem quite plausible. But the present dynamics coupled with the prospects for a “nuclear renaissance” (fueled by oil crises, energy prices, global warming, and acute energy security concerns) unfortunately seem to make the nuclear anarchy scenario not only the default option, but also a much more immediate prospect.

# Toward a Fourth Nuclear Age?

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What could be the tipping points that signal the final demise of the “third nuclear age” and decisively propel us into a different nuclear order? These could be many, but the ones that seem easier to envisage (which does necessarily imply that they are the most likely to occur) may be one or more of the following events. These are listed in descending order of likelihood according to my subjective judgment:

- Emergence of a nuclear or at least a nuclear-capable Iran followed in rapid succession by a Middle East nuclear arms race
- Escalation and spillover of the DPRK nuclear crisis
- Further progress toward meltdown of the Pakistani state followed by a nuclear avalanche
- Appearance or resurgence of any nuclear country X
- Proliferation spillover from the renaissance of nuclear power
- Acquisition of (crude) nuclear weapons by terrorists
- A new nuclear confrontation, be it between India and Pakistan, or the US and Russia or China
- Diminished confidence in existing nuclear arsenals leading to renewed efforts to test and modernize them

While the emergence of such a “fourth nuclear age” has by now become the default option, a more benign nuclear order might still ensue, thanks in no small part to the growing sense of alarm over exactly such a prospect. This concern was most successfully echoed by the abolition vision of George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn.<sup>22</sup> But even they would admit that under the best of circumstances the

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<sup>22</sup> See George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, “A World Free of Nuclear Weapons”, *The Wall Street Journal*, January 4, 2007; and

reinvigorated push toward nuclear abolition they have unleashed could take decades to reach its final destination.<sup>23</sup> Nevertheless, they would submit that the mere drive toward a global zero option coupled with some of the concrete steps listed below might also fundamentally change the character of the present nuclear order.<sup>24</sup> These might also propel us pretty soon into a new nuclear age, one characterized not by nuclear anarchy but rather a greater nuclear stability at lower numbers of weapons and more stringent controls and restrictions on the remaining nuclear arsenals and activities. For now, the prospects of realizing this nuclear disarmament vision are mainly predicated on the hope and conviction that we need to move in a direction yielding greater stability, rather than on a coldblooded realism that we can attain this end state in our time. In any event, no new overarching formula or process for implementing it has yet emerged although there are several initiatives underway vying for such status. And we are far from having reached a consensus among all key participants on the need for carrying out this paradigm shift, let alone about how to go about it in a sustained and stable manner.

Some of the more pressing requirements for regaining nuclear stability, other than the global disarmament vision, include – in no particular order:

- Regaining an overall understanding and collaboration between the US and Russia on strategic affairs while establishing a similar relationship between the US and China<sup>25</sup>
- Effectively and rapidly defusing several specific nuclear flashpoints, with Iran, DPRK, and Pakistan (in that order) topping the list
- Adjusting the original NPT formula regarding issues such as Treaty withdrawal, the link between the Treaty and Safeguards, and between the various obligations enshrined in the Treaty

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George P. Shultz, *et al.*, “Toward a Nuclear-Free World”, *The Wall Street Journal*, January 15, 2008.

<sup>23</sup> For an interesting review of the state of the play on the nuclear abolition debate see “Nuclear Disarmament: What to Do with a Vision of Zero”, *The Economist*, November 13, 2008. Another measure of the centrality of the debate it has stimulated is the wide range of recent articles on this theme that have appeared in leading journals of international relations. See, for example, Ivo Daalder and Jan Lodal, “The Logic of Zero: Toward a World Without Nuclear Weapons”, *Foreign Affairs*, Vol. 87, No. 6, November-December 2008.

<sup>24</sup> George P. Shultz, *et al.*, *The Wall Street Journal*, and their commentaries in *Reykjavik Revisited: Steps Toward a World Free of Nuclear Weapons* — Complete Report of 2007 Hoover Institution Conference, Stanford: Hoover Institution Press, 2008.

<sup>25</sup> This should include the US accepting China’s nuclear deterrent and not seeking capabilities to negate it, two attributes that have thus far been missing from the bilateral US-Chinese relationship. Without such an anchor it is difficult to envisage how one can attain strategic stability of a nature that would be indispensable for joint action to re-stabilize the nuclear order and beyond.

- Developing a new multifaceted commercially viable global regime on access to civilian nuclear technology. This regime would have to be predicated on the concept of making responsible access to power reactors and leased fuel easier, but at the same time diminishing the proliferation potential inherent in dual-use nuclear technologies, and the safety, security, and environmental risks inherent in nuclear power.
- Enhancing the IAEA Safeguards system (Additional Protocol and beyond) and reforming the IAEA culture and structure so as to apply it effectively
- Bringing into force the CTBT and maintaining a (hopefully verifiable) global moratorium on testing until that time
- Prudently managing the preservation and modernization challenge for smaller remaining nuclear forces of the P-5 and especially the US to defuse reliability/safety concerns of ageing systems without unleashing a negative political dynamic
- Building some form of effective global leadership to develop, facilitate, reward, and enforce the new nuclear arrangements. It could perhaps draw on some existing institutions (such as the UNSC, CD, and IAEA). But these would have to be fundamentally rearranged, revitalized, and above all rewired to perform this role, which could hardly be envisaged without some form of collective leadership sharing a sense of purpose and urgency.



# Conclusion

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Over 60 years after the dramatic advent to the world scene of nuclear weapons we may now have come full circle. Nuclear weapons are slowly making their way back to the center of the political agenda. And once again no holds are barred in discussing what to do about them. Mainstream thinkers and prominent practitioners alike are asking aloud the most fundamental questions regarding our nuclear destiny. Can we (continue to) live with nuclear weapons, and conversely can we risk living without them? What would we risk by trying to get rid of them, and what would be the peril associated with failing to do so? Can we “disinvent” nuclear weapons and, if so, how should we go about doing so responsibly and in a verifiable fashion?<sup>26</sup> Conversely, how high of a risk are we running by even raising doubts about the utility of nuclear deterrence, let alone by actually trying to do something to realize this vision?

Where all seem to agree is that we are coming dangerously close to the nuclear precipice. This naturally gives rise to an increasingly intense effort to urgently reexamine what would it take to reintroduce a measure of stability into the nuclear order. Have we reached the point where the offensively dominated nuclear deterrence regime where the wherewithal is possessed by the few has become unsustainable? Will it be inevitably replaced with one where nuclear weapons are in the hands of the many, including possibly non-state actors? By a defensively dominated nuclear order that trades the logic of “deterrence by punishment” for “deterrence by denial” as the default option in a multipolar nuclear context? By a mixture of both whereby missile defenses complements and reinvigorates classical nuclear (and conventional) deterrence by providing a measure of protection against erratic or reckless nuclear possessors? Or perhaps by a global nuclear abolition irreversibly ridding the world of all nuclear weapons?

Similarly, the hopes and risks associated with nuclear energy have also resurfaced as a serious related bone of contention. Some of the debate sounds strikingly familiar. It centers on questions such as the maturity of nuclear power technology, its viability for the generation of energy in a relatively cheap and reliable way, and its capacity to do so

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<sup>26</sup> For superb exposés of the issues that need to be confronted in thinking about nuclear abolition and the challenges lying ahead see Michael Quinlan, “Abolishing Nuclear Armouries: Policy or Pipedream?” *Survival*, Vol. 49, No. 4, December 2007, pp. 7-15; and George Perkovich and James A. Acton, “Abolishing Nuclear Weapons”, *Adelphi Paper* No. 396, London: International Institute for Strategic Studies, 2008.

without running excessive risks of nuclear proliferation, safety, security and waste management. But this debate does have a new twist, introduced by heightened concerns over global warming, energy security, and the dramatically improving track record of nuclear power plants. Unsurprisingly, the answers given to these questions currently remain inconclusive and tend to vary greatly over time and from one nation to another. This, however, is hardly an academic debate, and its outcome is clearly germane to the broader nuclear order of concern here. This holds especially true even if one contemplates nuclear disarmament, given the inherently dual-use nature of nuclear technology. Nor will it change if access to nuclear power remains potentially synonymous with access to the nuclear fuel cycle.

The prospect of a nuclear renaissance, in turn, forces us to question whether we can afford (politically, economically, and above all strategically) either to procrastinate in devising new global rules to regulate this domain or to sustain the current “laissez faire” environment. This seems especially pertinent because the current fortunes of nuclear power vary greatly and swing sharply neither merely on the basis of the absolute merits of nuclear power nor even on its relative ones in comparison to other energy sources. Extraneous political considerations and/or narrow, myopic economic interests could still lead to careless dissemination of nuclear power in the absence of proper safety, security, proliferation, and environmental safeguards commensurate with its sensitivity. This concern assumes some urgency given that nuclear technology has an active life of decades and its products for millennia, while rolling back decisions that have been made or technology that has already been transferred is excruciatingly difficult.

In the final analysis, there is one important feature that does seem to set apart the overall current nuclear debate from earlier ones, namely its truly global nature. The power to shape the global nuclear future now lies in the hands of a far larger number and strikingly different mix of stakeholders, governments, coalitions thereof (such as the “New Agenda Coalition”) and non-governments (from NGOs and ad hoc commissions all the way up to Al Qaeda) alike, through influence both on the arms control and disarmament processes and agendas, as well as their actions on the ground. This is not dissimilar to the situation presently characterizing either the efforts to resuscitate the global financial system or to fight global climate change. This could, at best, be a guarantee for securing a more equitable and widely subscribed outcome. At worst, though, it could also prove a recipe for paralysis and nuclear anarchy. So the pressing challenge in front of us is to navigate successfully between this set of incentives and hurdles in the effort to shape a benign “fourth nuclear age”. We must do so recognizing that muddling through is likely to result in the rapid emergence of its far more frightening variant.

It is perhaps appropriate to close on a philosophical afterthought regarding the evolution of the nuclear order. It might be helpful to look at the fate of this particular regime from a broader historical and comparative perspective on international regimes? The contemporary nuclear order has not merely endured but has in fact helped enhance global stability for over



a generation, notwithstanding fundamental transformations of the world during this period. By any account this constitutes a remarkable accomplishment, all the more so if we bear in mind the extremely unfavorable odds faced since its inception. Its track record becomes all the more impressive when viewed against the perspective offered by looking at the fortunes of other international regimes (such as the monetary and financial regimes). Yet this framework also suggests that we ought to consider it both unusual and fortunate if any international regime survives for a generation. Assuming this observation is indeed correct, it may actually have profound practical implications.<sup>27</sup> Because it implies that it is not merely unwarranted but also counterproductive to deny any longer the nuclear regime's demise or to look at it with the stigmatization and victimization that is typically associated with such an attribution (or admission) of failure. If we can dispense with such attitudes, the road may actually be paved for adopting the innovative solutions necessary either to resurrect this regime or build another one in its stead.

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<sup>27</sup> Credit for drawing attention to this perspective and the practical implications that flow from it go to David Holloway.



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