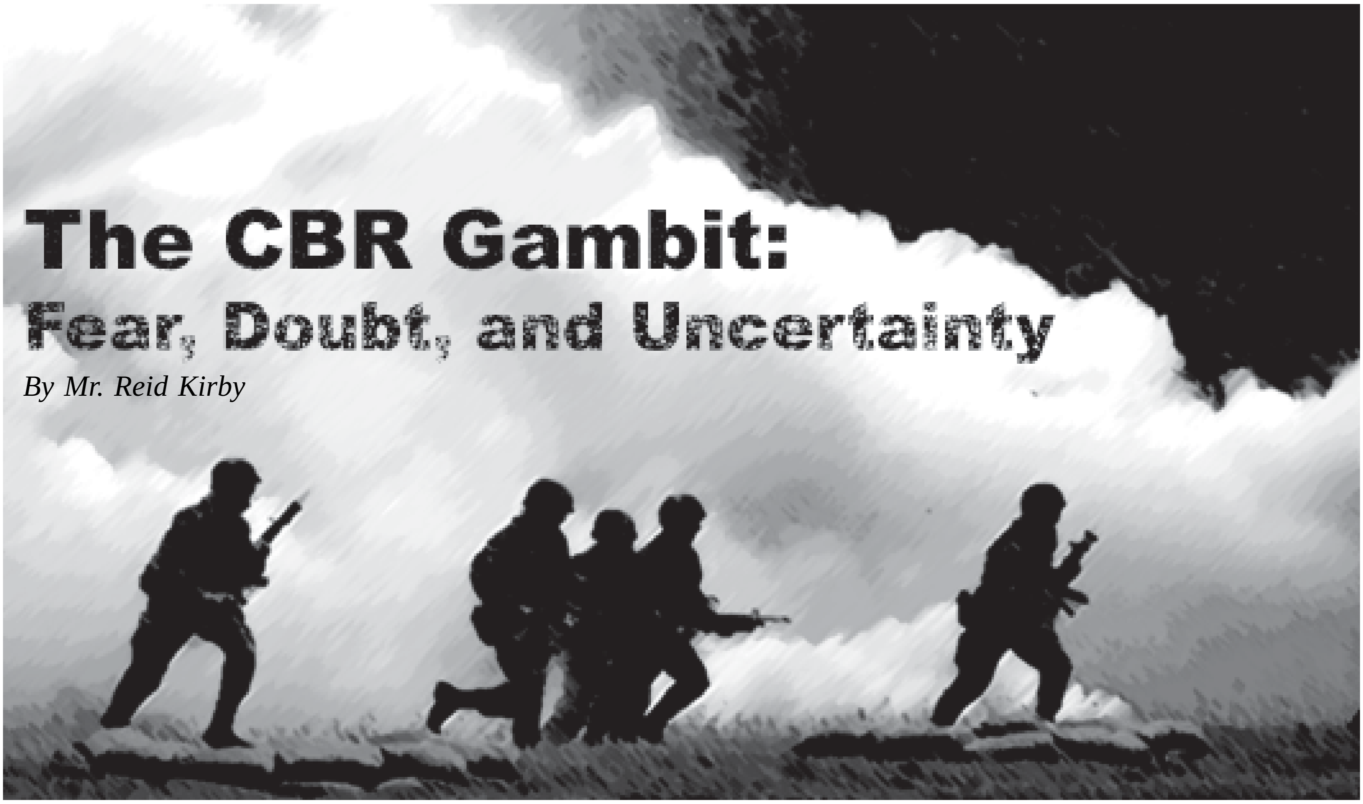

The CBR Gambit: Fear, Doubt, and Uncertainty

By Mr. Reid Kirby

In chess, the gambit is a tactic that breaks from traditional wisdom to mislead an opponent into making a fatal mistake. In traditional military terms, it is often thought of as feint, but gambit also applies to a wider use in warfare. Chemical, biological, and radiological (CBR) warfare is used primarily to neutralize a force through its casualty effect. It can also deny a force utility to terrain, facilities, and equipment through its persistence. And there is also a third use in which CBR warfare disrupts operations—by harassing and prompting a force into a disproportionate protective posture or action.

Today, we are all familiar with one form of the CBR gambit—the anthrax hoax. These provocations precipitate a costly disruption of the day-to-day lives of victims (usually chosen at random). Fortunately, since the incidents lack coordination between parties, such hoaxes can be discounted as mere criminal mischief. However, throughout the history of CBR, the gambit had a more practical concept. This article explores several historical scenarios and the theoretical nature of the CBR gambit so that it may be recognized and its intent negated.

World War I

At the battle of Loos, the British placed smoke candles between chlorine cylinder emplacements and released smoke to fill the time gaps between gas waves. The 35- to 40-minute continuous smoke wave from the British trenches was a psychological tactic intended to give the Germans the impression that a large attack had occurred. Even though the black-green smoke was easily identified by the Germans as not being gas, anxiety was apparent, as was confusion to the extent of the attack.[1]

One of the most deliberate gambits during World War I was the use of "camouflage gas." Amos Fries noted that such a tactic was intended to mask the presence of a casualty agent, preventing identification or simulating a presence when none was used.[2] Though Fries notes that the use of camouflage gas was rarely successful in projector attacks, Robert MacMullen, First Gas Regiment, commented on its use as "skunk gas" in defeating machine gun positions for the infantry.[3] In this role, a 4-inch Stokes mortar fired a round of the foul-smelling formyl compound. While German machine guns were temporarily silenced as soldiers donned their masks, the infantry moved in for the kill. The Germans also understood the CBR gambit. It was common practice to follow each artillery barrage with a few chemical rounds in an attempt to create disruption. Additionally, the munition expenditures commonly used by Germany have often been noted as too low for any pronounced casualty effect, with the intent seemingly bent on disruption.

World War II

During the September 1939 German invasion of Poland, German engineers encountered entanglements at the bridges over the Wisloka River near Jaslo in Galicia. When they attempted to remove the barricade, explosions sprayed liquid from several cans. Fourteen men immediately succumbed to poisoning, and several died in the days following the incident. Except for the casualties, the experience went almost unnoticed. It was later discovered that the cans were Polish chemical defense devices filled with a standard mixture containing a fair proportion of mustard gas. Lieutenant General Herman Ochsner, the German Chief of Chemical, discerned the action as a desperate attempt by local forces to disrupt the German advance.[4]

The Cold War

The 1950 Stevenson Report, which evaluated the use of CBR, noted that the silent and persistent nature of radiological warfare meant that people would have to reasonably wonder if they were subjected to hidden radiological hazards anytime an enemy plane passed over an area. It would therefore be prudent that such areas would have to be surveyed before use. It was also recognized that radiological warfare as a form of harassment was more likely than incidents resulting in mass casualties.[5] At the time, similar sentiments were expressed regarding biological warfare—would the psychological impact outweigh the casualty effect?

Disruption and Harassment

As is the role of the gambit in a game of chess, the CBR gambit is an attempt to prompt a foe to expend his resources when not needed, thus creating disruption and degraded performance throughout the enemy force. The user of the CBR gambit exploits the fear, doubt, and uncertainty of his opponent by provoking a protective response. After World War I, it was estimated that the mere act of having to don a protective mask reduced a soldier's fighting capability by as much as 25 percent. In some field conditions, having to assume mission-oriented protective posture 4 (MOPP4) can reduce a soldier's capability without actual exposure to CBR.

Relation to Deception

The CBR gambit has similarities to the various types of Soviet deception. Soviet deception tactics, known as *maskirovka*, are a collection of improvisational techniques, such as soldiers carrying flashlights to look like truck movement or placing camp stoves under metal plates to look like tank infrared signatures. In reality, these techniques exploit an enemy's intelligence cycle, creating uncertainty during the time lag between the detection, interpretation, and reaction stages.[6] Maskirovka requires strategic, operational, and tactical synergy to be believable and influence enemy decision making. Likewise, the CBR gambit falls apart when it lacks strategic, operational, and tactical continuity.

Like maskirovka, the successful use of the CBR gambit depends on a force's knowledge of the enemy's detection assets and response doctrine. Through World War II, the leading agent detection method was a soldier's sense of smell, so a simulant for a CBR gambit needed only to smell like the real thing (see *Figure 1*). Today, a gambit with a simulant of a V agent is only useful if it can be detected by enzyme tickets, ion mobilization, or electrochemical reaction.

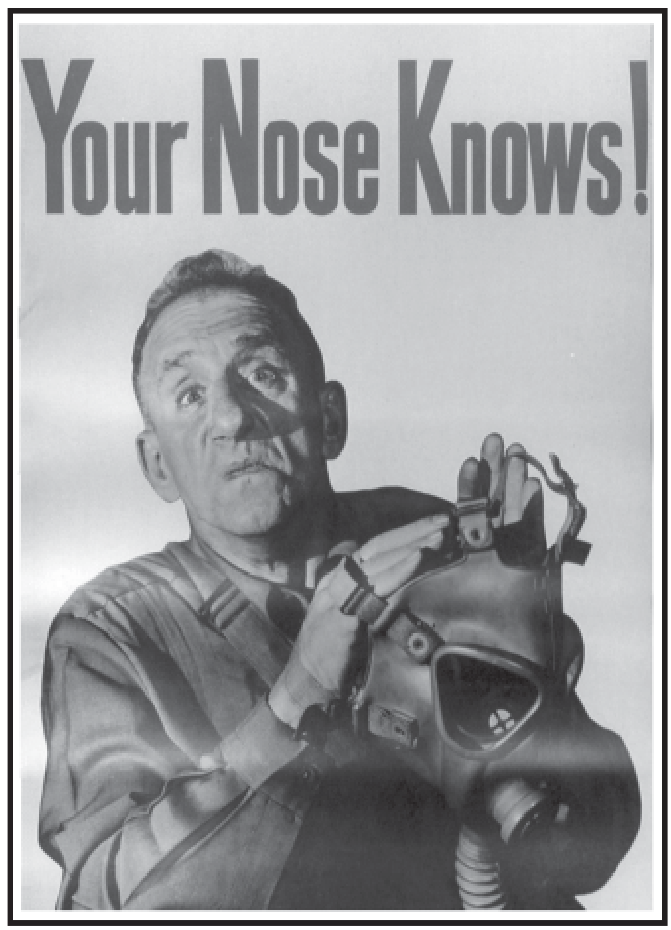

Figure 1. Through World War II, soldiers relied on their sense of smell to detect agents.

Understanding Uncertainty

Assume that you have a bag with two coins in it. One coin represents an actual CBR attack, with heads being just detection and tails being detection with casualties. The other coin has two heads, with both sides representing detection. How many times would you have to toss the second coin before realizing that the coin had two heads?

In 1948, Claude Shannon developed the Information Theory from his work with mathematical probabilities and statistics.[7] In his pivotal work, Shannon devised a theorem to quantify uncertainty by weighing the average of probabilities. By quantifying the uncertainty of a random variable, it is possible to indicate the average number of yes or no questions that must be asked to specify the value of that variable. It should be noted that the financial industry has a slightly different concept of uncertainty, seeing investments as having both risk (measurable probable outcomes) and uncertainty (unexpected change).

For example, assume that a military commander can expect—based on experience, field trials, historic study, and knowledge of force capabilities and terrain—his forces to move at an average rate of 20 kilometers per hour. The expected probability range would be 15 to 30 kilometers per hour. But when CBR is introduced, the premise for the expected rate of movement changes. This creates a new range of expectation. This event is comparable to the financial industry's concept of uncertainty. At first, without experience, the commander may make the assumption that the average rate of advance will be 10 kilometers per hour, with a range of 0 to 30. There is insufficient information to be more certain. As he becomes familiar with the CBR environment, the degree of uncertainty changes and he becomes confident that his forces will advance at an average rate of 15 kilometers per hour, with a range of 10 to 25. Uncertainty is dynamic and changes as information evolves (see *Figure 2*).

Another aspect of uncertainty is related to the distance between a person and the source of information. For example, when soldiers use a particular detection asset to detect the presence of a nerve agent, they are fairly certain that a positive test indicates the presence of the agent. As users of the technology, they believe what they are taught with little doubt. However, people familiar with the technology, design, and testing of the detection asset realize that there can be false positives and defective units, so their level of uncertainty is appreciably higher. On the opposite side of the spectrum are those who are not trained to detect nerve agents or are not familiar with the agent's effects. They too have a high degree of uncertainty that nerve agent was detected—they simply don't have enough understanding to believe the results one way or another. The certainty of soldiers trained on the detection asset is a phenomenon known as the "certainty trough" (see *Figure 3*).[8]

Risk Perception

How safe is safe? The CBR gambit also exploits risk perception. During the late 1970s, the Warsaw Pact addressed CBR exposure criteria based on an expected two-week survival time for soldiers in combat. The belief was that soldiers would not live longer than two weeks in modern combat, so the economic approach to protection was to secure full capability for up to two weeks. In theory, this meant that the Warsaw Pact forces could easily maneuver through areas that the North Atlantic Treaty Organization (NATO) forces would hastily evacuate. The difference in risk perception provided an edge to Warsaw Pact forces…for at least two weeks.[9]

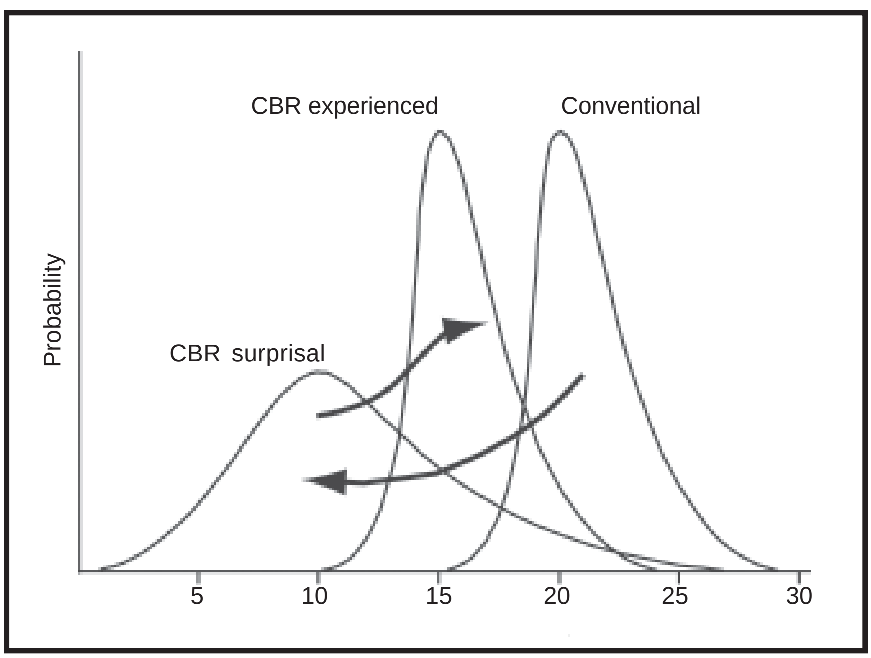

Figure 2. The changing degree of uncertainty in the CBR environment

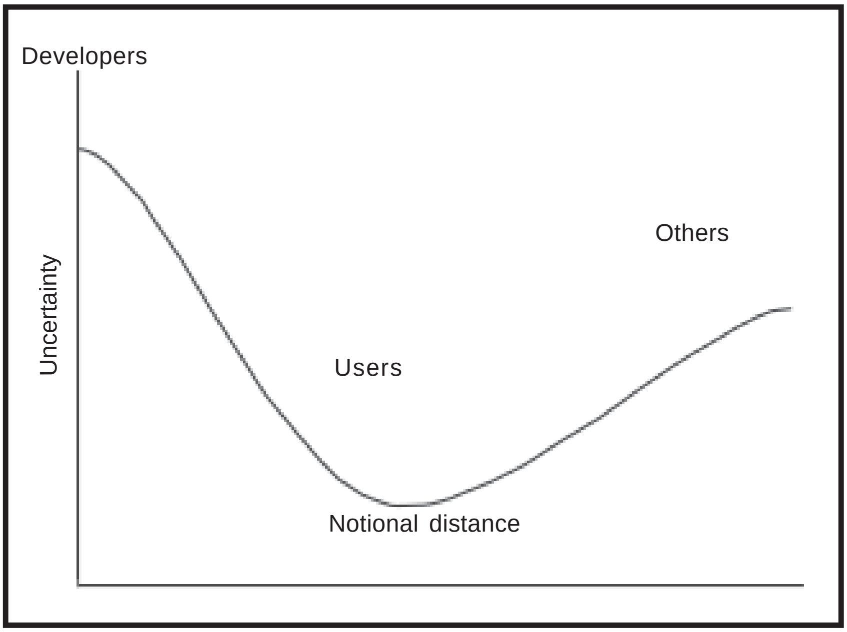

Figure 3. Certainty trough concept

Grim survival calculations aside, there is a considerable difference between the amount of CBR agent required to confidently produce casualties and the amount that will reliably preclude casualties. The contamination of a target with mustard gas can reliably preclude occupation for up to twenty-four hours, but the risk of casualties is still too high for anyone to seriously consider occupying the area for up to a week. Earlier occupation may not result in casualties, but there is still an uncertainty. Likewise, some detection assets cannot distinguish a reasonably safe exposure, making areas with even the lowest detectable quantities less attainable for occupation (see *Figure 4*).[10]

Low-level exposure and latent effects are now the norm in risk assessment. A unit exposed to a mustard gas attack can reasonably assume that 48 percent will suffer temporary blindness for about a week and about 2 percent will have respiratory involvement that will lead to death. What is less apparent at the time of an attack is that about 5 percent of the survivors will likely experience cancer sometime in their lives as a result of this exposure. On the other hand, a force that occupies an area (for about a year) where mustard gas is detected only by smell will experience no casualties, though about 26 percent will develop cancer.[11]

Risk attitudes have changed with time. During World War II, advice on chemical operations suggested that it would be better for US forces to temporarily doff their masks and experience the fringe effects of mustard gas rather than lose the combat edge. After the Gulf War, many veterans commented that the detected levels of sarin from Iraq following US bombing raids were above occupational exposure limits. Such limits were not intended for short-term battlefield exposure, but the expectation remained.

Former military manuals on chemical agents provided good detail on the physical properties of these agents and the dose required for immediate effect. As risk perceptions continue to focus on low-level exposure and long-term health effects, there is a need for future editions of these manuals to provide more intent and low-level exposure details for decision making. Ultimately, risk perception is a question of economics, but

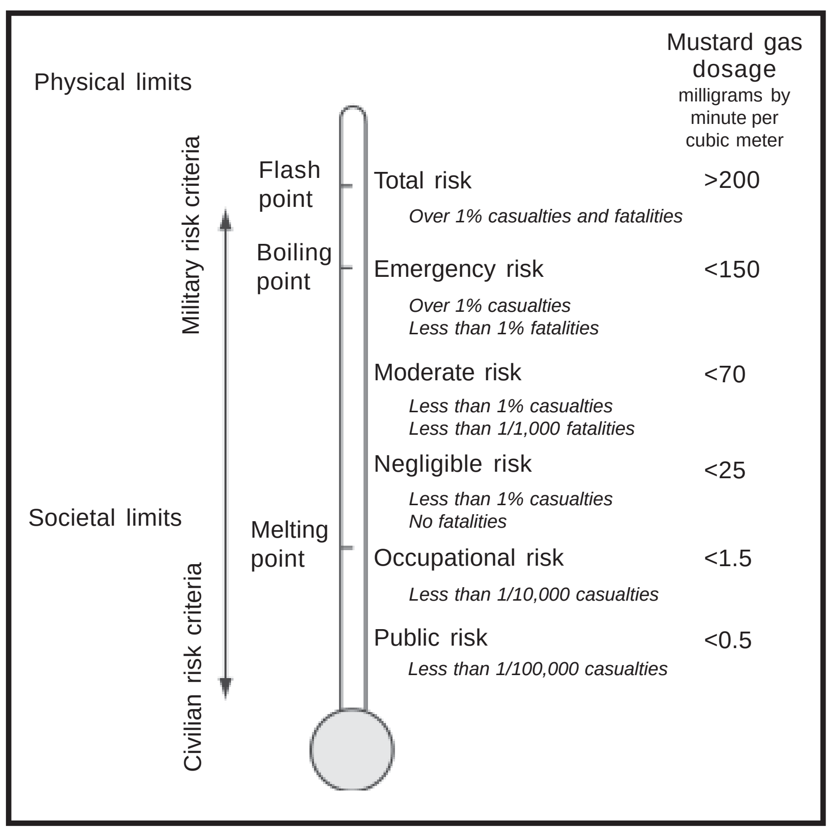

Figure 4. Example of mustard gas exposure risk criteria

it should not be based on economics across the board. There are some areas with more room for risk than others.

Today's Challenge

Consider a situation in which Su-37 aircraft swoop below the inversion cap and spray anthrax over a region of US forces. Though readily detectable as anthrax, how long will it take for commanders to recognize if the attack was actually a gambit with a non-disease-causing vaccine strain? While the identity of the anthrax remains unclear, how will US forces continue their mission? These are the sorts of questions that can be handled through training and preparation.

Studies show that panic is not a common feature in a community forced to evacuate under a technological threat.[12] It should not be assumed that panic would result from the CBR gambit. Leadership with timely and meaningful information alleviates the anxiety and mishaps that can result from the ensuing uncertainty. The most important tool in negating the CBR gambit is to recognize when it is in play. This can be done through timely identification, but it also requires interpretation of a wider scope of information.

Ultimately, the CBR gambit is a trick, a game. When successful, it changes order to disorder and gives an edge to the unconventional. When unsuccessful, it proves an annoyance.

Endnotes

[1] Major General Charles H. Foulkes, *GAS! The Story of the Special Brigade*, Willaim Blackwood & Sons Ltd., London, England, 1935, pp. 66–84.

[2] Amos A. Fries and Clarence J. West, *Chemical Warfare*, McGraw-Hill Book Co., New York, New York, 1921, pp. 23 and 28.

[3] Sergeant William L. Langer and Private Robert B. MacMullin, *With "E" of the First Gas*, Holton Printing, Brooklyn, NY, 1919, p. 21.

[4] Julian Perry Robinson, *The Problem of Chemical & Biological Warfare*, Vol. 1, *The Rise of CB Weapons*, Stockholm International Peace Research Institute, 1971, pp. 154–155.

[5] "Report of the Secretary of Defense's 'Ad Hoc' Committee on Chemical, Biological, and Radiological Warfare," 30 June 1950, pp. 19–20.

[6] Lieutenant Colonel Richard Armstrong, *Soviet Operational Deception: The Red Cloak*, US Army Command and General Staff College, Fort Leavenworth, Kansas, 1989.

[7] Claude E. Shannon. "A Mathematical Theory of Communication," *Bell Systems Technical Journal*, Vol. 2, July 1948, pp. 379–423, October 1948, pp. 623–656.

[8] Donald MacKenzie, "Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance," *MIT Press*, 29 January 1993.

[9] Simon Peymer, "Chemical Warfare and Radiation Research in the Former Soviet Union: The Military Medical Academy and Institute of Military Medicine (1970–1989)," *Global Consultants, Inc.*, Alexandria, Virginia, 1992.

[10] The values used in this illustration are from several sources in the 1980s and do not represent current expectations.

[11] Annetta Watson, et al., "Sulfur Mustard as a Carcinogen: Application of Relative Potency Analysis to the Chemical Warfare Agents H, HD, and HT," *Regulatory Toxicology and Pharmacology*, Vol. 10, December 1989, pp. 1–25.

[12] Barbara Vogt and John Sorensen, *Evacuation in Emergencies: An Annotated Guide to Research ORNL/TM-10277*, Oak Ridge National Laboratories, 1987.

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