THE FUNDAMENTALS OF NUCLEAR STRATEGY

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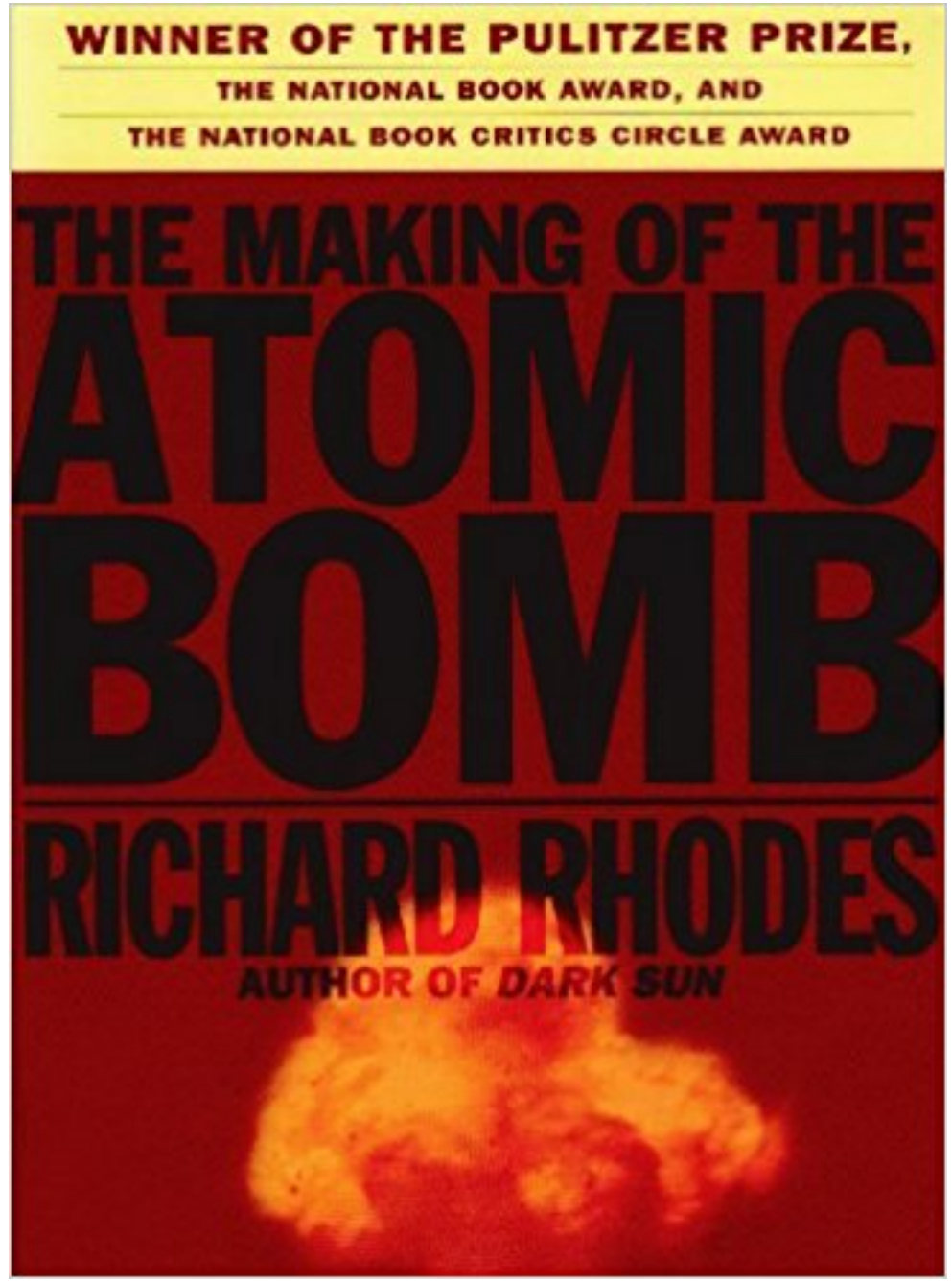
The Nuclear Age Arrives, August 6, 1945: Truman Announces the Hiroshima Attack

- "SIXTEEN HOURS AGO an American airplane dropped one bomb on Hiroshima, an important Japanese Army base. That bomb had more power than 20,000 tons of T.N.T. It had more than two thousand times the blast power of the British "Grand Slam" which is the largest bomb ever yet used in the history of warfare…. With this bomb we have now added a new and revolutionary increase in destruction to supplement the growing power of our armed forces…. ***It is an atomic bomb. It is a harnessing of the basic power of the universe. The force from which the sun draws its power has been loosed against those who brought war to the Far East."***

Truman Explains the Power of the Bomb

- "We are now prepared to obliterate more rapidly and completely every productive enterprise the Japanese have above ground in any city. We shall destroy their docks, their factories, and their communications. Let there be no mistake; we shall completely destroy Japan's power to make war….If they do not now accept our terms they may ***expect a rain of ruin from the air, the like of which has never been seen on this earth."***

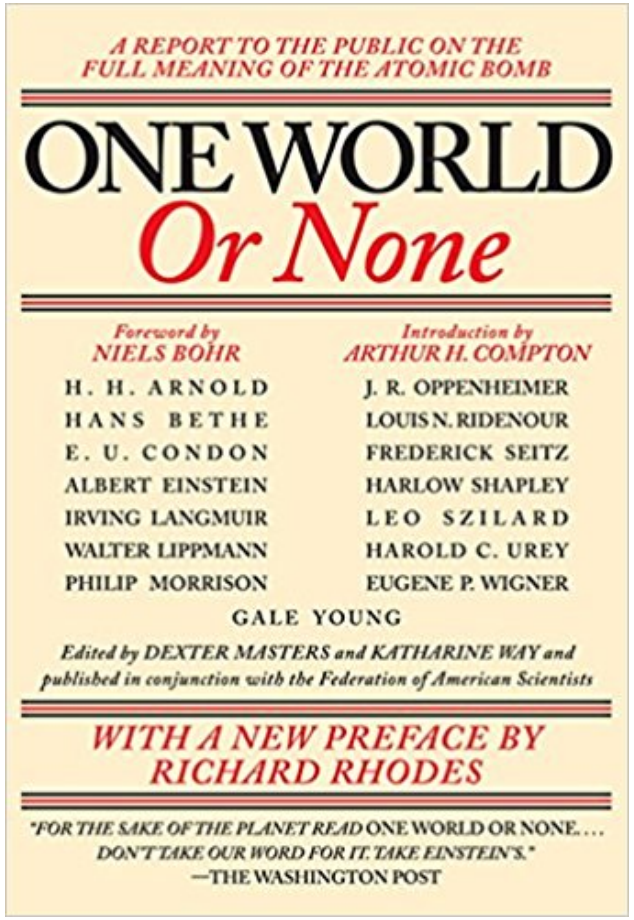

WINNER OF THE PULITZER PRIZE,
THE NATIONAL BOOK AWARD, AND
THE NATIONAL BOOK CRITICS CIRCLE AWARD
THE MAKING OF THE
ATOMIC
BOMB
RICHARD RHODES
AUTHOR OF DARK SUN

Finding Security in the Nuclear Age

Five possible answers to nuclear peril:

- World Government? Abolish war?
- Nuclear disarmament
- Deterrence
- Warfighting
- Conventionalization

REVOLUTIONIZE INTERNATIONAL POLITICS



- It is urgent that the implications of the nuclear revolution and the magnitude of the nuclear danger be understood.

- "We now have before us the clear choice between adjusting the pattern of our society on a world basis so that wars cannot come again, or of following the outworn tradition of national self-defense, which if carried through to its logical conclusion must result in catastrophic conflict" (Arthur Compton)

Internationalize or Eliminate Nuclear Weapons

The Baruch Plan

(Presented to the United Nations Atomic Energy Commission, June 14, 1946)

My Fellow Members of the United Nations Atomic Energy Commission, and My Fellow Citizens of the World:

We are here to make a choice between the quick and the dead.

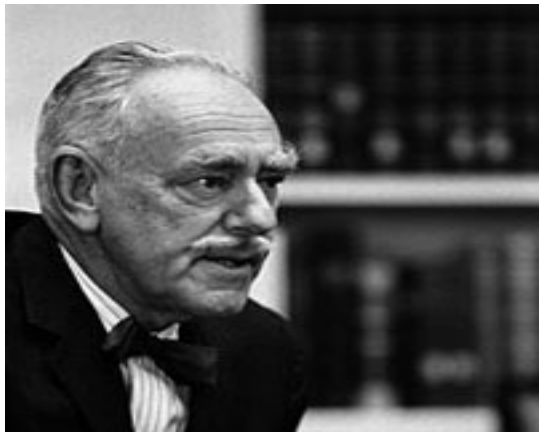
That is our business.

Behind the black portent of the new atomic age lies a hope which, seized upon with faith, can work our salvation. If we fail, then we have damned every man to be the slave of Fear. Let us not deceive ourselves: We must elect World Peace or World Destruction.

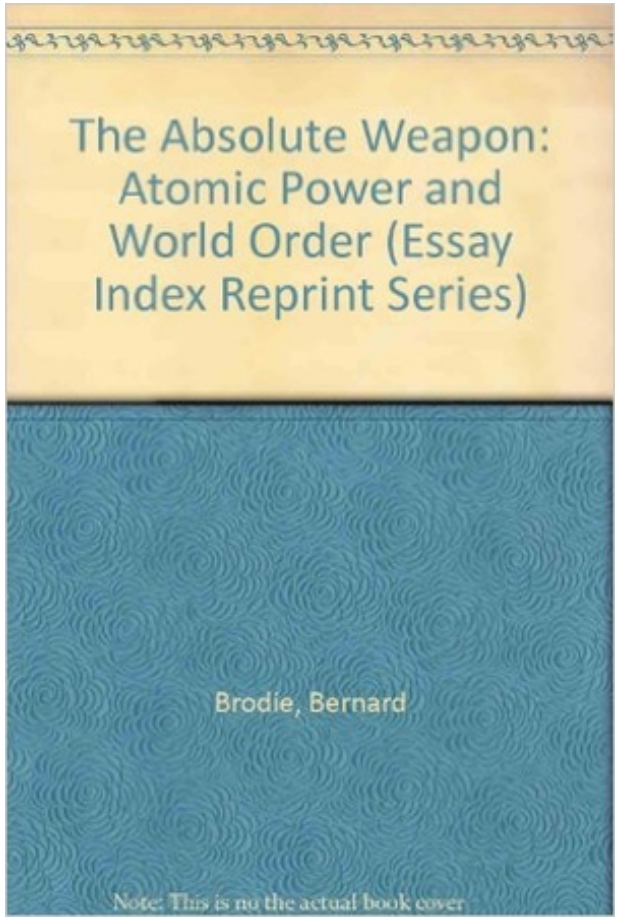
Russell-Einstein Manifesto

July 9, 1955

- We are speaking on this occasion, not as members of this or that nation, continent, or creed, but as human beings, members of the species Man, whose continued existence is in doubt.
- Here, then, is the problem which we present to you, stark and dreadful and inescapable: Shall we put an end to the human race; or shall mankind renounce war?



Deterrence by Threat of Retaliation



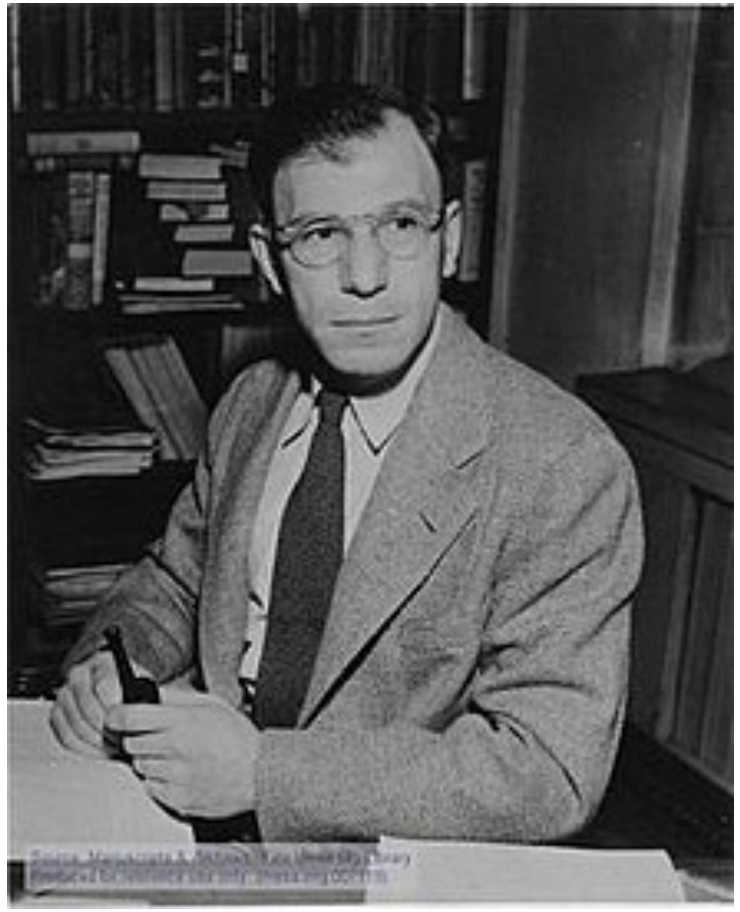
- Nuclear weapons are so destructive that the threat of second strike retaliation would be a very powerful deterrent
- No conceivable political objective would be worth absorbing a devastating retaliatory strike
- Primary purpose of nuclear weapons is to prevent use rather than to be used

Brodie on the Deterrence Revolution

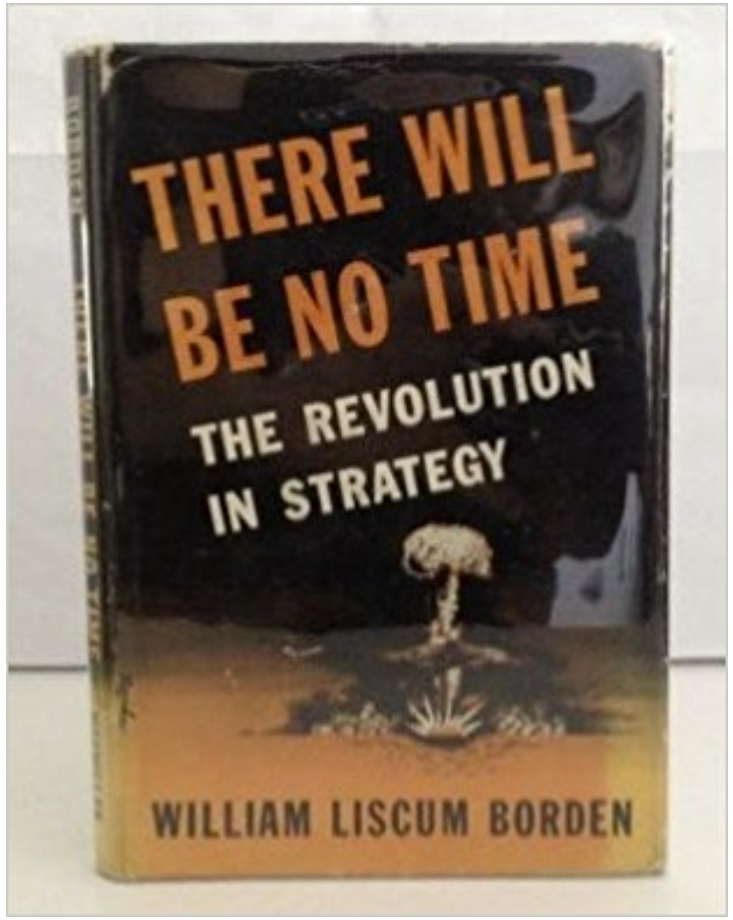
“Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose."

Bernard Brodie

(October 1945)



Nuclear Warfighting, 1946



- Early first use seen as the only way to limit damage that could be inflicted by the nuclear forces of an opponent
- Nuclear war is winnable
- Must fear “atomic Pearl Harbor”
- First strike versus second strike
- Counterforce versus counter-value targeting
- Deterrence versus warfighting

CONVENTIONALIZATION

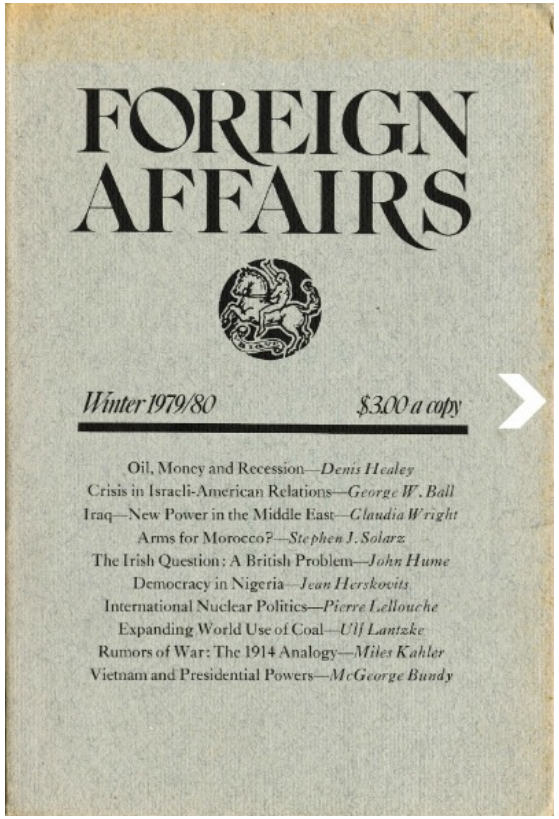
- Eisenhower's massive retaliation policy: nuclear response to conventional attack

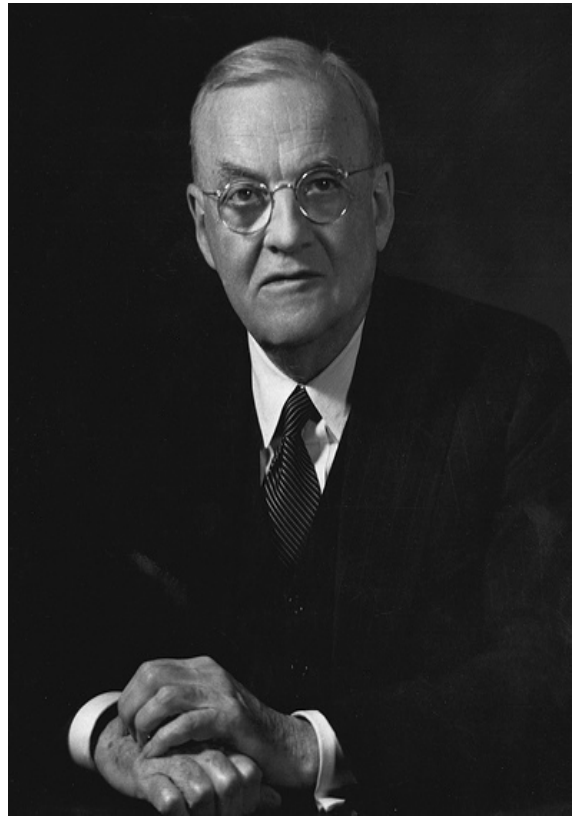
- **"Challenge and Response in United States Policy"**

By John Foster Dulles

Foreign Affairs, October 1957

- Desire usable nuclear weapons



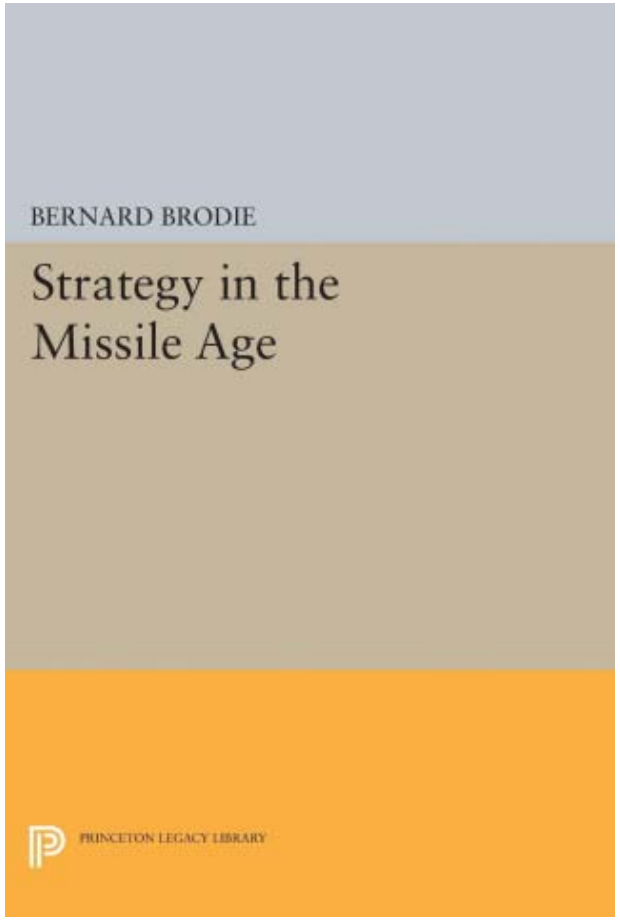


The Golden Age of Nuclear Strategy, 1955-1965

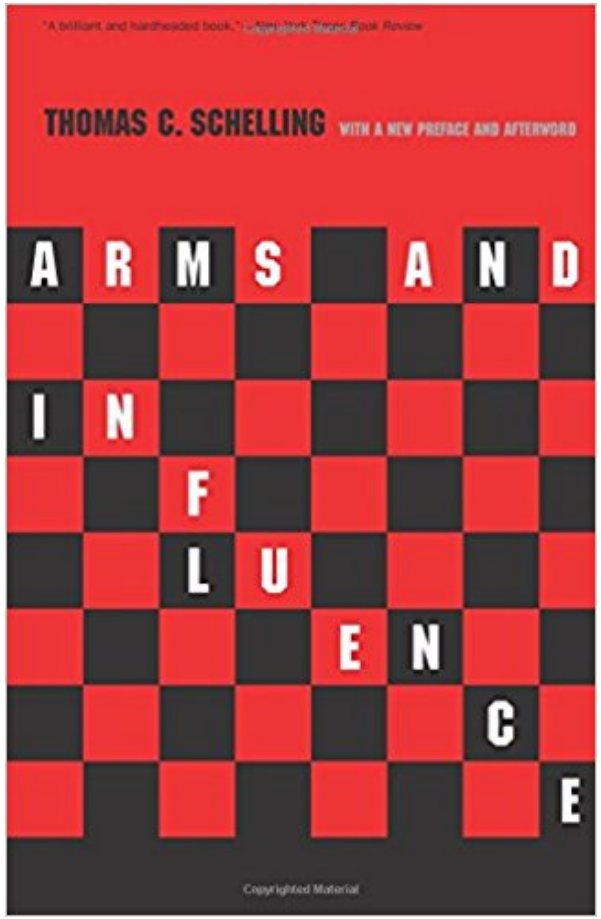
Consequential nuclear developments circa 1960:

- The missile age arrives
- The missile gap: Sputnik (1958) and the perception of Soviet advantage
- The nuclear arms race in full force: 20,000+ warheads on both sides by 1960
- The United States discovers force vulnerability
- Limited nuclear war and escalation ladders
- The N + 1 Problem: Nonproliferation worries arise
- 1962 Cuban missile crisis: nuclear dangers not hypothetical
- The development of arms control

Into a New Era



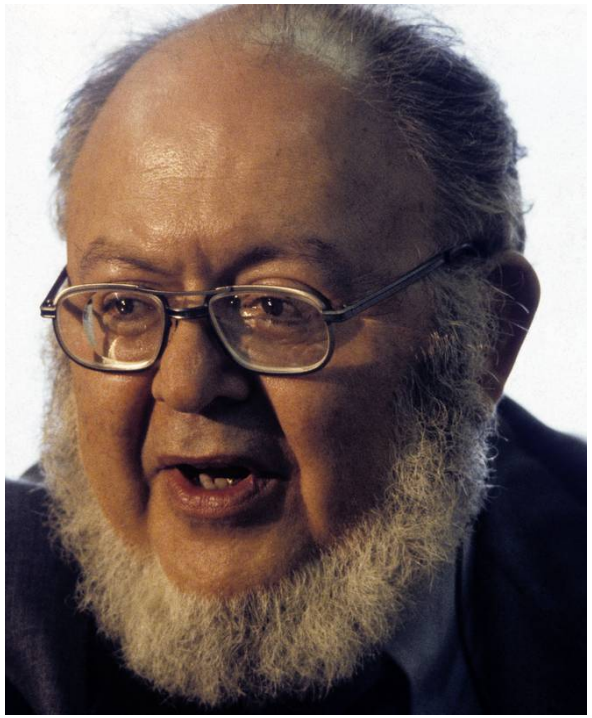
Enter Tom Schelling: "The Mischievous Influence of Haste"

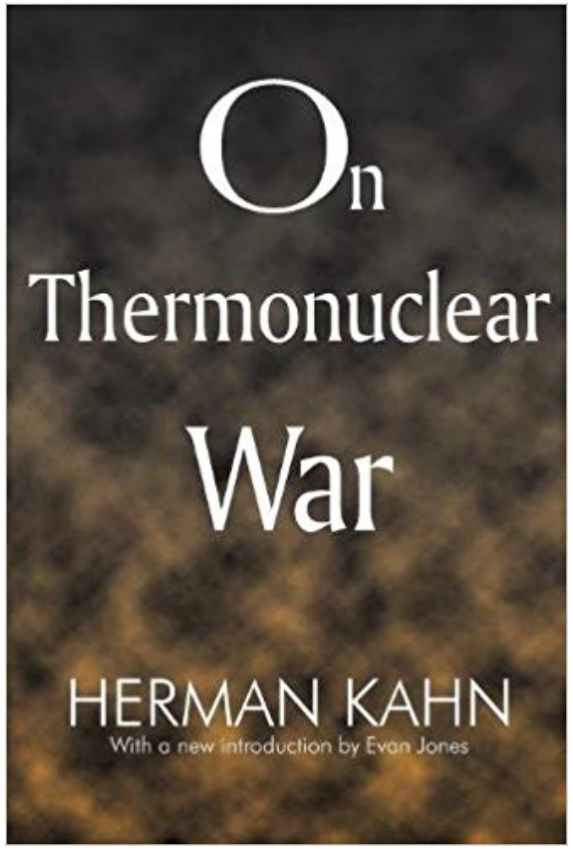


Albert Wohlstetter,"The Delicate Balance of Terror," *Foreign Affairs*, January 1959

- What if the other side strikes first?
- Deterrence cannot be assured if retaliatory forces can be destroyed by an opponent's first strike.
- American nuclear forces of the day – B-47 medium range bombers deployed on overseas bases near the Soviet Union – are vulnerable.

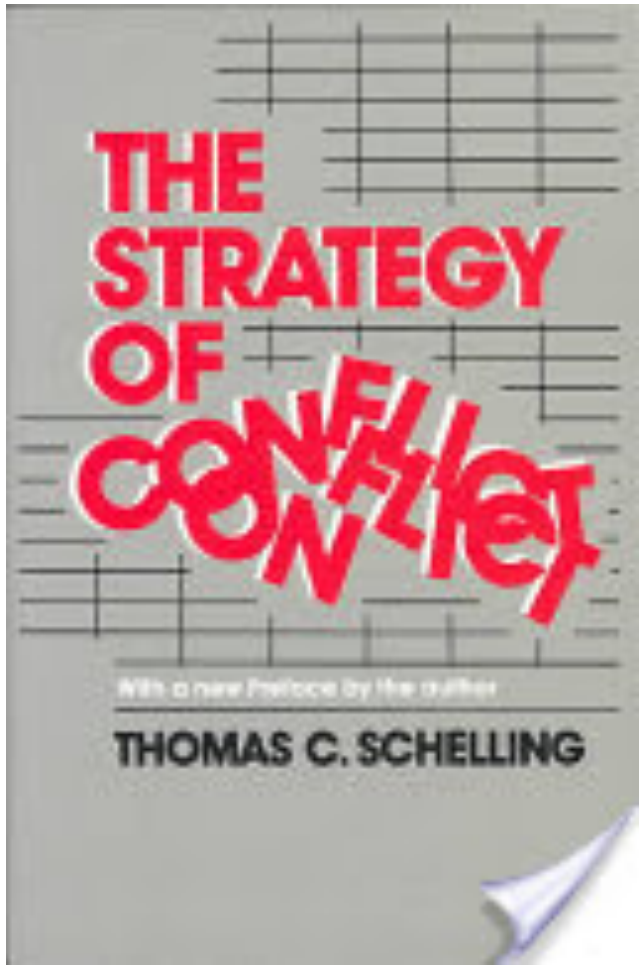
Varieties of Nuclear War and Worries about Escalation





- Need to think about scenarios other than all-out war
- Concept of an escalation ladder
- Concern about escalation dynamics in crisis or war
- Problem of deterring lower level challenges
- Escalation dominance and intra-war deterrence

"Reciprocal Fear of Surprise Attack"



- Vulnerable forces invite attack.
- Force vulnerability can produce "use them or lose them" choices.
- Each side will fear the other side's option to strike first.
- This fear could produce escalatory pressures in crisis or war.

First Strike Advantages and Incentives

- Preventive war: Attack to disarm the other side
- Preemptive war: Attack first if it appears that the other side is going to attack
- Damage limitation: Attack first if war or escalation in war appears inevitable in order to reduce the capability of the other side to inflict damage. Better to reduce the threat as much as possible. Provides grounds for first use even when some opposing forces will survive attack.

- First strike incentives produce instability: decision-makers will have rationales for using nuclear weapons and each side will fear the other's first strike temptations.

SCHELLING ON STABILITY

- ”Stability − the assurance against being caught by surprise, the safety in waiting, the absence of a premium on jumping the gun.”

- *Arms and Influence*, p. 235

Eliminating First Strike Incentives

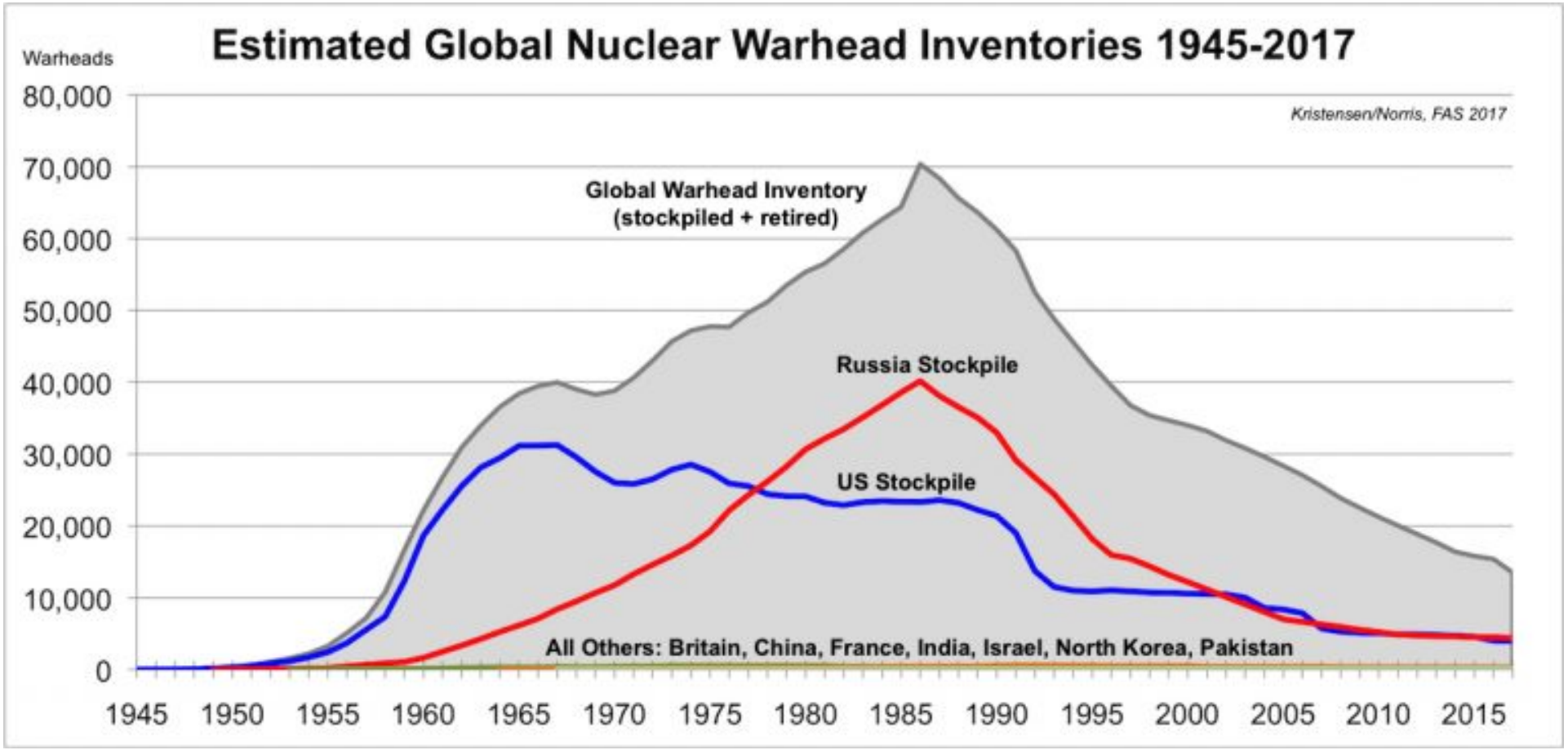
Stability requires that two essential conditions must be met:

1. Survivable retaliatory forces

2. Capable of inflicting unacceptable retaliatory damage under all circumstances.

How can these conditions be met?

VERY LARGE FORCES



Protection: Hardening and Shelters

- ICBMs deployed in extremely strong underground silos designed to absorb and survive nuclear attack
- Shelters or bunkers for aircraft (proposed but rejected)
- Problem: as ICBMs grow more accurate, silos grow more vulnerable

Alert and Evacuation Measures

- Bombers on continuous airborne alert for much of Cold War
- Bombers on the ground held at high state of alert to allow evacuation in the event of warning of attack (runway alert)

Stealth and Mobility

- Nuclear armed ballistic missile submarines (SSBNs) prowl the seas, difficult to detect and destroy
- Mobile missiles: late Cold War concerns about ICBM vulnerability result in development of small mobile ICBM (Midgetman). Never deployed.

Missile Defenses

- Protect retaliatory forces by intercepting attacking warheads
- Complicates attacker planning
- Increases force requirements for counterforce strikes
- Increases likelihood of surviving forces

LAUNCH ON WARNING(LOW)/ LAUNCH UNDER ATTACK (LUA)

Launch Under Attack to Redress Minuteman Vulnerability?

Richard L. Garwin

Secretary of Defense Harold Brown has noted that even if the Soviet Union develops the capability to destroy U.S. Minuteman silos, the Soviets cannot be certain that they can therefore destroy missiles. Accordingly, the development of the ability to destroy silos does not necessarily represent any net change in the Soviet ability to destroy other targets of value in the United States or, for that matter, to reduce the amount of destruction the United States can inflict on targets of value in the Soviet Union. This lack of assurance that Minuteman missiles could in fact be destroyed could clearly be very important under certain circumstances, and it is the purpose of this paper to explore in greater depth than has been publicly available, both technical and policy aspects of the ability to launch ICBMs "under attack" or "on impact."[1]

On the other hand, so long as the U.S. Submarine Launched Ballistic Missiles (SLBM) force is in fact invulnerable, and our cruise missiles and their carriers can penetrate Soviet air defense, whether Minuteman Re-entry Vehicles (RVs) survive to be launched may make little difference to the Soviet Union or to the United States. Each reader will no doubt have individual views on this point.

Some, including the author, although advocating increasing the durability of our system of ICBM basing, have emphasized at the same time the desirability of a clear capability to launch under attack, in order to diminish in the minds of Soviet leaders any possible benefits from a massive strike at the U.S. ICBM force, and so further reduce the chance that the Soviet Union would launch such a strike. Given the likelihood that no basing system for ICBMs will at all times be judged perfectly durable by all viewers (i.e., pre-launch survivability = 1.0), the ability to launch under attack could further

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A version of this paper was prepared for the New York Arms Control Seminar, sponsored by the Institute for War and Peace Studies of Columbia University.

1. Air Force definitions are approximately as follows: *Launch on warning*: a launch in response to sensor indication of an attack on the continental United States ("CONUS"). *Launch under attack*: a launch after high-confidence determination that CONUS is under missile attack. *Launch on (or after) impact*: Secretary Brown's term for a launch after nuclear explosions on or above ICBM fields. *Launch on vital assessment*: a launch after determination of the intent and extent of the attack, including the degree of threat to ICBM silos.

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- If attack is detected, fire missiles before they are destroyed.
- Benefit: Assures that there will be retaliation and make first strike very risky for opponent
- Complication: produces hair trigger postures that can be destabilizing in crises and can be dangerous if there is false warning

Diversify Delivery Systems: The Nuclear Triad

Condition 1: Survivable Retaliatory Forces

- Large numbers
- Protection: hardening and shelters
- Alert and evacuation measures
- Stealth and mobility
- Missile defenses
- Launch on warning or launch under attack doctrines
- Diversified delivery systems

Complications for Surviving Forces

1. Command and control vulnerabilities: adversaries might destroy the political and/or technical capacity to operate surviving forces in what were known as decapitation scenarios.

2. Missile defenses: If defenses exist on the other side, whatever forces survive an attack will have to penetrate those defenses to perform their mission. Defenses can further degrade your deterrent force, thereby supplementing a counterforce first strike. (Hence missile defenses come to be seen as destabilizing.)

Steinbruner on Nuclear Decapitation

- "A policy to decrease missile vulnerability is illogical unless it also addresses command vulnerability. Military planning is more likely to assume rapid escalation as opposed to limited warfare, nullifying the concept of survivability."
- Command and control systems are vulnerable and hard to protect.
- Command vulnerability makes preemptive attacks rational.

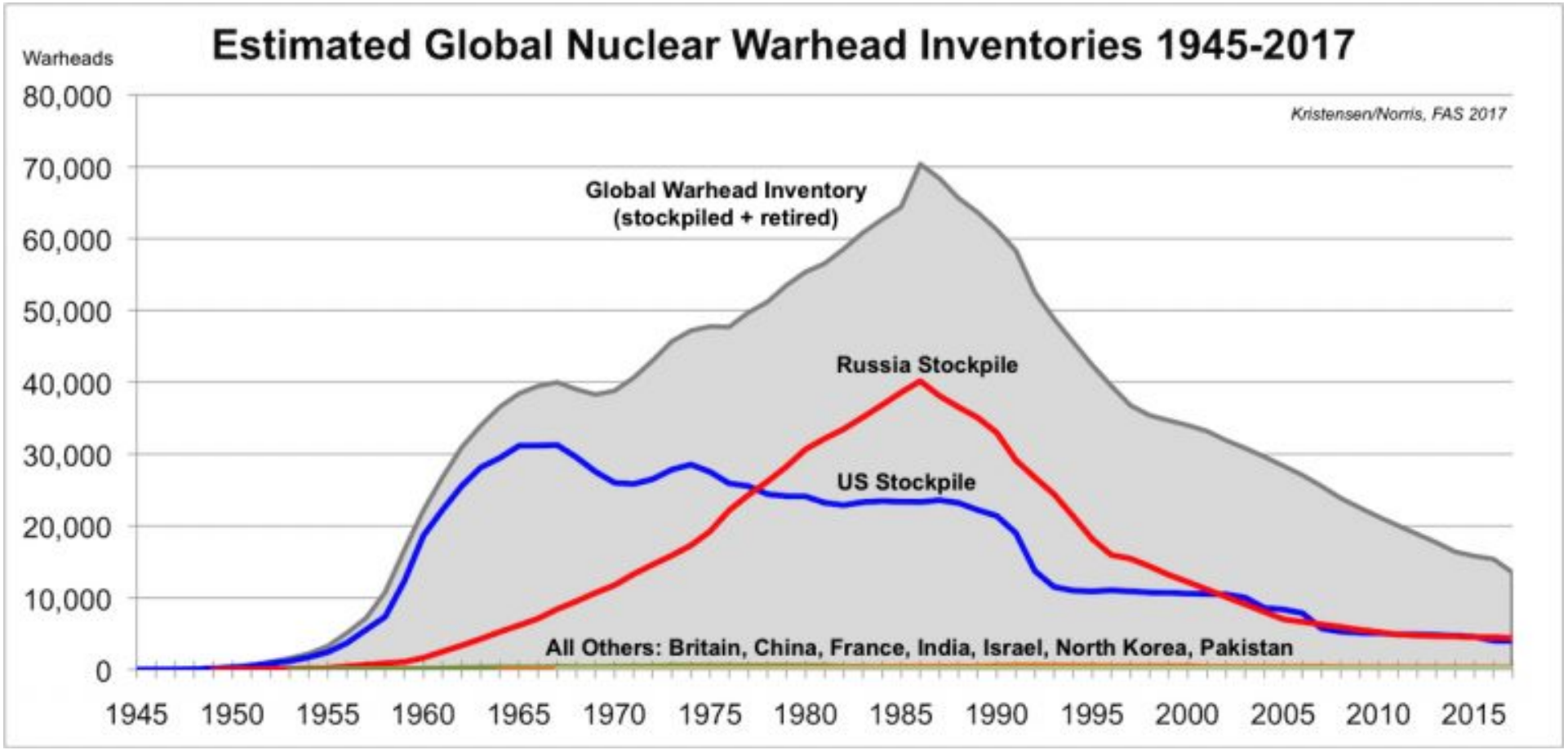
Destabilizing Missile Defenses

- Missile defenses MOST EFFECTIVE AS ADJUNCT TO COUNTERFORCE FIRST STRIKE, defending against the "ragged retaliation of a reduced attacking force.
- Defenses therefore part of a destabilizing posture.
- Neutralized by expanding attacking forces, producing offense-defense arms race
- Essentially eliminated by the 1972 ABM Treaty
- The US withdrew from the treaty in 2002.

Vulnerabilities of Missile Defenses

- Saturation: proliferate warheads to overwhelm defenses
- Decoys: multiply attacking objects to confuse and overwhelm defenses
- Self-protecting: defenses can be attacked and fail catastrophically when key nodes are destroyed
- Blinding: Defenses depend on radars and satellites that can be attacked
- Evasion: maneuverable warheads produce unpredictable trajectories.
- Alternative modes of delivery: aircraft, cruise missiles, merchant vessels, smuggling. "Lock the front door; leave the back door open."
- Software challenges: must work perfectly the first time the system is really used under operational conditions
- High success rate required: against thousands of attacking warheads, traditional attrition rates are unacceptable.

Offense-Defense Arms Racing?



Condition 2: Unacceptable Retaliatory Damage, or What Deters?

Wide Range of Views on Requirements for Deterrence – Deterrence is quite easy or very hard

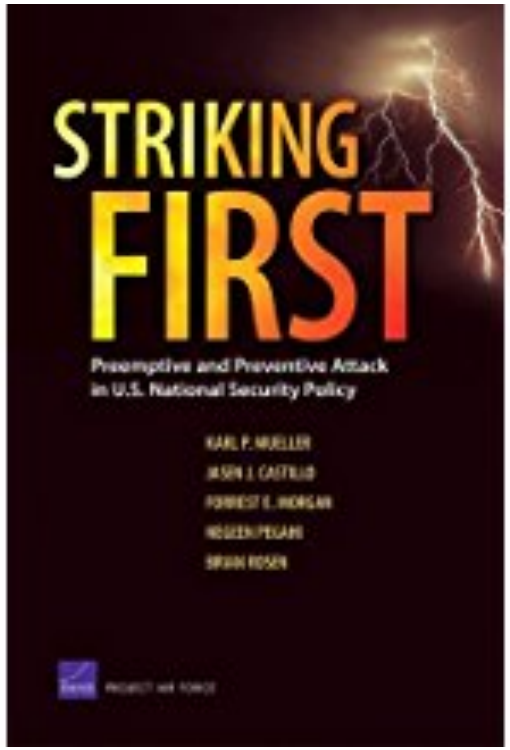
- Existential Deterrence
- Minimum Deterrence
- Flexible Response
- Assured destruction
- Second-strike Counterforce
- Escalation dominance

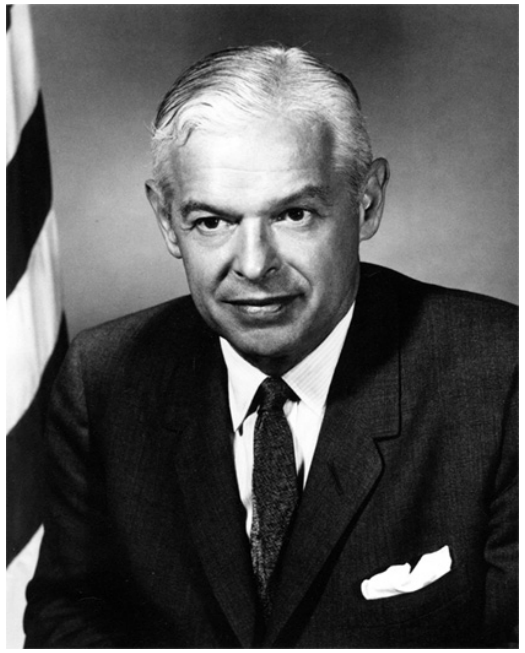
A MAD Answer: Mutual Assured Destruction

- If surviving forces are sufficiently large and sufficiently destructive to do massive damage under all circumstances, then there is no incentive to strike first under any circumstances.
- If both sides possess such a capability, then a condition of mutual deterrence − or mutual assured destruction − exists. In this case neither side has an incentive to strike first.
- If adding weapons does not reduce potential damage from a retaliatory strike, there is less incentive to competitive acquisition of weapons, producing arms race stability.

Not Mad about MAD

- Always controversial
- MAD as desirable condition, a policy, as fact, as unfortunate reality, as something to be escaped as much as possible.
- Operational doctrines always pursued counterforce, warfighting options.





Is Nuclear Stability Being Undermined?

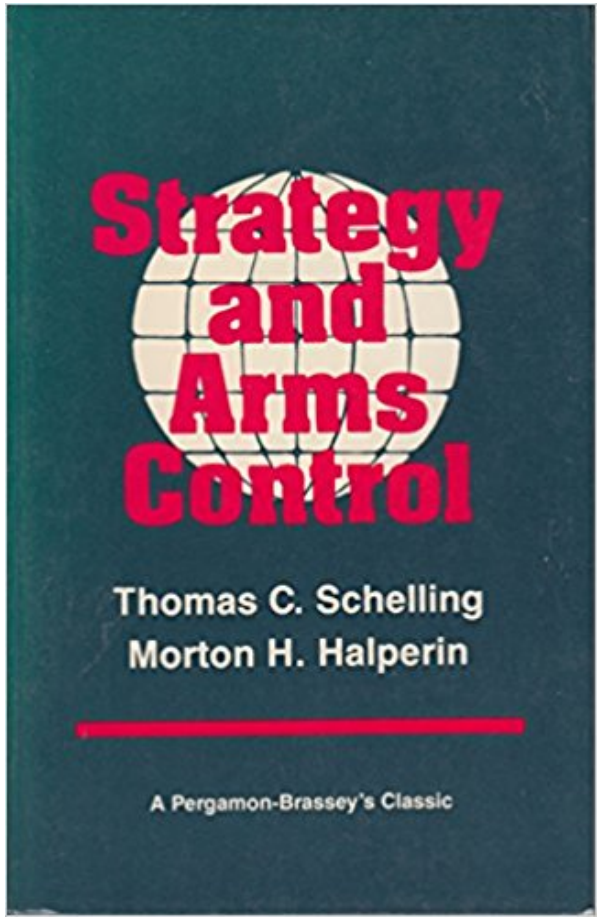
Mature Cold War

- Stable nuclear balance
- Well established technologies
- Extensive arms control architecture
- Extensive Soviet-American diplomatic interaction

Today

- Dramatic technological change
- Nuclear multipolarity
- Frayed political relationships
- Decaying arms control framework

The Rise of Arms Control



- Even intense rivals share an interest in avoided unwanted nuclear war
- Preserve stability via negotiated arrangements
- Explicitly managed competition can save resources and reduce risks
- Negotiated limits can contain arms race dynamics and promote arms race stability

Nagasaki, August 9, 1945

For More Nuclear Strategy and History