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### **The Importance of Professional Nuclear Policy Analysis**

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In a recent article entitled, “Deterrence is Not Rocket Science: It is More Difficult,”<sup>1</sup> Keith Payne commented on an earlier published article written by two physicists who maintained that since no one has experienced nuclear warfare, all individuals discussing nuclear polices, including those within defense establishment “silos,” are amateurs and all should be considered equally able to speculate usefully on the subject. Payne challenged that argument by amply demonstrating how complex it can be for a nation to configure a credible nuclear deterrent. It takes time and commitment for analysts to learn their skills before they can adequately give a discourse on deterrence. As I had discovered when I did research for my book, *From Berkeley to Berlin*, Keith Payne’s point about the importance of the needed quality of nuclear policy analysis was made at the outset of the Cold War, when a badly needed American nuclear deterrent strategy came about just in time to face a challenge from the Soviet Union.

The Cold War was approaching an apogee in 1954. Among other events, France saw its aspirations in Southwest Asia end as French soldiers fought for their lives at a remote outpost called Dien Bien Phu. The United States had demonstrated the world’s first thermonuclear weapon in November 1952, and the Soviets followed suit within six months. The U.S. Air Force wanted the Atomic Energy Commission (AEC) to develop a one megaton bomb that could be dropped from a strategic bomber and the AEC responded in 1954 with Operation Castle, which featured tests of multi-megaton thermonuclear devices. President Eisenhower, fearful that expansive defense budgets could bankrupt the country, wanted to reduce the costs of



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conventional military forces. He felt the best way to deter a Soviet military provocation, especially against Western Europe, was to make it clear the United States would respond to Soviet aggression with the full force of the U.S. nuclear arsenal. His nuclear policy was formally announced by his Secretary of State, John Foster Dulles, in a speech before the Council of Foreign Relations in New York. Eisenhower's nuclear policy was called "Massive Retaliation."<sup>2</sup>

Criticism of the Eisenhower administration's nuclear strategy did not take long to emerge. To Paul Nitze, who had served in Truman's State Department, Massive Retaliation made no sense. Nitze felt Dulles had not grasped how powerful hydrogen bombs were. Further criticism of Eisenhower's defense strategy came ten months after Dulles' speech from a professor of political science named William W. Kaufmann, who would later educate a generation of political science students at MIT. Kaufmann wrote an essay entitled "The Requirements of Deterrence" for the Center of International Studies at Princeton, which provided the intellectual logic that challenged Massive Retaliation as a Cold War strategy.<sup>3</sup> Even Eisenhower's fellow West Pointer, General Matthew Ridgeway, Chief of Staff of the Army, derided Massive Retaliation as being a policy that would weaken the country's conventional forces to a point where they would be unable to stop, let alone deter, Russian aggression in regional areas where a direct threat to the United States was not present.

Two years before the Dulles speech, AEC Commissioner Thomas Murray had urged a Nobel laureate, director of the University of California Radiation Laboratory, Ernest O. Lawrence, to create a laboratory that could better prepare the nation to face the emerging thermonuclear threat coming from the Soviet Union. Lawrence obliged the commissioner and in September 1952, the Radiation Laboratory opened an adjunct facility at an abandoned naval aviation base in Livermore, California. In a fortuitous event, Lawrence had met a renowned geophysicist named David Griggs during World War II at the MIT Radiation Laboratory. President Roosevelt's special scientific council, Vannevar Bush, had asked Lawrence to create a laboratory to help develop radar during the war and the result was the MIT Radiation Laboratory. One of the laboratory's recruits was Griggs, who had joined a research project led by Lawrence's lieutenant, Louis Alvarez. Griggs, Alvarez, and Lawrence became lifelong associates.

After the world war, when Air Force General Hap Arnold approved the creation of the RAND Project, Griggs was appointed director of RAND's Physics Division. He spurred interest among his talented political analysts to go to the new laboratory in Livermore and immerse themselves into the research going on there. Among the RAND analysts who would arrive in Livermore were some future giants of nuclear policy strategies, including Bernard Brodie, William Kaufmann, Herman Kahn, Andy Marshall, and Albert Wohlstetter. Kahn spent enough time at the new laboratory to have his own office, situated in a hallway surrounded by nuclear physicists intent on designing thermonuclear warheads.



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In the mid 1950s, RAND had conducted a study that tested the viability of Eisenhower's Massive Retaliation strategy. If America's recourse to Soviet aggression was to attack the Soviet homeland with its massive stockpile of nuclear weapons dropped from Strategic Air Command bombers, wouldn't it be prudent of the Soviets to destroy that fleet of bombers before committing the aggression? To limit the chances of losing bombers before they had a chance to take off on their missions, Strategic Air Command (SAC) airbases operated under a program called Reflex, where B-47 bombers were ordered into the air within fifteen minutes of warning. In reality that was often not the case.<sup>4</sup> RAND analysts fashioned together war games in which the Soviet Air Force conducted a surprise attack against the U.S. Strategic Air Command by dropping an atomic bomb at each SAC airbase, and after several iterations, they concluded that such an attack could succeed. The strategy of Massive Retaliation rested on a bed of sand; the country's nuclear deterrent force was vulnerable to a surprise attack of annihilation.

In another case of serendipity regarding the forging together of a nuclear deterrent strategy for the country, the RAND analysts who went to Livermore benefitted from one of Lawrence's legacies, that is, his management style. Lawrence organized his laboratory in Livermore like he did with his laboratory in Berkeley. He used a leadership style called matrix management. When a specific problem arose that needed attention, a program was created with the specific purpose of solving that problem. A program leader was chosen who selected a team from organizational divisions of experts, like a physics division, an engineering division, a chemistry division, and so on. The program was therefore composed of an eclectic team of experts each feeling empowered to apply their brand of expertise to the problem. When the RAND analysts emersed themselves into scientific teams heavily engaged with designing thermonuclear warheads, they fit in as though they were just more matrixed personnel and were readily accepted as part of the team. This was a highly innovative environment, which showed itself when the Livermore laboratory set out to create a nuclear arsenal pertinent to the nation's needs.

The RAND analysts were faced with the challenge of formulating a credible deterrent that was compatible within the limits of existing technologies. Wohlstetter stated the problem succinctly: "political pundits greatly overestimated the difficulties of a Soviet surprise attack with thermonuclear weapons and vastly underestimated the complexity of the Western problem of retaliation."<sup>5</sup> Their recent study that had uncovered the vulnerability of the U.S. nuclear retaliatory force weighed heavily in their calculations. Bernard Brodie supplemented observations made by Kaufmann in an internal RAND working paper titled "Must We Shoot from the Hip?" – it called for a decreased vulnerability of the nation's deterrent force. That is, America had to retain a surviving force as a bargaining lever without having to worry the Soviets might knock out the reserve force in a "first strike."<sup>6</sup>

In practical terms, decreasing the vulnerability of a nuclear retaliatory force meant that the sizes of the warheads needed to be reduced dramatically. The principal thermonuclear bomb at the



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time was the B-17, which weighed in at about twenty-three tons and required the Air Force to deploy a special bomber, the B-36, just to carry it. That greatly limited the platforms that could deliver a retaliatory blow at an aggressor, and of course, that made them terribly vulnerable to a surprise attack. What was needed were thermonuclear warheads that were much smaller in size and rugged, so that more platforms that were better able to survive an attack could carry them. So, the RAND analysts made it clear to their physicist teammates at Livermore that thermonuclear warheads needed to be much smaller, and those serendipitous interactions between political analysts and physical scientists started a revolution in the way the nuclear stockpile would be designed and built.

That revolution in warhead designs soon took hold. Just thirty-six months after the Laboratory had opened its gates, Livermore physicists, after three debilitating nuclear test failures, designed and tested a thermonuclear warhead that was smaller than anything preceding it. Within another year Livermore design teams had successfully tested the smallest hydrogen bomb to ever exist to that point. This wasn't an accident, and it doesn't mean that Los Alamos was incapable of achieving a similar feat. It does show however, how potent it is to have nuclear policy analysts as integral contributors to the design process.

Meanwhile, by 1956 the Soviet Union's aggressive posturing was becoming harder and harder for the American public, and the government, to completely ignore. Soviet tanks ruthlessly put down an insurrection of the Hungarian people against Soviet repression. Political unrest in Asia and Africa was being fueled by Soviet operatives. Especially in Western Europe, Germany in particular, Stalin had made it no secret that he wanted to see communism expand, and that didn't change when Stalin was succeeded by Nikita Khrushchev. A communist takeover of West Berlin was a constant threat. It was in this atmosphere that a new Chief of Naval Operations, Admiral Arleigh Burke, had an idea to answer the need for a more invulnerable nuclear deterrent force. He proposed using submerged submarines carrying fleet ballistic missiles to provide a potent credible deterrent force against Soviet aggression. Besides the challenge of developing a missile launched from a submarine capable of reaching Moscow, there was yet another substantial issue - its payload had to be light and small. The Air Force had developed the Atlas ICBM by this time that required a smaller thermonuclear warhead, but even so, a typical ICBM warhead weighed in at about one and a half tons. A warhead for a smaller fleet ballistic missile required a warhead one third the size. In his book written in 1956, *Atomic Weapons and East-West Relations*, Nobel laureate Patrick Blackett said that would be a highly unlikely accomplishment.

Admiral Burke called together a conference that would be called the Nobska Conference to discuss, among other things, whether the Navy should develop a fleet ballistic missile program to supplement the national strategic nuclear stockpile. Unknown to the conferees, Livermore had tested a thermonuclear warhead three weeks earlier that was small; the smallest such device to have yet been tested. During the conference Livermore physicist Edward Teller



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announced that Livermore's laboratory could develop a strategic nuclear warhead small enough to fit in a fleet ballistic missile within the next four years. Burke asked the Los Alamos representative, Harold Agnew, if his laboratory could match that claim. Agnew said such a warhead did not exist and it would take at least five years to develop. With the declaration of a distinguished physicist that a warhead for the fleet ballistic missile could be built, Burke had what he needed and awarded the Livermore laboratory a contract to design and develop a warhead for the Polaris Missile.

The first Polaris submarine, the *USS George Washington*, was launched in January 1960, and it carried sixteen thermonuclear warheads. Its sisters would be launched just in time to welcome the country's new president, John F. Kennedy. With its Polaris submarines on station the United States was in an unequivocal position of knowing its nuclear forces could survive a massive surprise strike and retaliate. There was no other weapon system like Polaris. Kennedy knew well how valuable submarine launched missiles were to the country and said so to the Navy: "Once one has seen a Polaris firing the efficacy of this weapon system as a deterrent is not debatable."<sup>7</sup> The new president abandoned his predecessor's Massive Retaliation strategy and adopted a new strategy that seemed to come out of the pages of a document written by William Kaufmann. The new strategy, which RAND analysts had dubbed a "Counterforce Strategy," greatly reflected the work that had been going on by those policy analysts at Livermore. It relied heavily on the invulnerability of a nuclear retaliatory force, and of course, Livermore's growing arsenal of warheads going in the national stockpile amply supported that requirement.

Just three months into Kennedy's presidency, he was faced with a military debacle called the Bay of Pigs. Khrushchev looked closely at the way the new American administration handled the affair, and he concluded Kennedy had showed a lack of nerve that could be played upon. In June 1961, he met with Kennedy in Vienna, Austria, and he pushed himself upon the president with a demand that West Berlin had to become part of communist East Germany. He gave Kennedy an ultimatum to evacuate all American troops from West Berlin within six months—in time for the Red Army to seize and occupy the city. Kennedy was shaken; when he reached Washington, he told his national security staff he was not going to have a quiet term of office; a thermonuclear war within the year was a distinct possibility. Nevertheless, he was not going to give in one inch to Khrushchev's demands. Kennedy thread through a narrow passageway of presidential statesmanship and did a balancing act. On the one hand he had to convince Khrushchev he would not surrender West Berlin to communism. On the other hand, he didn't want to provoke the Soviet premier into an irrational act. The way he accomplished that feat was remarkable.

Political pundits have suggested over the years that the Soviet Union didn't have the capacity to launch a surprise attack to annihilate the U.S. nuclear deterrent force. That would have come as a surprise to Kennedy and his staff. They took seriously Khrushchev's earlier threats that



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the Soviets could drop a super bomb on each of the capitals of the West if his demands over the status of West Berlin were not met. Kennedy also had to face a cast of policy makers like Adlai Stevenson, who wanted him to placate Khrushchev and meet his demands. A decade earlier, William Borden, the congressional chief of staff to the Joint Committee on Atomic Energy, foresaw that kind of attitude among politicians and their advisors. As a law student at Yale immediately after the Second World War, Borden wrote a book, *There Will Be No Time*, in which he said in the United States the notion persisted that weakness promotes good will. He felt that fallacy was at the heart of America's long record of unpreparedness.<sup>8</sup> Fortunately, Kennedy was intellectually and emotionally prepared for a crisis that was arguably more serious than another nuclear crisis he would be facing the following year over missiles in Cuba.

Khrushchev turned up the political heat. In August he told Kennedy the Soviets would be resuming nuclear testing. They burst forth with an astonishing forty-five nuclear tests in sixty-five days. As though intending to use the tests as a form of intimidation, fourteen were above a megaton in yield, including a test on October 30, in the Novaya Zemlya test range, of a 58-megaton device, the so-called Tsar Bomba. It remains the largest yield device ever tested in history.<sup>9</sup> Meanwhile, Kennedy announced a national program to devise ways to better protect the American public from the devastation of a nuclear war.

During this trying time Kennedy never lost his nerve; he kept to his resolve. In interviews given a few years after this crisis, members of his national security staff said that Kennedy got the backbone to withstand the Soviet pressure from his belief in the preponderant strength and invulnerability of his nuclear forces. National Security Advisor McGeorge Bundy said as much in a biographical memoir he wrote that accentuated the crisis over Berlin. Six months after the climax of the crisis, Kennedy himself expressed his thanks to the individuals who had given him the resolve to face down a bullying Khrushchev when he told a crowd of 85,000 spectators in Berkeley, "I am forced to confront an uncomfortable truth. The New Frontier [his Administration's nickname] may well owe more to Berkeley than to Harvard."<sup>10</sup>

So, getting back to the original theme of this article, could "amateur" nuclear policy analysts have come out of their silos to provide Kennedy with a nuclear policy strategy as good as the RAND analysts' Counterforce Strategy turned out to be? I doubt it. That nuclear strategy took years of study to develop, and it needed intense collaboration with other members of the defense establishment, including the physicists of Livermore. Their achievement strikes one as being the product of professionals.



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<sup>1</sup> Keith B. Payne, “Deterrence is Not Rocket Science, It is More Difficult,” *Information Series*, No. 527 (July 6, 2022), available at [https://nipp.org/information\\_series/keith-b-payne-deterrence-is-not-rocket-science-it-is-more-difficult-no-527-july-6-2022/](https://nipp.org/information_series/keith-b-payne-deterrence-is-not-rocket-science-it-is-more-difficult-no-527-july-6-2022/).

<sup>2</sup> J. Foster Dulles, “Evolution of foreign policy: text of speech by John Foster Dulles Secretary of State before the Council on Foreign Relations, New York, N.Y. (January 12, 1954),” Washington: Dept. of State, Hathi Trust Digital Library, available at <https://babel.hathitrust.org/cgi/pt?id=umn.31951d024881358&view=1up&seq=4>.

<sup>3</sup> Adam Bernstein, “Defense Expert William Kaufmann,” Obituary, *The Washington Post* (December 17, 2008).

<sup>4</sup> Benjamin Welles, “U.S. Bombers in Spain Poised To Take to Air in 15 Minutes,” *The New York Times* (September 6, 1958), p. 2.

<sup>5</sup> Wohlstetter made this assessment in a RAND paper he wrote, with contributions from William Kaufmann, (1958), RAND/P1472, *The Delicate Balance of Terror*, available at <https://www.rand.org/pubs/papers/P1472.html>.

<sup>6</sup> Bernard Brodie, “Must We Shoot from the Hip?,” Internal RAND working paper (September 4, 1951).

<sup>7</sup> John F. Kennedy letter to Rear Admiral Ignatius J. Galantin, the Navy’s Special Project Officer for the Polaris weapon system (November 19, 1963).

<sup>8</sup> William Liscum Borden, *There Will Be No Time: The Revolution in Strategy* (The MacMillan Company, 1946), p. 209.

<sup>9</sup> Vitaly I. Khalturin, Tatyana G. Rautian, Paul G. Richards, and William S. Leith, “A Review of Nuclear Testing by the Soviet Union at Novaya Zemlya, 1955-1990,” *Science and Global Security* (2005), Vol. 13, pp. 1-42, available at [https://www.ideo.columbia.edu/~richards/my\\_papers/khalturin\\_NZ\\_1-42%20.pdf](https://www.ideo.columbia.edu/~richards/my_papers/khalturin_NZ_1-42%20.pdf).

<sup>10</sup> Tom Wicker, “President on Coast Tour; Watches Atlas Launching,” *The New York Times* (March 24, 1962), p. 1, available at <https://www.nytimes.com/1962/03/24/archives/president-on-coast-tour-watches-atlas-launching-president-tours.html>.

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