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Self-Defense against Computer Network Attack under International Law

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In his opening remarks to the Symposium which was the occasion for the current consideration of the international-law constraints on computer network attack (CNA),¹ Vice Admiral A. K. Cebrowski, President of the US Naval War College, asked the conferees, *inter alia*, to pay attention to the question, “Does international law require us to wait until lives are lost or property damaged before we may engage in acts of self-defense?”² This is a question that has troubled international decision-makers and legal scholars for centuries. It has given rise to numerous and diverse opinions as to the proper threshold for the moment at which a potential victim State may lawfully use armed force to protect itself before the national border has been crossed, or the bombs have begun to fall, or the missiles have been launched. Consideration of this subject has given rise to a number of theories denominated by scholars and others variously as “pre-emptive” strike, “anticipatory self-defense,” “interceptive self-defense,” and a variety of other terms. Determining the moment when a State may legally take armed defensive action as a matter of self-preservation is difficult enough in the arena of conventional armed attack, where military and political intent may be divined from concrete actions of the alleged aggressor State, such as mobilization of military and economic forces, movement of ground troops and/or air and naval forces, and military exercises which may be regarded as rehearsals for

armed action. But when an attack—i.e., computer network attack—can be initiated without warning and instantaneously by a few computer strokes or clicks of a mouse at a location remote from the target State,³ determining the threshold criteria is even more difficult. Nevertheless, the harm to a target nation and its infrastructure can be equally or more devastating than if kinetic forces were used. The destruction or impairment of critical networks controlling such activities as domestic air control systems, electrical power systems and grids, national banking systems, etc., even if military command and control networks are unaffected, could cripple a nation's economy and create a public health crisis of immense proportions.

While a leading expert in the field of network security who addressed the symposium assured the participants that a successful penetration of secure systems was not as easy as some alarmists have made it out to be,⁴ it is nevertheless generally accepted that a skilled and persistent “hacker” could penetrate and seriously damage many critical infrastructures. Assuming even that such an impending attack could be predicted with reasonable certainty, an issue which will be discussed at a later point in this chapter, the fact that the attack could be conducted by an individual or group that may or may not be a part of the armed forces or otherwise officially connected to a State, raises the additional questions of whether such an attack can be attributed to the State in which the attack is initiated and whether such an attack is an “armed attack” within the accepted meaning of that term. Or is it, in the nomenclature used by Professor Yoram Dinstein, only an “unfriendly act” or an “ordinary breach of international law,”⁵ which, under the widely accepted view, does not come within the prohibition of a “threat or use of force” as that term is used in Article 2(4) of the United Nations Charter?⁶ Categorization is particularly important in view of Article 51's mandate that authorizes resort to the “inherent” right of self-defense only “if an armed attack occurs against a Member of the United Nations.”⁷

The principal paper on the subject of self-defense at the CNA Symposium was given by Professor Dinstein and is published in this commentary under the title, “Computer Network Attacks and Self-Defense.”⁸ As the moderator of a small group of symposium participants designated to discuss this subject following the presentation of the paper, I was asked to prepare additional comments on the subject. Rather than address all aspects of the doctrine of self-defense against computer network attack that were dealt with in Professor Dinstein's paper and in the small group discussion, I shall primarily focus in this commentary on the discussion which dealt with the issue raised by Admiral Cebrowski in his opening remarks—whether international law requires a State to wait until lives are lost or property damaged before it responds in self-defense. Professor Dinstein

answers this question in the negative by invoking a doctrine which he labels as “interceptive self-defense.”⁹ This subject provoked the most lively discussion in the small group and revealed substantial differences of opinion among the conferees. In essence, they appeared to be expressions of two schools of thought that find support in the legal literature on this subject. The first of these supports the “strict” interpretation of UN Charter Article 51, which would require that an armed attack have actually taken place before a victim State may respond in self-defense. Professor Dinstein’s “interceptive self-defense” is a sub-set of this school, giving it some flexibility of interpretation by allowing counter-action to be taken in advance of the first blow being struck by an analysis of when the armed attack actually begins, that is, when the potential aggressor “embarks upon an irreversible course of action, thereby crossing the Rubicon.”¹⁰ The second school asserts that there exists an “inherent” right of self-defense pre-dating the Charter, which continues to exist alongside the law of the Charter, and permits, in some cases, “anticipatory” self-defense when an armed attack may not have actually occurred but, according to objective evidence, is imminent.

The “Strict” School

The intellectual foundation for a “strict” interpretation of Article 51 can be found either in a narrow or literal reading of Article 51 as suggested by a number of eminent authorities or in the interpretation elaborated by Professor Dinstein in his book, *War, Aggression and Self-Defence*, that there was no pre-existing law of self-defense prior to the adoption of the UN Charter, and thus the law of self-defense as expressed in Article 51 is the sole legal basis for exercising this right.

One of the earlier expressions of the narrow or literal reading of Article 51 is found in an article by Professor Josef Kunz, who stated in 1947 that:

[T]his right [of self-defense under Article 51] does not exist against any form of aggression which does not constitute “armed attack.” . . . [T]his term means something that has taken place. Art. 51 prohibits “preventive war.” The “threat of aggression” does not justify self-defense under Art. 51. . . . The “imminent” armed attack does not suffice under Art. 51.¹¹

Dr. Djura Nincic makes a similar argument, stating:

[N]othing less than an armed attack shall constitute an *act-condition* for the exercise of the right of self-defense within the meaning of Article 51 It further

stipulates that *the armed attack must precede the exercise of the right of self-defense*, that only an armed attack which has actually materialized, which has “occurred” shall warrant a resort to self-defense. This clearly and explicitly rules out the permissibility of any “anticipatory” exercise of the right of self-defense, i.e., resort to armed force “in anticipation” of an armed attack.¹²

Other adherents of this view include Hans Kelsen,¹³ Louis Henkin,¹⁴ Ian Brownlie,¹⁵ Hersch Lauterpacht,¹⁶ Andrew Martin,¹⁷ and Robert Tucker.¹⁸

Professor Randelzhofer, who authored the Chapters on Articles 2(4) and 51 in Simma’s exhaustive exegesis on the UN Charter,¹⁹ also adopts, as the “prevailing view,” the strict interpretation ascribed to the aforementioned scholars.²⁰ With respect to the specific question of whether a State has a right of anticipatory self-defense, he acknowledges that “[t]here is no consensus in international legal doctrine over the point.”²¹ But he goes on to conclude that “Art. 51 has to be interpreted narrowly as containing a prohibition of anticipatory self-defence. Self-defence is thus permissible *only after the armed attack has already been launched*.”²² His rationale for this conclusion is that since

the (alleged) imminence of an attack cannot usually be assessed by means of objective criteria, any decision on this point would necessarily have to be left to the discretion of the state concerned. The manifest risk of an abuse of that discretion which thus emerges would *de facto* undermine the restriction to one particular case of the right of self-defence.²³

Professor Dinstein also adheres to the view that a literal interpretation of Article 51 is required, arguing, in essence, that a right of self-defense exists if, and only if, an armed attack occurs.²⁴ He reaches that conclusion by a different route, however. In *War, Aggression and Self-Defence*, he argues, in effect, that there was no legally-recognized right of national self-defense prior to the adoption of the UN Charter. In support of that view he states:

From the dawn of international law, writers sought to apply this [domestic law] concept [of self-defense] to inter-State relations, particularly in connection with the just war doctrine. . . . But when the freedom to wage war was countenanced without reservation (in the nineteenth and early twentieth centuries), concern with the issue of self-defence was largely a metajudicial exercise. As long as recourse to war was considered free for all, against all, for any reason on earth—including territorial expansion or even motives of prestige and grandeur—States did not need a legal justification to commence hostilities. The

plea of self-defence was relevant to the legality of forcible measures short of war, such as extra-territorial law enforcement Still, logically as well as legally, it had no role to play in the international arena as regards the cardinal issue of war. Up to the point of the prohibition of war [i.e., adoption of the UN Charter], to most intents and purposes, “self-defence was not a legal concept but merely a political excuse for the use of force.”²⁵

Further developing this theme, Professor Dinstein argues that the right of self-defence cannot be justified under either natural law or as an element of the sovereignty of States. With respect to the natural law he states:

[A] reference to self-defence as a “natural right”, or a right generated by “natural law”, is unwarranted. It may be conceived as an anachronistic residue from an era in which international law was dominated by ecclesiastical doctrines.²⁶

With respect to reliance on the principle of sovereignty as a basis for an “inherent” right of self-defence, he acknowledges that the series of identical American notes accompanying the invitations to a number of States to become parties to the Kellogg-Briand Pact lends some support to that theory. Those notes stated, *inter alia*, that the right of self-defence “is inherent in every sovereign state and is implicit in every treaty.”²⁷ Professor Dinstein states, however, that:

[T]he principle of State sovereignty sheds no light on the theme of self-defence. State sovereignty has a variable content, which depends on the stage of development of the international legal order at any given moment. The best index of the altered perception of sovereignty is that, in the nineteenth (and early twentieth) century, the liberty of every State to go to war as and when it pleased was also considered “a right inherent in sovereignty itself” Notwithstanding the abolition of this liberty in the last half-century, the sovereignty of States did not crumble. The contemporary right to employ inter-State force in self-defence is no more “inherent” in sovereignty than the discredited right to resort to force at all times.²⁸

While it is clear from Professor Dinstein’s analysis that he regards a State’s right of self-defence not to be activated until an armed attack actually occurs, he avoids the catastrophic consequences that might result from such a rigid doctrine by walking back the time that an attack actually begins to the point where the incipient attacker “embarks upon an irreversible course of action, thereby

crossing the Rubicon.”²⁹ He labels this as “interceptive” self-defense, which he distinguishes from “anticipatory” self-defense in that it requires that the other side “has committed itself to an armed attack in an ostensibly irrevocable way,” rather than that the attack is merely “foreseeable.”³⁰

While it is true that the self-defense doctrine owes its origin to theological and natural-law sources, which were the foundations of the concept of the “just war,”³¹ and while Professor Dinstein is undoubtedly correct that during the positivist era of the 19th and early 20th centuries, any State was free to make war as an element of sovereignty, States nonetheless often continued to plead self-defense as a legal as well as a political or moral justification. This practice was more than a vestigial remnant of ecclesiastical law. States regarded it as inherent in their statehood; it is therefore not surprising that the term “inherent” found its way into Article 51 of the Charter.

Although Professor Randelzhofer states that the literal or strict interpretation of Article 51 with its denunciation of anticipatory self-defense is the “prevailing view” among recognized scholars, he nevertheless admits that there is substantial scholarly opinion *contra*. He states:

There is no consensus in international legal doctrine over the point in time from which measures of self-defence against an armed attack may be taken. Thus, in particular those authors who interpret Art. 51 as merely confirming the pre-existing right of self-defence consider anticipatory measures of self-defence to be admissible under the conditions set up by Webster in the *Caroline* case, i.e. when “the necessity of that self-defence is instant, overwhelming and leaving no choice of means, and no moment for deliberation.”³²

The adherents of this opposing view are both numerous and distinguished. They include, among others, such publicists as Oscar Schachter, Myres McDougal, Robert Jennings, Humphrey Waldock, and Antonio Cassese.

Sir Humphrey Waldock was one of the earliest critics of the highly restrictive interpretation of Article 51 by the literalists. In his Hague lectures of 1952, Sir Humphrey stated:

If an armed attack is imminent within the strict doctrine of the *Caroline*, then it would seem to bring the case within Article 51. To read Article 51 otherwise is to protect the aggressor’s right to the first stroke. To cut down the customary right of self-defense beyond even the *Caroline* doctrine does not make sense in times when the speed and power of weapons of attack has enormously increased.³³

Professor Myres McDougal and Florentino Feliciano, focusing primarily on the Kunz and Nincic readings of the Charter text, argue that the objections to such readings are twofold. First, Kunz and Nincic attempt to interpret the meaning of the text from an analysis of the words alone, attempting to divine a single clear and unambiguous meaning, and Kunz, in addition, “casually de-emphasize[s]” the preparatory work on the document. The second major flaw in their argument is that they seriously underestimate the potentialities of modern military weapons systems and the contemporary techniques of non-military coercion.³⁴

With respect to arguments that allowing a State to respond in an anticipatory manner would vest too much discretion in individual States, McDougal and Feliciano point out that the claim to the right of self-defense “remains subject to the reviewing authority of the organized community.”³⁵

One of the more cogent criticisms of the conclusions reached by the literalists was made by Professor David Linnan in a recent article in which he applied the interpretive principles of the Vienna Convention on the Law of Treaties to an interpretation of Article 51 of the Charter. He states:

Under the Vienna Convention, the textual exegesis or ordinary meaning approach enjoys primacy in the absence of inherent ambiguity or manifestly absurd result. Publicists employing the ordinary meaning approach, but dismissing Article 51’s inherent right-*droit naturel* language as mere infelicitous drafting (viewing the natural law approach as generally discredited) violate its most basic canon. . . . [U]nder an ordinary meaning approach the use of the natural law terminology indicates the adoption by reference of its scheme of self-defense (without reaching or expressing an opinion on the validity of the natural law approach itself, which is a national view of international law not shared by all states). Regarding the scheme of self-defense adopted, U.S. views expressed in the notes accompanying the Kellogg-Briand Pact are representative.³⁶

Professor Linnan goes on to argue that if, however, the use of the term “inherent right” creates an ambiguity, it brings into play the secondary rule of interpretation, which authorizes resort to supplementary materials under Article 32 of the Vienna Convention, at which point the “legislative history” of Article 51 comes to the fore. As he and many other publicists have pointed out,³⁷ the drafting history shows clearly that Article 51 was inserted to clarify the point that the new Security Council system would not displace contemporaneous efforts involving the creation of regional security systems.³⁸

But international law is not just a creature of treaty text. It is at least equally a product of State practice. Analyzing State practice since the adoption of the

Charter, Sir Robert Jennings and Sir Arthur Watts, while cautioning that anticipatory self-defense should be regarded as unlawful under most circumstances, state that:

[I]t is not necessarily unlawful in all circumstances, the matter depending on the facts of the situation including in particular the seriousness of the threat and the degree to which pre-emptive action is really necessary and is the only way of avoiding that serious threat.³⁹

Proceeding on that basis, they conclude:

The development of the law, particularly in the light of more recent state practice, in the 150 years since the *Caroline* incident, suggests that action, even if it involves the use of armed force and the violation of another state's territory, can be justified as self-defence under international law where (a) an armed attack is launched *or is immediately threatened*, against a state's territory or forces (and probably its nationals); (b) there is an urgent necessity for defensive action against that attack; (c) there is no practicable alternative to action in self-defence . . . ; (d) the action taken by way of self-defence is limited to what is necessary to stop or prevent the infringement, i.e., to the needs of defence; and (e) in the case of collective self-defence, the victim of an armed attack has requested assistance.⁴⁰

The severe restraints that Jennings and Watts would apply to the exercise of "anticipatory" self-defense reflect their concern that the right could be abused with enormously serious consequences. Professor Rosalyn Higgins has expressed the same concern. She has contrasted two cases in which Israel asserted this doctrine to justify resort to pre-emptive strikes to illustrate her view of what may or may not constitute a justified anticipatory exercise of the right of self-defense. The first was the Six Days War of 1967. Recall the events leading up to Israel's pre-emptory attack: President Nasser summarily ejected the UN Emergency Force from Sinai and the Gaza strip; he closed the Straits of Tiran, a vital seaway link for Israel to the outside world; both Syria and Egypt massed troops on Israel's border; and Syria and Egypt unleashed a barrage of bellicose statements. As Professor Higgins points out, neither the UN Security Council nor the UN General Assembly condemned Israel's action. On the contrary, there was a general feeling, "certainly shared by the Western states, that taken in context, this was a lawful use of anticipatory self-defence."⁴¹ The second case was that of the Israeli air strike against the Iraqi nuclear reactor in 1981.

There, the Security Council, with the concurrence of the United States and the Common Market's "Group of Ten," "strongly condemn[ed]" Israel's actions.⁴² Not only was the *building* of a nuclear reactor not a *use* of force; the timing of the strike lacked the temporal element of urgency required by the *Caroline* criteria.⁴³

Professor Cassese, in the same collection of essays, agrees with Professor Higgins and, in addition, appears to go further by relaxing somewhat the rigorous criteria of the *Caroline* case.

One might perhaps draw the conclusion that consensus is now emerging that under Art. 51 anticipatory self-defence is allowed, but on the strict conditions that (i) solid and consistent evidence exists that another country is about to engage on a large-scale armed attack jeopardizing the very life of the target State and (ii) no peaceful means of preventing such attack are available either because they would certainly prove useless to the specific circumstances, or for lack of time to resort to them, or because they have been exhausted.⁴⁴

One of the most vocal critics of the strict interpretation theory has been the late Professor McDougal. He urged that in the age of the ballistic missile, to postpone action in self-defence until after the "last irrevocable act" reduces the right of self-defence to a right of retaliatory response.

It is precisely this probable effect that gives to the narrowly restrictive construction of Article 51, when appraised for future application, a strong air of romanticism.⁴⁵

Professor Schachter has written on the subject of self-defence on several occasions. While his writings reflect a profound commitment to the principles of Article 2(4) of the UN Charter, he nevertheless concludes that Article 51 cannot be so narrowly construed as to require a State to forego the right to respond when, based on persuasive evidence, an attack appears imminent. As he stated most eloquently in 1986:

On the level of principle, it makes sense to support a norm that opposes the preemptive resort to force but acknowledges its necessity when an attack is so immediate and massive as to make it absurd to demand that the target state await the actual attack before taking defensive action. Webster's statement in the *Caroline* case is probably the only acceptable formulation at the present time to meet this situation.⁴⁶

Finally, one must consider the judgment of the International Court of Justice in the *Nicaragua* case, as well as Judge Schwebel's dissenting opinion. In the jurisdictional phase of the case, the United States had argued that its multilateral treaty reservation divested the court of jurisdiction since the customary law of self-defense had been "subsumed" or "supervened" by treaty law, that is, Article 51 of the Charter. At that stage, the Court, in refusing to dismiss the case, stated:

The fact that the above-mentioned principles [including *inter alia* the principle of self-defense] . . . have been codified or embodied in multilateral conventions does not mean that they cease to exist and to apply as principles of customary law, even as regards countries that are parties to such conventions.⁴⁷

During the Merits stage, the Court further concluded that even if the customary law and treaty principles were identical in content, the customary-law rule may apply separately and independently.⁴⁸ Since, however, the parties to the case placed their reliance as to the applicability of the right of self-defense only on the case of an armed attack which had already occurred, the issue of the lawfulness of an armed response to an imminent threat of attack was not raised nor addressed by the majority opinion.⁴⁹

Judge Schwebel, in his dissent, while also acknowledging that the issue was not before the Court, and while recognizing that "the issue is controversial and open to more than one substantial view," opined, *ex abundi cautela*, that he disagreed with a construction of Article 51 as if it read, "Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if, and only if, an armed attack occurs."⁵⁰

While the foregoing discussion admittedly constitutes only a partial review of the many scholarly writings on the use of force and the right of self-defense, I believe it constitutes a fair representation of the various positions taken by the leading commentators who have addressed this issue. From this review it would appear safe to conclude that there is a deep division between those who argue for a literal interpretation of Article 51 and those who argue that such an interpretation is inconsistent with the true meaning of the Article, particularly in the post-nuclear age. To conclude that one view or the other is the "prevailing" view, as Randelzhofer has done, is, I believe, too strong a conclusion to draw given the number and eminence of the scholars that are represented in the opposing camp.

In view of the foregoing, I do not consider it to be unreasonable that the United States takes the position that anticipatory self-defense against an

imminent attack is permitted under Article 51. This position is articulated in the relevant military operational manuals and in the Joint Chiefs of Staff (JCS) Standing Rules of Engagement. The Navy's Manual, for example, provides as follows:

Anticipatory Self-Defense. Included within the inherent right of self-defense is the right of a nation (and its armed forces) to protect itself from imminent attack. International law recognizes that it would be contrary to the purposes of the United Nations Charter if a threatened nation were required to absorb an aggressor's initial and potentially crippling first strike before taking those military measures necessary to thwart an imminent attack. *Anticipatory self-defense involves the use of armed force where attack is imminent and no reasonable choice of peaceful means is available.*⁵¹

The JCS Standing Rules of Engagement authorize the exercise of the right of anticipatory self-defense against forces displaying "hostile intent," which is defined, *inter alia*, as follows:

Hostile Intent. The threat of imminent use of force against the United States, US forces, and in some circumstances, US nationals, their property, US commercial assets, and/or other designated non-US forces, foreign nationals and their property.⁵²

Having concluded that it would not be unreasonable for a State to take the position that anticipatory self-defense against an imminent armed attack is lawful, and having found that the United States has adopted this position, the question remains as to what are the criteria for determining when an attack is "imminent." The classic formulation is US Secretary of State Daniel Webster's dictum that an armed response is lawful when the necessity of action is "instant, overwhelming, and leaving no choice of means, and no moment for deliberation."⁵³ This is the test adopted by many eminent scholars and has been repeated often in legal and diplomatic arguments. It was adopted in the US Navy's operational manual prior to its current iteration.⁵⁴ A number of scholars have concluded, however, that this articulation is much too restrictive in the present age, particularly in the light of the possibility of devastating nuclear attack. McDougal and Feliciano have stated, for example, that:

[T]he standard of required necessity has been habitually cast in language so abstractly restrictive as almost, if read literally, to impose paralysis.⁵⁵

In their own extensive analysis of the required degree of necessity, McDougal and Feliciano are unable to provide tests that are less abstract, finally concluding that the requirement of necessity “can only be subjected to that most comprehensive and fundamental test of all law, reasonableness in particular context.”⁵⁶ Analyzing the particular context of the Cuban Missile Crisis of 1962, Professor McDougal concluded that the US quarantine of Cuba was a lawful application of the doctrine of self-defense.⁵⁷ Central to his analysis was that the United States’ action was an exercise of “initial discretion,” which was then backed up by mustering the support of the members of the Organization of American States and reporting its action to the Security Council.⁵⁸

Sally and Thomas Mallison have analyzed the criteria for the lawful employment of self-defense against an imminent armed attack in several of their writings, most recently in volume 64 of the Naval War College’s “Blue Book” series (1991), where they, like McDougal and Feliciano, concluded that the Webster formulation was too restrictive, “since a credible threat may be imminent without being ‘instant’ and more than a ‘moment for deliberation’ is required to make a lawful choice of means.”⁵⁹ Like McDougal and Feliciano, they also assert that whether an anticipatory resort to armed force in self-defense is lawful can only be determined in the context of the facts of the specific case.⁶⁰ They emphasize that where anticipatory self-defense is claimed, the criteria for lawfulness must be applied with greater stringency than when an actual attack has occurred.⁶¹

Computer Network Attacks as “Armed Attacks”

It is important that what is under discussion here is not what may be lawful in an ongoing armed conflict (*jus in bello*) but rather actions by a hostile individual, group, or State against another State while the target State and the State of origin of the actions are not yet engaged in armed conflict (*jus ad bellum*). In an ongoing armed conflict (war), it is unquestionably legitimate for a State to attack its enemy’s military telecommunications infrastructure, including military computer networks.⁶² Attacks on other telecommunications and network facilities which serve both military and civilian clientele may also be legitimate military objectives, provided that the international humanitarian law of armed conflict is observed with respect to proportionality, including limiting collateral damage.⁶³ It is a matter of indifference whether the mode of attack is kinetic or electronic, although the former may be more objectionable since it is more destructive and may cause more long-lasting effects.

In examining whether a computer network “attack” may constitute an “armed attack,” Article 51 cannot be construed in isolation but rather must be read in the context of other articles of the Charter, particularly Articles 2(4), 39, 41 and 42. Article 2(4) provides:

All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.

Article 39 empowers the Security Council to determine the existence of “any threat to the peace, breach of the peace, or act of aggression” and to make recommendations or decide on “measures” to be employed under Article 41 or Article 42. Article 41 provides a non-exhaustive list of measures “not involving the use of armed force” which the Security Council may take including “complete or partial interruption of . . . telegraphic, radio, and other means of communication.” Article 42, in turn, provides for actions “by air, sea, or land forces” when the measures provided for in Article 41 are inadequate. Since the actions in Article 41 are described as “measures not involving the use of armed force,”⁶⁴ whereas those in Article 42 involve the use of armed forces, it would appear that, at least as an initial presumption, a computer network attack would not be regarded as an “armed attack.” Giving effect to such an initial presumption, however, ignores the significance of the drastic consequences that such an attack can have on the social, economic and military structure of a State. As will be discussed *infra*, whether an attack is to be considered as an armed attack depends on the consequences of the attack rather than the modality.

The various terms used in the Charter, including the Preamble—“war” (Preamble), “armed force” (Preamble), “acts of aggression” (Article 1), “threat or use of force” (Article 2(4)), “act of aggression (Article 39), and “armed attack” (Article 51)—differ in scope and content. Though related in content “they differ considerably in their meaning.”⁶⁵ None of them is further explained in the Charter.

This lack of definition has led to several attempts, primarily by the General Assembly, to give further content to the terms, particularly “act of aggression.” Article 3 of the 1974 General Assembly’s “Definition of Aggression” Resolution provides the following non-exhaustive list of acts which qualify as acts of aggression:

- (a) The invasion or attack by the armed forces of a State of the territory of another State, or any military occupation, however temporary, resulting from such

invasion or attack, or any annexation by the use of force of the territory of another State or part thereof;

(b) Bombardment by the armed forces of a State against the territory of another State or the use of any weapons by a State against the territory of another State;

(c) The blockade of the ports or coasts of a State by the armed forces of another State;

(d) An attack by the armed forces of a State of the land, sea or air forces, marine and air fleets of another State;

(e) The use of armed forces of one State, which are within the territory of another State with the agreement of the receiving State, in contravention of the conditions provided for in the agreement or any extension of their presence in such territory beyond the termination of the agreement;

(f) The action of a State in allowing its territory, which it has placed at the disposal of another State, to be used by that other State for perpetrating an act of aggression against a third State;

(g) The sending by or on behalf of a State of armed bands, groups, irregulars or mercenaries, which carry out acts of armed force against another State of such gravity as to amount to the acts listed above, or its substantial involvement therein.⁶⁶

While the term “act of aggression” is broader than “armed attack,” it is apparent that most of the acts listed in the General Assembly’s resolution would also constitute an “armed attack” and would, if of sufficient scale and effect, invoke the victim’s right to respond under its right of self-defense.

As several recent articles and monographs have revealed, analyzing the novel and still-developing concept of computer network attack under either the customary law of self-defense or Article 51 of the Charter presents both theoretical and practical difficulties.⁶⁷ The principal difficulty flows from the fact that both traditionally and under the Charter, the discussion and codification of what constitutes an act of aggression or an armed attack generally involve the use of *armed force*—either in the form of employment of military weapons or hostile acts by members of the armed forces. It is now clear that the “armed force” involved does not have to be a part of the organized military forces of a State. As indicated above, the General Assembly’s “Definition of Aggression”

Resolution, after listing certain acts involving the “armed forces of a State,” also includes, as an act of aggression, the sending by or on behalf of a State of “armed bands, groups, irregulars or mercenaries, which carry out acts of armed force against another State” or the substantial involvement of a State in such actions provided they reach a certain level of gravity.⁶⁸ The judgment of the International Court of Justice in the *Nicaragua* case likewise held that the “arming and training of the *contras* [by the United States] can certainly be said to involve the threat or use of force against Nicaragua.”⁶⁹ It also held, however, that the “mere supply of funds . . . does not in itself amount to a use of force.”⁷⁰

Those publicists who have grappled with the problem of determining when a computer network attack constitutes an armed attack, have two possible avenues of approach—either the instrumentality or the consequences test. Nearly 40 years ago, Professor McDougal and Mr. Feliciano, though not visualizing cyber warfare, were critical of focusing on the instrumentality as the “precipitating event” for lawful self-defense, stating that to do so

is in effect to suppose that in no possible context can applications of nonmilitary types of coercion (where armed force is kept to a background role) take on efficacy, intensity, and proportions comparable to those of an “armed attack” and thus present an analogous condition of necessity. Apart from the extreme difficulty of establishing realistic factual bases for that supposition, the conclusion places too great a strain upon the single secondary factor of modality—military violence.⁷¹

Michael Schmitt points out, however, that:

At least since the promulgation of the Charter, [the] use of force paradigm has been instrument-based; determination of whether or not the standard has been breached depends on the type of the coercive *instrument*—diplomatic, economic, or military—selected to attain the national objectives in question. The first two type of instruments might rise to the level of intervention, but they do not engage the normatively more flagrant act of using force.⁷²

While admitting that an instrument-based approach provides a relatively easily-applied test for calculating lawfulness of an act of intervention,⁷³ he ultimately concludes that it does not provide a useful test for computer network attack.

Computer network attack challenges the prevailing paradigm, for its consequences cannot easily be placed in a particular area along the community

values threat continuum. The dilemma lies in the fact that CNA spans the spectrum of consequentiality. Its effects freely range from mere inconvenience (e.g., shutting an academic network temporarily) to physical destruction (e.g., as in creating a hammering phenomenon in oil pipelines so as to cause them to burst) to death (e.g., shutting down power to a hospital with no back-up generators). It can affect economic, social, mental, and physical well-being, either directly or indirectly, and its potential scope grows almost daily, being capable of targeting everything from individual persons or objects to entire societies.⁷⁴

Professor Schmitt recognizes, however, the weakness of a system of analysis which attempts to apply a system developed to regulate kinetic activities to account for non-kinetically based harm.⁷⁵ He calls for a new normative architecture.⁷⁶ Recognizing also, however, that there is no current consensus as to the need for developing such an architecture, he articulates an “appropriate normative framework”⁷⁷ under current international law as framed within the UN Charter, that relies on the “consequences” theory.

To constitute an armed attack, the CNA must be intended to directly cause physical damage to tangible objects or injury to human beings. . . . States, acting individually or collectively, may respond to a CNA amounting to armed attack with the use of force pursuant to Article 51 and the inherent right of self-defense.⁷⁸

The Institute for National Strategic Studies of the National Defense University has also adopted a “consequences” test as to whether a CNA rises to the level of an armed attack, stating:

[I]t appears likely that an “armed attack” would include some level of actual or potential physical destruction, combined with some level of intrusion into its target’s borders, or violation of its sovereign rights. . . . [A]ttacks that are sufficiently destructive may qualify as “armed attacks,” no matter what their level of intrusion, and vice versa.⁷⁹

Likewise, Professor Dinstein adopts a consequences test. He offers as examples of CNAs that would constitute armed attacks the following:

Fatalities caused by loss of computer-controlled life-support systems; an extensive power grid outage (electricity blackout) creating considerable deleterious

repercussions; a shutdown of computers controlling waterworks and dams, generating thereby floods of inhabited areas; deadly crashes deliberately engineered (e.g., through misinformation fed into aircraft computers), etc. The most egregious case is the wanton instigation of a core-meltdown of a reactor in a nuclear plant, leading to the release of radioactive materials that can cause countless casualties if the neighboring areas are densely populated. In all these cases, the CNA would be deemed an armed attack.⁸⁰

Walter Gary Sharp, Sr., would lower the threshold substantially.

[T]he mere penetration by a state into sensitive computer systems such as early warning or command and control systems, missile defense computer systems, and other computers that maintain the safety and reliability of a nuclear stockpile, should by their very nature be presumed a demonstration of hostile intent. Individually, these computer systems are so important to a state's ability to defend itself that espionage into any one of them should be presumed to demonstrate hostile intent.⁸¹

It is to be recalled that under the JCS Standing Rules of Engagement, demonstration of a hostile intent is the determinant for permitting an armed response to an imminent armed attack.⁸² Invoking such a low threshold for triggering the right to respond by armed force in self-defense seems to be establishing a dangerous standard, especially when it is often difficult to determine whether a computer network attack has occurred at all. In some instances, malfunctions which appear at first to be the result of computer network attack have been determined, after more thorough investigation, to be the result of faulty software or operator error.⁸³

If one agrees that computer network attacks of some degree of severity and under some circumstances may constitute "armed attacks," then one must apply some criteria for determining when such attacks cross the threshold from interventions that do not warrant responses under the right of self-defense to those that do. As has been mentioned, the closest the UN Charter itself comes to describing anything remotely resembling CNA is in Article 41, where it lists "complete or partial interruption . . . of telegraphic, radio, and other means of communication" as a measure "not involving the use of armed force" which the Security Council may take against threats to the peace, breaches of peace, or acts of aggression.⁸⁴ Presumptively, computer networks would fall under a broad definition of "telegraphic, radio, and other means of communication," but in today's environment of almost total dependence on

the proper functioning of computer networks for control of vital societal functions, as well as critical national-security systems, the “complete or partial interruption” of such systems would have a much more drastic effect than anything that could have been envisaged by the framers of the Charter in 1945. Article 41, therefore, cannot be said to require the categorization of computer network attacks as actions “not involving the use of armed force.” As Professor Schmitt has suggested, it would be desirable for a normative architecture specifically tailored to CNA to emerge. For the present, however, until a consensus develops for the need for a new normative architecture, it would appear that the most rational and practical test of whether a computer attack can be the precipitating event for the exercise of lawful self-defense is whether the consequences are major damage to or destruction of vital military or civilian infrastructures or the loss of human life.

Anticipatory Self-Defense against Computer Network Attack

As discussed earlier, there is substantial legal support for the proposition that where there is persuasive evidence that an armed attack is imminent, the potential victim State is not required to stand idly by until the actual attack has occurred—it may respond with proportional force to ward off the attack. The difficulty with the application of this principle is in determining that in fact an attack is imminent. In the case of an attack by kinetic means, there are usually (but certainly not always) intimations of an impending attack. Some may be ambiguous, such as a step-up in propaganda or bellicose statements; others may carry a clearer threat—movement of troops to the border, mobilization of forces, increased aerial and electronic surveillance, deployment of naval and air forces, and clandestine infiltration of intelligence agents. While a computer network attack may also be preceded by acts that suggest an attack is imminent (or it may itself be a part of the pre-attack build-up for an attack by kinetic means), the capability of an attacker to cause almost instantaneous harm suggests that the first notice that a victim State may have that a computer network attack is underway is to experience the harmful effects themselves. If the consequence of the CNA is serious harm to vital infrastructure or loss of human life, then under the principles previously discussed, a proportional response is lawful. But difficult questions remain. Response against whom? Can the attacker be identified? The originator of the attack may have sent his electronic attack through multiple switches and servers in several different countries. Is the attacker acting on behalf of a foreign government, or is he merely a teen-age “hacker” engaged in what is to him a prank?⁸⁵ If the hacker is not a direct agent of a foreign government, is

the foreign government aware of his actions and impliedly consenting to them? The permutations and combinations of situations under which attacks may occur number in the millions. Professor Schmitt has reported that today over 120 countries are in the process of establishing information warfare competence⁸⁶ and by the year 2002 some “nineteen million individuals will have the know-how to launch cyber attacks.”⁸⁷

Obviously, not every probing of a presumably secure network, whether one controlling vital civilian infrastructure or a military network controlling critical defense functions, such as air defense, atomic weapons, satellite communications, or intelligence gathering, can be considered as a prelude to a full-scale network attack. Professor Schmitt has reported that the Defense Information Systems Agency identified 53 attacks on defense systems in 1992.⁸⁸ By 1995 the number had increased to 559 and was expected to reach 14,000 in 1999.⁸⁹ Figures supplied by the Defense Information Systems Agency reports are even more unsettling. That agency reported that the Defense Department may have experienced as many as 250,000 attacks in 1994.⁹⁰ Although each of these “attacks” required investigation and appropriate action, none of them presumably were of sufficient gravity either to indicate that they were themselves an “armed attack” that would have authorized a resort to armed force in response nor were they regarded as indicators that such an armed attack was imminent.

It would seem, then, that the most likely application of the doctrine of anticipatory self-defense to computer network attacks would be in the case of such attacks that in and of themselves do not constitute an armed attack but rather are evaluated as precursors of an armed attack by kinetic means and/or further, more severe cyber attacks. In modern warfare, the electronic battlefield will play a crucial role, and any steps that a prospective attacker can take to neutralize or destroy its enemy’s electronic command and control, intelligence, communications, or weapons-control networks prior to a kinetic attack would gain enormous advantage. While these preliminary CNAs may not themselves rise to the level of armed attack, they may, if combined with other evidence of an impending attack, be sufficient to authorize armed measures of self-defense—not against the CNAs themselves, but rather as an exercise of the right of anticipatory self-defense against the impending kinetic or more serious cyber attack.

Professor Schmitt, who also visualizes the most likely scenario to be the use of CNA to soften up the battlespace,⁹¹ proposes a three-prong test for determining when a State may respond to a CNA that itself does not constitute an armed attack.

1. The CNA is part of an overall operation culminating in armed attack;
2. The CNA is an irrevocable step in an imminent (near-term) and probably unavoidable attack; and
3. The defender is reacting in advance of the attack itself during the last possible window of opportunity available to effectively counter the attack.⁹²

This formulation appears to be an application of Secretary Webster's dictum in the *Caroline* case, adapted to computer network attack. As we have seen, the *Caroline* standard has been found by many publicists to be too narrowly drawn to apply in all circumstances. "The last possible window" may be too late to avoid catastrophic results. The problem does not lend itself to a specific formula. I suggest that whatever the formula used, in the final analysis, the decision maker must apply "that most comprehensive and fundamental test of all law, reasonableness in particular context."⁹³

Concluding Remarks

In this chapter I have attempted to defend the proposition that a State's right to exercise its "inherent" right of self-defense by armed force is not limited to the situation in which an attack has actually occurred, but may also apply when a State has persuasive evidence that such an attack is imminent (anticipatory self-defense). The State exercising the right of *anticipatory* self-defense, however, bears a heavy burden of proof that the evidence upon which it acted was indeed persuasive and must withstand *ex post facto* examination by the international community, primarily through the Security Council. I have also attempted to demonstrate that the term "armed attack" may also include attacks upon computer networks solely by electronic means if the *consequences* of such attacks include either substantial harm to vital civil or military networks, or loss of human life, or both. Although the first of these propositions is admittedly controversial, and some have labeled it a minority view, I believe that there is distinguished scholarly support for that position, as well as substantial support in State practice. The adoption of this position by the United States, as reflected in its military manuals and Standing Rules of Engagement is therefore justifiable. As to the second proposition, that is, that the test of whether an action constitutes an armed attack is the consequence of the attack, there does not seem to be any other choice, since an instrumentality-based criterion is wholly impractical in view of the capability of an innocuous instrument—the computer—to become

a lethal weapon in the hands of a skilled and persistent “hacker” determined to invade and attack another’s computer network.

When I attempt to apply the doctrine of anticipatory self-defense to computer network attack, I find myself in waters difficult to navigate. The most likely scenario for CNA is that it will occur suddenly, without warning. It also seems likely that a true hostile CNA reaching the level of an “armed attack” will not be an isolated incident, but rather will occur as part of the preliminary softening-up of the battlespace preceding an attack by kinetic weapons or a more serious cyber attack. Professor Schmitt apparently visualizes this same scenario since he shifts the focus of his section on anticipatory self-defense to use of “computer network attack operations executed to prepare the battlespace.”⁹⁴ Under these circumstances, it becomes even more important for a State facing what may appear to be an imminent CNA carefully to utilize all its resources in its analysis of all the surrounding events, political and military, to aid in its determination of whether an armed response may be made under the right of self-defense. Only in this way can it meet its heavy burden of establishing the justification for initiating the first resort to the use of armed force.

Notes

1. US Naval War College Symposium, Computer Network “Attack” and International Law, convened at the Naval War College, Newport, Rhode Island, June 22–25, 1999.

2. Vice Admiral A. K. Cebrowski, USN, CNE and CNA in the Network Centric Battlespace: Challenges for Operators and Lawyers, Welcoming Address to the Conferees, June 22, 1999.

3. Michael E. Ruane, *New Computer Technology Makes Hacking A Snap*, WASHINGTON POST, March 10, 1999, at 1.

4. Remarks of Dr. Mark Gembicki, Chief Technical Officer of WarRoom Research, Inc., to the Symposium, June 22, 1999.

5. Yoram Dinstein, *Computer Network Attacks and Self-Defense*, published in this volume.

6. UN CHARTER, art. 2, para. 4.

7. *Id.*, art. 51. As we shall discuss later, the meaning of the term “armed attack” is not identical with the term “threat or use of force” used in Art. 2, para. 4.

8. Dinstein, *supra* note 5.

9. *Id.* Professor Dinstein has elaborated this doctrine more fully in his book, *WAR, AGGRESSION AND SELF-DEFENCE* 172–173 (3d ed. 2001) [hereinafter DINSTEN].

10. DINSTEN, *supra* note 9, at 172.

11. Josef L. Kunz, *Individual and Collective Defense in Article 51 of the Charter of the United Nations*, 41 *AMERICAN JOURNAL OF INTERNATIONAL LAW*, 872, 878 (1947). It is interesting to note that Professor Kunz’s literal interpretation of Article 51 leads him to conclude that the language of the article, which codifies the one requirement of necessity (“armed attack”) frees the defending State from the requirements of reasonableness and proportionality, which, along with “immediacy,” have traditionally been regarded as requirements for the exercise of the right in both domestic and international law. He even suggests that a minor border incident would justify a full-scale war. *Id.* at 876, 878.

12. Djura Nincic, *Reply, in* International Law Association Committee on the Charter of the United Nations, Report on Some Aspects of the Principle of Self-Defense in the Charter of the United Nations and The Topics Covered by the Dubrovnik Resolution 68 (Georg Schwarzenberger ed., 1958) (emphasis in original).

13. HANS KELSEN, *THE LAW OF THE UNITED NATIONS* 797 (1950) (“It is of importance to note that Article 51 does not use the term ‘aggression’ but the much narrower concept of ‘armed attack,’ which means that a merely ‘imminent attack’ or act of aggression which has not the character of an attack involving the use of armed force does not justify resort to force as an exercise of the right established by Article 51” (emphasis supplied). Kelsen reiterates this view in the supplement to the 4th printing of his book in 1956. It should also be noted that Kelsen states that the inclusion of the word “inherent” in Article 51 is a superfluity. “The effect of Article 51 would not change if the term ‘inherent’ were dropped.” *Id.* at 792).

14. LOUIS HENKIN, *HOW NATIONS BEHAVE* 141–44 (2d ed. 1979) (“The fair reading of Article 51 permits unilateral use of force only in a very narrow and clear circumstance, in self-defense if an armed attack occurs.” *Id.* at 141).

15. IAN BROWNLIE, *INTERNATIONAL LAW AND THE USE OF FORCE BY STATES* 264–80 (1963) (“It can only be concluded that the view that Article 51 does not permit anticipatory action is correct and that the arguments to the contrary are either unconvincing or based on inconclusive pieces of evidence.” *Id.* at 278).

16. HERSCH LAUTERPACHT, *2 OPPENHEIM’S INTERNATIONAL LAW* 156 (7th ed. 1952) (“[T]he Charter confines the right of armed self-defense to the case of an armed attack as distinguished from anticipated attack.”) It should be noted that in the Jennings and Watts 9th edition of this authoritative treatise, the authors partially disavow the statement in the earlier version, stating that “while anticipatory action in self-defence is normally unlawful, it is not necessarily unlawful in all circumstances, the matter depending on the facts of the situation including in particular the seriousness of the threat and the degree to which pre-emptive action is really necessary and is the only way of avoiding that serious threat.” ROBERT JENNINGS AND ARTHUR WATTS, *1 OPPENHEIM’S INTERNATIONAL LAW* 417 (1992). For further elaboration of the Jennings and Watts views, see *infra* notes 39 and 40 and accompanying text.

17. ANDREW MARTIN, *COLLECTIVE SECURITY* 169 (UNESCO Paris, 1952) (“Under the Charter they no longer have this latitude [to respond to an apprehended attack]: the attack must be actual and armed.”)

18. Robert Tucker, *The Interpretation of War Under Present International Law*, 4 *INTERNATIONAL LAW QUARTERLY* 11, 29–30 (1951).

19. *THE CHARTER OF THE UNITED NATIONS* (Bruno Simma ed., 1994).

20. Albrecht Randelzhofer, *Article 51, in id.* at 661, 666.

21. *Id.* at 675.

22. *Id.* at 676 (emphasis supplied).

23. *Id.* It should be noted that Professor Randelzhofer rejects the conclusion of the International Court of Justice in the *Nicaragua* case that the customary law of self-defense corresponds “almost completely to the right of self-defence under Art. 51 of the Charter,” but regards this as of little moment, since, in his view the customary law could apply only to the few non-UN members. “As regards UN Members, it stands that Art. 51, including its restriction to the armed attack, supersedes and replaces the traditional right to self-defence.” *Id.* at 678.

24. DINSTEIN, *supra* note 9, at 168.

25. *Id.* at 160, quoting, in part, E. Jimenez de Arechaga, *International Law in the Past Third of a Century*, 159 *RECUEIL DES COURS DE L’ACADÉMIE DU DROIT INTERNATIONAL* 1 at 96 (1978) [other citations omitted].

26. *Id.* at 163.

27. United States Identical Notes, reproduced in 22 AMERICAN JOURNAL OF INTERNATIONAL LAW (Supp.) 109 (1928).

28. DINSTEIN, *supra* note 9, at 164, quoting in part from A. S. HERSHEY, THE ESSENTIALS OF INTERNATIONAL PUBLIC LAW 349 (1912) [other footnotes omitted].

29. *Id.* at 172.

30. *Id.* Compare Professor Dinstein's theory with that suggested by Professor M. Nagendra Singh more than three decades earlier. Professor Singh also insisted that the actual occurrence of an armed attack was a condition precedent to the exercise of self-defense, but he too would authorize resort to self-help when the potential aggressor "has taken the last proximate act on its side which is necessary for the commission of the offence of an armed attack." M. Nagendra Singh, *The Right of Self-Defence in Relation to the Use of Nuclear Weapons*, 5 INDIAN YEARBOOK OF INTERNATIONAL LAW 3, 25 (1956).

31. See D. W. BOWETT, SELF-DEFENSE AND INTERNATIONAL LAW 2-3 (1958), and sources cited therein.

32. Randelzhofer, *supra* note 20, at 675.

33. C. Humphrey M. Waldock, *The Regulation of the Use of Force by Individual States in International Law*, ACADÉMIE DE DROIT INTERNATIONAL, RECUEIL DE COURS 455, 498 (1952) (footnote omitted).

34. MYRES S. MCDUGAL & FLORENTINO P. FELICIANO, LAW AND MINIMUM WORLD ORDER 234-41 (1961).

35. *Id.* at 237.

36. David Linnan, *Self-Defense, Necessity and U.N. Collective Security: United States and Other Views*, 1 DUKE JOURNAL OF COMPARATIVE & INTERNATIONAL LAW 57, 81 (1991).

37. See, in particular, MCDUGAL & FELICIANO, *supra* note 34, at 235; O. Schachter, *The Right of States To Use Armed Force*, 82 MICHIGAN LAW REVIEW 1620, 1633-34 (1982); Waldock, *supra* note 33 at 497.

38. MCDUGAL & FELICIANO, *supra* note 34, and authorities cited therein.

39. ROBERT JENNINGS & ARTHUR WATTS, 1 OPPENHEIM'S INTERNATIONAL LAW 421 (9th ed. 1992).

40. *Id.* at 422 (emphasis supplied).

41. Rosalyn Higgins, *The Attitude of Western States towards Legal Aspects of the Use of Force*, in THE CURRENT LEGAL REGULATION OF THE USE OF FORCE 435, 442-43 (Antonio Cassese ed., 1986). But in the same volume, see *contra*, Ian Brownlie, *The U.N. Charter and the Use of Force, 1945-1985*, *id.* at 491, 498-99. Professor Dinstein, in his analysis of these cases under his doctrine of "interceptive self-defense," reaches the same conclusion as Professor Higgins with respect to the two Israeli actions. DINSTEIN, WAR, AGGRESSION AND SELF-DEFENCE, *supra* note 9, at 44 and 191.

42. U.N. SCOR (2288th mtg.), U.N. Doc. S/RES/487 (1981), reprinted in 75 AMERICAN JOURNAL OF INTERNATIONAL LAW 724 (1981).

43. Higgins, *supra* note 41, at 443. Other commentators have reached the same conclusion. See, e.g., William T. Mallison and Sally V. Mallison, *The Israeli Aerial Attack of June 7, 1981, Upon the Iraqi Nuclear Reactor: Aggression or Self-Defense?*, 115 VANDERBILT JOURNAL OF TRANSNATIONAL LAW 417 (1982); DINSTEIN, *supra* note 9, at 45 and 169; Antonio D'Amato, *Israel's Air Strike Upon the Iraqi Reactor*, 77 AMERICAN JOURNAL OF INTERNATIONAL LAW 584 (1983). *Contra*: TIMOTHY L. H. MCCORMACK, SELF-DEFENSE IN INTERNATIONAL LAW: THE ISRAELI RAID ON THE IRAQI NUCLEAR REACTOR 302 (1996).

44. Antonio Cassese, *Return to Westphalia? Considerations on the Gradual Erosion of the Charter System*, in Cassese, *supra* note 41, 505, 515-16.

45. MCDUGAL & FELICIANO, *supra* note 34, at 240.

46. Oscar Schachter, *In Defense of International Rules on the Use of Force*, 53 UNIVERSITY OF CHICAGO LAW REVIEW 113, 136 (1986).

47. Military and Paramilitary Activities (*Nicaragua v. United States*) (Jurisdiction), 1984 I.C.J. 424 (Nov. 26).

48. Military and Paramilitary Activities (*Nicaragua v. United States*) (Merits), 1986 I.C.J. 96 (June 27) [hereinafter *Nicaragua* case].

49. *Id.* at 103.

50. *Id.* at 347, quoting Waldock, *supra* note 33, at 496–97, and citing BOWETT, MCDUGAL & FELICIANO, and SCHACHTER (dissenting opinion of Judge Schwebel).

51. Department of the Navy, The Commander's Handbook on the Law of Naval Operations (NWP 1-14M/MCWP 5-2.1/COMDTPUB P5800.1), para. 4.3.2.1 (1995) (emphasis supplied). This publication was formerly designated as NWP-9 (Rev. A) [hereinafter cited as NWP 1-14M and NWP-9 (Rev.A) respectively].

52. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3121.01A, Standing Rules of Engagement for US Forces, para 5h (2000) [hereinafter JCS SROE].

53. Secretary of State Daniel Webster to Mr. Fox, British Minister at Washington, April 24, 1841, quoted in 2 JOHN BASSETT MOORE, A DIGEST OF INTERNATIONAL LAW 412 (1906).

54. NWP-9 (Rev. A), para. 4.3.2., *supra* note 51, which provided that the necessity must be “instant, overwhelming, and leaving no reasonable choice of means.”

55. MCDUGAL & FELICIANO, *supra* note 34, at 217.

56. *Id.* at 218. In the course of their analysis, McDougal and Feliciano conclude that the standard of necessity under Article 51 is not less restrictive than the customary-law standard, which required a “high degree of necessity—a ‘great and immediate’ necessity [citing Westlake], ‘direct and immediate’ [citing Lawrence], ‘compelling and instant’ [citing Schwarzenberger],” to be characterized as “legitimate self-defense.” *Id.* at 231, 232–41 [citations omitted].

57. MYRES S. MCDUGAL, *The Soviet-Cuban Quarantine and Self-Defense*, 57 AMERICAN JOURNAL OF INTERNATIONAL LAW 597 (1963).

58. *Id.* Professor Brunson MacChesney, in a companion piece, agreed that under the conditions that prevailed at the time [nuclear stand-off], “A threatened state must retain some discretion in its initial judgment of necessity. Subsequent review will determine its validity.” Brunson MacChesney, *Some Comments on the ‘Quarantine’ of Cuba*, 57 AMERICAN JOURNAL OF INTERNATIONAL LAW 592, 595–96 (1963).

59. William T. Mallison and Sally Mallison, *Naval Targeting: Lawful Objects of Attack*, in THE LAW OF NAVAL OPERATIONS 241, 263 (Horace B. Robertson, Jr. ed., 1991) (Vol. 64, US Naval War College International Law Studies).

60. *Id.*

61. *Id.* at 263. The three applicable criteria which they identify are: “(1) A good faith attempt to use peaceful procedures; (2) actual necessity (as opposed to a sham or pretense) in the context of either an existing armed aggression or a threat of armed aggression against the defending state which is both credible and imminent; and (3) proportionality in responding defensive measures.” *Id.* at 262.

62. NWP 1-14M, *supra* note 51, para. 8.1.1. *See*, in particular, the notes to para. 8.1.1 in the Annotated Supplement to the Manual. ANNOTATED SUPPLEMENT TO THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS 402–03 (A. Ralph Thomas & James C. Duncan eds., 1999) (Vol. 73, US Naval War College International Law Studies).

63. *Id.* *See*, in particular, note 11 to para. 8.1.1 for a listing of the so-called “target sets” for the offensive air campaign of Operation DESERT STORM against Iraq.

64. UN CHARTER, art. 41.

65. Randelzhofer, *supra* note 20.

66. Annex, G.A. RES. 3314 (XXIX) 1974), adopted without a vote on December 14, 1974.

67. *See* WALTER GARY SHARP, SR., CYBER SPACE AND THE USE OF FORCE, Ch. 6; LAWRENCE T. GREENBERG ET AL., NATIONAL DEFENSE UNIVERSITY INSTITUTE FOR

NATIONAL STRATEGIC STUDIES, INFORMATION WARFARE AND INTERNATIONAL LAW, ch. 2; Sean P. Kanuck, *Information Warfare: New Challenges for Public International Law*, 37 HARVARD INTERNATIONAL LAW JOURNAL 272, 288-89 (1996); Michael Schmitt, *Computer Network Attack and the Use of Force in International Law: Thoughts on a Normative Framework*, 37 COLUMBIA JOURNAL OF TRANSNATIONAL LAW 885 (1999).

68. "Definition of Aggression" Resolution, *supra* note 66.

69. *Nicaragua case*, *supra* note 48, at 119.

70. *Id.*

71. MCDUGAL & FELICIANO, *supra* note 34, at 240-41.

72. Schmitt, *supra* note 67, at 909 (emphasis in original).

73. *Id.* at 911.

74. *Id.* at 912.

75. *Id.* at 917.

76. *Id.*

77. *Id.* at 934.

78. *Id.* at 935.

79. LAWRENCE T. GREENBERG ET AL., *supra* note 67, at 85-87.

80. Dinstein, *Computer Network Attack*, *supra* note 5.

81. SHARP, *supra* note 67, at 130.

82. See JCS SROE, *supra* note 52.

83. See examples in the NDU study, *supra* note 67 at 59-64.

84. UN CHARTER, art. 41.

85. In a 1999 article in the Washington Post, Michael Ruane reported that the Internet contains a vast number of "easy, ready-to-use computer hacking programs" and that for many kids, computer hacking just "seems kind of cool." Ruane, *supra* note 3, at 1.

86. Schmitt, *supra* note 67, at 898, citing Jack L. Brock in *Information Security: Computer Attacks at Department of Defense Pose Increasing Risks: Testimony Before the Permanent Subcomm. On Investigations of the Senate Comm. On Governmental Affairs, 104th Cong. (1996)* (statement of Jack L. Brock, Director, Defense Information and Financial Management Systems Accounting and Information, General Accounting Office).

87. Schmitt, *supra* note 67, at 898, citing President's Commission on Critical Infrastructure Protection, *Critical Foundations: Protecting America's Infrastructures A-48* (Oct. 1997).

88. Schmitt, *supra* note 67, at 893.

89. *Id.*

90. Jack L. Brock, Jr., Director, Defense Information and Financial Management Systems, GAO, Report to Congressional Requesters (May 22, 1996). The report noted that only about 1 in 150 attacks is detected and an estimated 65 per cent of the attacks penetrated Defense systems. Michael Ruane reports that the Department of Defense undergoes 80 to 100 attacks every day. Ruane, *supra* note 3, at 1.

91. Schmitt, *supra* note 67, at 932.

92. *Id.* at 933. It should be noted that Professor Schmitt, in his formulation, closely follows the nomenclature of Professor Dinstein's "interceptive self-defense" doctrine. *Id.* at 931-33.

93. MCDUGAL & FELICIANO, *supra* note 34, at 218.

94. Schmitt, *supra* note 67, at 932.