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# Beyond the Internet: *Mētis*, *Techne*, and the Limitations of Online Artifacts for Islamist Terrorists

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*This study challenges the conventional wisdom that the Internet is a reliable source of operational knowledge for terrorists, allowing them to train for terrorist attacks without access to real-world training camps and practical experience. The article distinguishes between abstract technical knowledge (what the Greeks called techne) and practical, experiential knowledge (mētis), investigating how each helps terrorists prepare for attacks. This distinction offers insight into how terrorists acquire the practical know-how they need to perform their activities as opposed to abstract know-what contained in bomb-making manuals. It also underscores the Internet's limitations as a source of operational knowledge for terrorists. While the Internet allows militants to share substantial techne, along with religious and ideological information, it is not particularly useful for disseminating the experiential and situational knowledge terrorists use to engage in acts of political violence. One likely reason why Al Qaeda and other Islamist terrorists have not made better use of the Internet's training potential to date is that its value as a source of operational knowledge of terrorism is limited.*

**Keywords** Al Qaeda, Europe, improvised explosive devises (IEDs), Internet, Islamist terrorism, knowledge, *mētis*, Pakistan, *techne*, training, weapons

## Introduction

In recent years, a cottage industry has emerged in terrorism studies, one that highlights the value of web sites, chat rooms, and other online resources for terrorists and insurgents around the world.<sup>1</sup> Militants representing a variety of ideological causes and organizational configurations are said to harness the informational

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power of the Internet to raise funds, recruit members, wage psychological warfare, even plan and coordinate attacks.<sup>2</sup>

One of the more sweeping, and controversial, claims made by some contributors to this literature is that the Internet has essentially replaced the need for physical training in urban warfare and terrorism. Activists and academics alike declare that—post-9/11 counterterrorism pressure be damned—terrorists no longer need to travel to distant, exotic locales to receive training in their violent tradecraft.<sup>3</sup> Now they can learn to become competent terrorists in the comfort of their own homes, as long as they have access to a computer with a reliable Internet connection. Indeed, some influential commentators claim that militant web sites form an “online terrorism university,” a virtual environment where jihadis can learn to “construct weapons ranging from simple IEDs to nuclear, biological, and chemical weapons.”<sup>4</sup>

There is an element of hyperbole in such accounts, as several scholars have recently suggested.<sup>5</sup> To be sure, Islamist militants in Western Europe and elsewhere use the Internet to gather information and communicate with their colleagues. A large, and growing, repository of instructional materials on terrorism and guerrilla warfare has accumulated on web sites and discussion boards in recent years. Some of these manuals, videos, discussion boards, and other artifacts may indeed help terrorists carry out their activities. But when it comes to information gathering and paramilitary instruction, more is not necessarily better. As countless “googlers” have learned, too much information can quickly lead to information overload, requiring a mechanism to separate the wheat from the chaff. For terrorists, this knowledge management challenge is complicated by the uneven quality of online artifacts. Some, or parts of some, artifacts contain accurate and reliable information that careful—and knowledgeable—practitioners can put to devastating effect. Yet, as discussed below, many online documents contain misleading, even false information, technical flaws that can prove costly to inexperienced novices. While numerous researchers detail the myriad and creative ways militants exploit the Internet to advance their cause, few bother to consider the accuracy of online materials available to terrorists. Even fewer question whether the Internet is suitable for developing the sort of “hands on” practical knowledge that terrorists need to execute violent attacks.

This article addresses these gaps by examining the role—and limitations—of online instructional materials in facilitating terrorism learning. Unlike previous research, this study does not focus on describing the abundant online artifacts available to contemporary terrorists. Nor do I wonder why Al Qaeda has not exploited the “full” training potential of the Internet. Instead, I analyze two types of operational knowledge, both of which are necessary for terrorist attacks: abstract technical knowledge (what the Greeks called *techne*) and practical, experiential knowledge (*mētis*). This distinction provides new insight into how terrorists acquire the practical know-how they need to perform their activities as opposed to abstract know-what contained in technical manuals. It also underscores the Internet’s limitations as a source of operational knowledge for terrorists. While the Internet allows militants to share substantial *techne*, along with religious and ideological information, it is not particularly useful for disseminating the experiential and situational knowledge terrorists use to engage in acts of political violence. One likely reason why Al Qaeda and other Islamist terrorists have not made better use of the Internet’s training potential is that its value as a source of real-life terrorism knowledge is, at least to date, quite limited.

In making these claims I draw on extensive field work on Islamist militancy in Britain and Spain. In the summer and fall of 2007, I interviewed dozens of officials from American, British, and Spanish intelligence and law enforcement agencies, including, but not limited to, the Federal Bureau of Investigation, the London Metropolitan Police, and the Spanish Civil Guard and national police. During my field work I sought informants with expertise on Islamist terrorism in Britain, Spain, and Western Europe more broadly. I also interviewed an explosives consultant for American and British defense agencies, a leading authority in his field who enjoys remarkable access to online terrorism manuals. I complemented my interviews with additional sources of data, including documents from criminal proceedings in Britain and Spain, studies by researchers based at the Norwegian Defense Research Establishment (FFI), and the translated writings of Mustafa Setmariam, a jihadi strategist who has written extensively on preparation and training under the pen names of Abu Mus'ab al-Suri and Umar Abd al-Hakim.

In this article, I draw on all these data to interpret how some Islamist militants in Britain and Spain exploit the Internet to access and share operational knowledge of terrorism, and the limitations they face in doing so. I do not, however, provide a general account for how terrorists of every grievance, from every location use the Internet to advance their cause; nor do I empirically test how all Islamist terrorists exploit the Internet. Cultural analysis is, as Clifford Geertz once observed, “intrinsically incomplete,” even more so when the subject under study is as secretive and subjective as the online world of Islamist militancy.<sup>6</sup>

Tapered as my analysis may be, one theme that emerges from these data is the importance of learning terrorism skills such as bomb-making and weapons handling through practice, rather than formal instruction alone. Technical information and book learning are undeniably important for militants, but hands-on performance provides them the know-how to build bombs, fire weapons, and complete other terrorism-related activities. While the Internet plays a significant role in disseminating terrorist *techne*, it is not clear how, or even whether, it facilitates learning-by-doing, allowing Islamist militants to develop the practical expertise they need to plan and execute attacks.

### ***Techne and Mētis***

Terrorists acquire knowledge of their violent craft through study and practice. The method of diffusion depends on the type of knowledge being acquired. In organization theory, this distinction is commonly framed in terms of explicit and tacit knowledge.<sup>7</sup> Brian Jackson highlights this distinction in one of the few studies that examines terrorists' operational knowledge. According to Jackson, the Provisional Irish Republican Army did not learn to use mortars effectively until its members complemented their explicit knowledge of mortars, which they obtained from military reference books, with the tacit knowledge they developed from building and firing these weapons themselves.<sup>8</sup> In this article, I build on Jackson's insight, not by incorporating his distinction between explicit and tacit knowledge, but by drawing on two ancient Greek concepts to suggest something different.

Abstract technical information, *techne*, is similar to explicit knowledge: it is communicated through language, stored in artifacts, and taught as formal instruction. *Techne* is communicated in “small, explicit, logical steps” that can be broken down and verified, like a cooking recipe—or an explosives preparation.<sup>9</sup> Terrorists,

for example, may acquire bomb-making *techne* by reading manuals and other instructional materials that provide detailed, step-by-step recipes for making improvised explosive devices (IEDs), or by attending training camps where experienced practitioners teach these small, explicit, logical steps as part of their deadly curriculum.

Unlike explicit knowledge, which may be situational, *techne* transcends location and context. *Techne* is based on general principles that apply across time and space, like the Pythagorean theorem, or a recipe for hydrogen peroxide-based explosives. Such technical knowledge is universal; it does not vary across local settings. Certain chemicals react with other chemicals to cause explosions, whether the reaction occurs at a rural training camp in Central Asia or an inner-city apartment building in Western Europe. *Techne* is useful to terrorists not only because it is easy to codify, like explicit knowledge, but because it is fungible. Would-be terrorists may acquire abstract knowledge for building bombs and executing attacks at a training camp in Waziristan, at a farmhouse outside Madrid, or in an online instruction manual.

Not all knowledge can be acquired and applied in this manner, however. Practitioners of a specific craft, such as medicine, law enforcement, and terrorism, often rely on intuitive, practical knowledge, what the Greeks called *mētis*. Like tacit knowledge, practitioners develop *mētis* gradually, by engaging in the activity itself, rather than through formal study. Terrorists may learn the *techne* involved in building bombs, shooting weapons, and other activities by studying manuals or receiving formal instruction, but to develop hands-on proficiency they must put the book down and practice. Practice may not make perfect, but it does build skills. To become a competent terrorist, one must build bombs, fire guns, or survey targets, acquiring the practical know-how that is helpful for executing successful attacks. Terrorists acquire *mētis* by doing, developing their violent talents through practice, combat, and carrying out attacks in specific, local settings.

Unlike *techne*, *mētis* is not “settled knowledge”; it varies across local contexts.<sup>10</sup> What works in one location may not work in another. Street smarts in London are different from cave smarts in Afghanistan. The skills required to succeed at urban terrorism in the West are not easily obtained from training in guerrilla warfare, even as taught at the best Al Qaeda camps in Afghanistan. The abstract formula for making hydrogen-peroxide IEDs may not vary across locations, but the materials available to bomb-makers will. “What is available in Pakistan is not necessarily available here in the UK,” explains an intelligence analyst with the British Foreign and Commonwealth Office. “[C]hemicals are often easier for these guys to get in Pakistan than here, so they have to adjust to local conditions.”<sup>11</sup> Adjusting to local conditions requires local knowledge: the Pakistani-trained bomb-maker has to figure out which of the chemicals he needs are available in Britain. Then he must apply his practical knowledge by obtaining the necessary chemicals (without alerting the authorities) and adjusting his bomb-making formula to fit the new ingredients. As this example suggests, both *techne* and *mētis* are essential to executing a successful bombing, but only the latter allows practitioners to adapt technical knowledge to suit local conditions.

To this point, *mētis* sounds a lot like tacit knowledge and it is easy to see why they are often conflated. But there are at least two significant differences between the two concepts. First, unlike tacit knowledge, which is intuitive, practitioners are generally aware of the *mētis* they have developed through first-hand experience. This has important implications for information sharing. Tacit knowledge lies beyond the

realm of what is consciously known; it is difficult, if not impossible, to share with others. *Mētis* on the other hand does not reside in participants' subconscious, nor in the computers, manuals, and other instructional materials they carry around or access online. It resides in their heads and hands, in the form of experiential know-how they have accumulated over time and repeated practice. While difficult to codify in formal documents, *mētis* can be—and is—shared among practitioners through face-to-face interactions, storytelling, apprenticeships, and hands-on demonstrations in building bombs, firing weapons, and other activities.

Apart from being consciously-known, and articulated, *mētis* differs from tacit knowledge in a second important respect. Unlike tacit knowledge, *mētis* is a form of crafty intelligence that “bears on fluid situations which are constantly changing and which at every moment combine contrary features and forces that are opposed to each other.”<sup>12</sup> While *metis* is often translated from classical Greek as “cunning intelligence,” James Scott points out that this fails to capture the full range of *mētis*-related skills that fire fighters, military commanders, and statesmen use to adapt to changing environments.<sup>13</sup> Nor are defining attributes of *mētis*, including dexterity, ingenuity, and elusiveness, captured in distinctions between tacit and explicit knowledge, which focus on information transfer. Such attributes are, however, essential to terrorism because they allow militants to remain “pliable enough to accommodate the unexpected,” whether the surprise comes from their own mistakes or government counterterrorism efforts.<sup>14</sup> In planning and carrying out operations, terrorists must shield their activities from law enforcers and respond to unexpected events by changing their day-to-day practices in simple but effective ways. The bomb-maker's ability to adjust to local conditions, to fit the technical requirements of his explosives formula to locally-available resources has little to do with tacit knowledge, but it is the hallmark of *mētis*.<sup>15</sup>

### The Call to Practice

Terrorism scholars have been slow to appreciate the distinction between *techne* and *mētis*, along with its implications for how terrorists learn. Few researchers have systematically analyzed operational knowledge of terrorism, and those that do tend to accept the conventional, less insightful dichotomy between explicit and tacit knowledge. Disturbingly, jihadi tacticians have not been weighed down by such conceptual baggage. Mustafa Setmariam Nasar, a prominent Al Qaeda-affiliated strategist, highlights the split between theoretical and practical knowledge repeatedly in his writings, a distinction that is akin to what I have in mind for *techne* and *mētis*. Setmariam also stresses the importance of learning-by-doing, suggesting that aspiring mujahidin can best acquire critical skills through “participation in battle.”<sup>16</sup>

While researchers disagree over Setmariam's stature within the transnational Islamist movement and his influence on actual terrorists, they agree that the Syrian militant is more of a historian and theorist of jihad than a practitioner himself.<sup>17</sup> In spite of working as a military instructor in Afghanistan for several years in the late 1980s and early 1990s, Setmariam's direct combat experience is limited. Indeed, he has been dismissed as a “pen jihadist” by intelligence officials, which did not stop the U.S. government from offering a \$5 million reward for information leading to his capture in 2004.<sup>18</sup> Nor, as Brynjar Lia of the Norwegian Defense Research Establishment (FFI), points out, is Setmariam a classically trained Islamic scholar. The value of Setmariam's writings, most of which appear under his pseudonyms,

Abu Mus‘ab al-Suri and Umar Abd al-Hakim, lies not in his interpretation of Islamic jurisprudence but in his ability to extract general lessons from previous “jihads” in Syria, Afghanistan, and elsewhere for present-day militants.<sup>19</sup> The extent to which Setmariam is actually followed by Islamist terrorists remains an open question.

What is known is that Mustafa Setmariam has written widely on training and preparation and his writings, which are available to militants through numerous Arabic-language web sites, stress the need for mujahidin to be well-versed in both theoretical and practical knowledge of jihad. The former, Setmariam points out, refers to abstract “principles of the Islamic doctrine in general, and the jihadi doctrine in particular,” as well as “the theory of guerrilla warfare . . . and the basis for jihadi guerrilla warfare.”<sup>20</sup> To acquire theoretical knowledge, militants “must be provided with the necessary studies, books, and readings, according to the level of their understanding and ability to comprehend.”<sup>21</sup> Setmariam humbly recommends several of his own lectures and writings for this purpose, along with the work of Abdallah Azzam, the leader of Arab-Afghan resistance fighters in Peshawar during the 1980s and the guiding light for the militant network that later crystallized into Al Qaeda.<sup>22</sup> Recognizing the value of online materials, Setmariam also recommends several “theoretical” manuals on light weapons and explosives available on the Internet.<sup>23</sup>

While online artifacts are important for developing what Setmariam calls “theoretical” knowledge of jihad, or what I term *techne*, he also emphasizes that urban guerrilla warfare requires certain “talents” that cannot be obtained simply by reading about them, including “selecting, planning and executing operations.”<sup>24</sup> Setmariam maintains that some mujahidin, like some poets, painters, and musicians, are more gifted than others, but he also insists that practical training and “participation in the fight allows the individual to discover abilities he never thought he possessed.”<sup>25</sup> Recalling his own combat experience in Afghanistan, Setmariam emphasizes the value of mixing “training and real fighting,” particularly when “experienced personnel are present to supervise the training.”

Once, I witnessed a lesson on the use of mortars which took place directly on the front during the jihad against the Russians and the Communists. . . . The trainer . . . gave us theoretical lessons on artillery for two days. Then, it was implemented in practice, with live shooting at enemy targets, whereupon those targets responded by a similar bombardment. . . . In the course of three or four days, the trainees were living in a live environment which was excellent for training and fighting at the same time.<sup>26</sup>

Setmariam complements his trial-by-fire technique with an apprenticeship approach to training. Raw recruits, under the supervision of experienced veterans, gradually increase their involvement in violent activities over the course of several operations:

Untrained members would participate in the first operation as an observer only, witnessing its execution among the public. During the second stage they would be armed and participate as an auxiliary element, not intervening unless necessary. During the third stage, they enter to execute the operation, supported by trained senior members.

After this stage they would perform both training and participation on the battle field.<sup>27</sup>

In such apprenticeships, militants develop “their skills through real-life activity,” building bombs, assassinating apostates, and performing other violent acts.<sup>28</sup> Veterans share their experiential knowledge, in a word, their *mētis*, with novices through practical demonstrations and personal narratives, like Setmariam’s war story from Afghanistan. With the accumulation of experience, novices cultivate their own *mētis*-laden skills, moving beyond their apprenticeships to become violent practitioners in their own right. Practitioners then continue to develop and share their own *mētis* through “training and participation on the battle field.”<sup>29</sup>

### Why Real-World Training Matters

Jihadis’ need for practical knowledge, as recognized by Setmariam, underscores an important limitation in the Internet’s role as a source of violent know-how. Notwithstanding the recent proliferation of academic studies and news reports documenting how Islamist terrorists allegedly use the Internet to train recruits, it is not clear whether online artifacts facilitate hands-on learning among militants, allowing them to share experiential *mētis*, as opposed to more easily acquired *techné*.

Setmariam’s own writings are ambiguous on this point. He appreciates the Internet’s role as a repository of “theoretical” knowledge on jihad and a communications tool to share this knowledge among the mujahidin. A cornerstone of his jihadi training program is to “spread the culture of preparation and training . . . by all means of distribution, especially the Internet, the distribution of electronic discs, direct correspondence, recordings, and every other method.”<sup>30</sup> Setmariam also recognizes that “in the post-September 2001 world,” “it is no longer possible and practical” to establish open training camps in former safe havens due to America’s “stunning technological superiority” in the global war against Al Qaeda.<sup>31</sup> Instead, the mujahidin must “move the training to every house, every quarter, and every village of the Muslim countries,” where even the “simplest cells . . . under the most difficult circumstances of security and secrecy” can acquire knowledge from “theoretical studies” using “manuals that are available today on the Internet.”<sup>32</sup> The “most important of these manuals,” he stresses, are those dealing with “light and medium weapons . . . the science of explosives engineering . . . target reconnaissance . . . assembling and manufacturing explosives . . . combat tactics . . . [and] secret organizational conduct.”<sup>33</sup>

But if Setmariam is clear on the Internet’s importance as a source of “theoretical” knowledge of guerrilla warfare, a role he suggests has grown since 9/11, he also acknowledges the limitations of such technical knowledge for training mujahidin in practical skills like firing weapons and building bombs. After boasting how jihadi training is “very simple,” making it “possible to plant training camps across the Islamic nation, in all her houses and quarters,” Setmariam adds a telling disclaimer: “However, one must be extremely cautious in the field of explosives. The training in houses on explosives must be limited to theory only.”<sup>34</sup> When it comes to translating theoretical know-what on explosives into practical know-how, jihadis must log off the computer and practice in the real world, far from congested urban areas. Practical training in isolated regions, Setmariam notes, will help the mujahidin “avoid losses caused by accidents, and the security exposure that comes on top of it.”<sup>35</sup> He applies this argument to “shooting practices” as well, which must be carried



out with “great security precautions,” after “creating necessary areas and suitable conditions in caves . . . uninhabited mountains . . . vast forests . . . deserts” and similar locations.<sup>36</sup>

Maximizing the safety of the mujahidin and avoiding counterterrorism pressure is not the only reason for isolating training exercises. Militants need space where veterans with real-life fighting experience can share their practical knowledge with novices through hands-on instruction. Training in urban guerrilla warfare may be as “simple” as Setmariam declares, but he also repeatedly counsels that experienced human beings, not online artifacts, make the best trainers. “Whoever has the previous knowledge about these weapons and who received some previous training on them must train those around him,” he exhorts.<sup>37</sup> “Theoretical studies” and Internet “[m]anuals on assembling and manufacturing explosives” are useful “*provided that the implementation is supervised by a specialist in chemistry, and that it takes place in areas far from people, and with very small amounts.*”<sup>38</sup> Technical, or as Setmariam prefers, “theoretical” knowledge and online materials are not enough: aspiring bomb-makers and sharp-shooters must be taught by experienced specialists and given the opportunity to practice what they have learned by building IEDs and firing weapons. Setmariam’s “post-September” training program falls short on this essential requirement, as he himself concedes: “the only remaining need is to practice shooting and the use of explosives.”<sup>39</sup> This remaining need is not a trivial one, as this article makes clear.

Setmariam is not the only one to recognize the limitations of online artifacts for developing practical knowledge of terrorism. Ironically, some intelligence officials that dismiss Setmariam as a pen jihadist agree with him on this point. Asked to consider the distinction between *mētis* and *techne*, government officials I interviewed suggest that the Internet’s value as a source of practical knowledge is overblown. One intelligence analyst with the British Foreign and Commonwealth Office points out that while many bomb-making manuals are now readily available online, building an IED is “not so easy as reading something from the Internet. Bomb-building requires practical experience.”<sup>40</sup> “The practical knowledge of actually putting together bombs often goes beyond the Internet,” adds a counterterrorism official from the London Metropolitan Police, which explains why many Islamist militants with bomb-making aspirations “have received some sort of training overseas.”<sup>41</sup>

Training is essential for fledgling terrorists, particularly when it provides them with hands-on instruction relevant to their areas of operation. Referring to nearly thirty separate terrorist plots uncovered in Britain in recent years, the director of the MI5, the country’s domestic intelligence agency, announced in a rare public speech that local militants often received “guidance and training” from Al Qaeda-affiliated fighters in Pakistan.<sup>42</sup> Other officials I interviewed emphasize that the most significant terrorist plots in Britain, including the Operation Crevice plot to detonate fertilizer-based explosives around London in 2004, the London tube and bus bombings of 2005, and the airline liquid explosives plot of 2006, involved people that had received at least some practical training from more experienced militants in Pakistan. “You can’t compensate for the lack of hands-on-training,” explains a British counterterrorism analyst, stressing the importance of overseas-trained militants.<sup>43</sup> “We know that there is a tendency for groups to go to Pakistan now to seek out training as a means of getting the information they need to get the scheme accomplished,” adds an FBI official in London. “They are developing the basic knowledge and ability they need by going through the training camps.”<sup>44</sup> “Training in Pakistan is

important,” emphasizes another official, a senior investigative officer with the Metropolitan Police, “in part because of the bad information that’s available on the Internet.”<sup>45</sup>

At the Pakistani camps, veteran jihadis teach novices ambush techniques, weapons handling, and how to build what Bruce Hoffman calls “increasingly sophisticated” IEDs.<sup>46</sup> While Hoffman highlights Al Qaeda’s “pivotal” role in such training, the camps at which these activities unfold are generally modest affairs, particularly in comparison with some of the Afghanistan camps of the 1990s. The new training facilities, such as they are, may consist of a tent or two located in isolated mountain terrain, or a house in a town surrounded by a wall.<sup>47</sup> Classes may contain a trainer, his assistant, and a class of ten to twenty students. Copying a page from Setmariam’s playbook, trainers limit opportunities to practice what has been learned to avoid arousing suspicion with the sound of weapons fire and explosions. In his testimony in the Operation Crevice trial, which ended in the conviction of five militants for their involvement in the foiled plot, Mohammed Junaid Babar recalls that trainees at one camp were only allowed a couple of shots from their weapons at the end to avoid attracting unwelcome attention from neighbors and authorities: “Basically everyone waited until the last day to fire their weapons.”<sup>48</sup>

However unassuming, these facilities do offer novices hands-on instruction from knowledgeable veterans, a critical component for sharing *mētis*. When aspiring jihadis with local knowledge of their planned area of attack connect with seasoned trainers at such facilities, the consequences can be devastating. Following their two-day explosives training in Pakistan, British militants Omar Khyam and Anthony Garcia, both of whom were later convicted for their involvement in the Crevice plot, obtained over half a ton of ammonium nitrate fertilizer, which they stored near London for the purpose of building bombs.<sup>49</sup> While Her Majesty’s authorities dodged a bullet in Operation Crevice, they were less fortunate in the London tube and bus bombings a year later. “Mohammed Siddique Khan and Shehzad Tanweer from the 7/7 bombings went to Pakistan to receive training,” explains a former Metropolitan Police counterterrorism official. “Their original intention was to go to Afghanistan and fight there, but in Pakistan while they were experiencing difficulty trying to get to a training camp they met [an operative], who told them, ‘Look, you’re from Britain, instead of getting trained and going to Afghanistan, why don’t you go back to the UK and do something there?’”<sup>50</sup> The aspiring suicide bombers apparently took their mentor’s advice to heart, with tragic consequences for dozens of Londoners.

Mohammed Babar’s testimony from the Operation Crevice trial underscores the importance of practical, hands-on training. Babar had been an original participant in the conspiracy to detonate fertilizer-based explosives in London but later turned state’s evidence against his former colleagues. During the trial, he described how he and Omar Khyam practiced building explosives using different fertilizers, including ammonium nitrate and Di-Ammonium Phosphate (DAP). After Babar and Khyam successfully detonated the ammonium nitrate bomb, they decided to test a second bomb using DAP. “It was in case we couldn’t get ammonium nitrate,” Babar explained, “we wanted to see if this was a suitable substitute.”<sup>51</sup> The explosion failed because “the chemicals did not react properly,” providing Babar and his co-conspirators useful feedback for their planned operation. Babar also described how his fellow militants practiced firing a variety of weapons during their training: “They were just basically learning how to shoot, different positions of shooting, how

to shoot an AK-47, assembling and disassembling an AK-47, light machine gun, rocket launcher.”<sup>52</sup>

Evidence that emerged following the 2004 train bombings in Madrid also suggests the importance of first-hand practice, even when the bombers greatly simplified their task by acquiring ready-made explosives. Prior to the attacks, Jamal Ahmidan, one of the leaders of the operation, and his colleagues obtained more than one hundred kilograms of Goma-2 Eco dynamite from a mine in Asturias province, in northwest Spain. This meant that unlike the perpetrators behind other terrorist plots the Madrid bombers did not have to build their devices from scratch; they only had to assemble the bombs using prefabricated components. But the bombers still had to attach triggers and detonators to the dynamite. When assembling their dynamite-bombs at a house near Madrid they rented for this purpose, Ahmidan and his fellow bombers reportedly tested the cell phone triggers and detonators before connecting them to the explosives, to make sure they functioned properly.<sup>53</sup>

As these examples suggest, developing a feel or “knack” for building bombs and performing other violent acts requires practice and learning-by-doing, which is difficult to obtain from the Internet, no matter how many online manuals one reads or instructional videos one watches. Terrorists may use the Internet to gather information and prepare attacks, but they “can only learn so much by watching indoctrination tapes,” explains a former State Department official. “They still have to go out and practice.” There are “certain skills that really need to be practiced,” he continues, “like the bomb-maker.”<sup>54</sup> Another former official, a counterterrorism specialist with the Metropolitan Police, makes the point with an analogy:

Most of the time it’s going to be more difficult to do it [build a bomb] based solely off information from the Internet than through actual practice. It’s like putting together furniture for the first time from instructions that come with the purchase versus putting together furniture with the knowledge gained from doing it.<sup>55</sup>

Difficult, of course, does not mean impossible. There are cases in which militants used online artifacts to help them plan and execute attacks. Jamal Ahmidan and his fellow conspirators in the Madrid train bombings downloaded numerous documents from different jihadi websites, including a popular manual called “Series for the Preparation of the Struggle” (*Serie para la preparación de la lucha*), that reportedly contained suggestions for placing bombs inside hand bags or “something similar” (the Madrid bombers used backpacks) and how to communicate by cell phones without attracting law enforcement surveillance.<sup>56</sup> Some of Setmariam’s writings were also found on a computer allegedly used by the Madrid bombers.<sup>57</sup> The terrorists behind the May 2003 attacks in Casablanca and the April 2005 bombing in Cairo’s Khan al-Khalili bazaar reportedly manufactured homemade IEDs from instructions they downloaded from the Internet.<sup>58</sup> But it is not clear from the published accounts of any of these attacks how closely the terrorists actually followed these online artifacts when making their bombs, whether they supplemented these documents with their own real-world know-how, whether they had the opportunity to practice what they learned from the Internet, and whether experienced bomb-makers assisted them by providing additional information and support. Suggestions and speculation abound, but solid evidence remains scarce, in no small part because so many of the perpetrators “martyred” themselves during or after their attacks.<sup>59</sup>

In his survey of recent terrorist plots in Western Europe, Norwegian defense scholar Petter Nesser notes that while Islamist militants used the Internet for recruitment, socialization, and operational planning, they “maintained a strong desire for real-life ‘military style’ training and face-to-face encounters with experienced mujahidin.”<sup>60</sup> Many of the schemes Nesser describes, including Operation Crevice, the gruesome murder of the Dutch filmmaker Theo Van Gogh in Amsterdam in 2004, and the airline liquid explosives plot in Britain in 2006, involved perpetrators that received operational training in Pakistan or elsewhere. “The terrorist cell that appeared to be most independent and ‘virtual,’” he observes, describing a failed attempt by two Lebanese students to bomb German passenger trains with gas canister bombs using instructions they downloaded from the Internet, “was also the one that came across as most amateurish.”<sup>61</sup> As Jeffrey Bale documents in a separate report, the Lebanese students built the bombs themselves from artifacts they downloaded from the Internet, including an Arabic-language instructional video called “The Use of the Gas Canister as an Explosives Charge.”<sup>62</sup> In spite of following the step-by-step instructions contained in the video to the best of their limited abilities, the would-be bombers failed to include the necessary “oxygen mixture” in their detonation devices, apparently due to their ignorance of pressurized gases.<sup>63</sup> This critical technical error prevented the canister bombs from igniting when the detonators went off, sparing dozens and perhaps hundreds of civilians from sudden, violent deaths.<sup>64</sup> The bombers’ lack of training contributed to this error and, according to Nesser, was “one of the reasons why the operation failed.”<sup>65</sup>

Similar lack of training—and incompetence—kept an aeronautics engineer and a medical physician from igniting their crude IEDs in London and Glasgow in 2007. One explosives expert familiar with the attacks notes that the bombers’ use of propane gas cylinders suggests they were unable to manufacture or even obtain explosives. “They are probably keen amateurs who could not get their hands on the real thing and do not realise the limits of what they are doing,” he explains.<sup>66</sup> Like the would-be train bombers in Germany the year before, the engineer and physician used the Internet to prepare for their attacks. Also like the two Lebanese militants, they failed to provide the oxygen mixture necessary to ignite the propane canisters, this time placed in separate cars parked outside a popular nightclub and a nearby bus stop in London’s West End theatre district. The engineer and physician committed another basic mistake when they placed nails on the car floors, where any explosion would have driven them into the ground instead of nearby onlookers. Their follow-up attack at the Glasgow Airport in Scotland was even more slipshod. With the police closing in on them, they desperately tried to ram their way into the Glasgow terminal in a Jeep Cherokee filled with gasoline and more propane cylinders. Instead, their Jeep got stuck in the entrance to the building. In spite of their best efforts, the two attackers again failed to detonate the gas cylinders. The best the aeronautics engineer could manage was to douse himself with gasoline and set himself and the Jeep on fire.<sup>67</sup>

Apparently, highly-educated professionals do not necessarily make good terrorists. While some analysts claim that a formally trained engineer and physician should have known better, the point is that they didn’t. “I think the Glasgow-London guys found that it’s harder to carry out an explosives attack than they thought,” a former counterterrorism official with the Metropolitan Police wryly observes.<sup>68</sup> “You can find videos on the [I]nternet from Iraq on how to booby-trap a car,” another expert explains, “but carrying it out is not as simple as people might think.”<sup>69</sup> Similar

observations could be made of the two Lebanese militants that tried to bomb the German passenger trains in 2006. What the perpetrators behind both these failed Internet-supported attacks were missing was real-life explosives expertise, gained through hands-on training or their own combat experience, to supplement the technical information they downloaded from the Web.

In fact, successful bomb-making requires a combination of *techne* and *mētis*. Abstract technical knowledge, as found in online artifacts like bomb-making recipes, is essential because it contains precise measurements for combining different, often volatile chemicals in precise ways to produce the desired explosions. Exact measurements of multiple ingredients are difficult for boundedly-rational human beings to remember without recipes and other documents that clearly stipulate the necessary inputs and their desired quantities. Seven months after receiving explosives training in Pakistan, Omar Khyam and Salahuddin Amin apparently forgot which chemicals they needed to mix with ammonium nitrate, and in what ratios, to make the IEDs they planned to set off in London. Amin, who was still in Pakistan at the time, consulted a knowledgeable veteran to get the information, which he wrote up in some notes that he shared with Khyam.<sup>70</sup>

Would-be bombers like Amin and Khyam need precise technical knowledge that is clearly documented in coherent, step-by-step instructions they can follow. Yet, applying this abstract knowledge to meet local conditions requires practice, in this case assembling bombs from different materials with one's own hands. The Crevice militants practiced building explosives during their training in Pakistan, using various chemicals to determine which would work best with local ingredients they expected to obtain back in Britain. Fortunately, British officials disrupted the plot before the terrorists had a chance to put their practice to use. But the failure of the Crevice plot should not obscure how Khyam and his colleagues, like other bomb-makers, sought to combine abstract know-what with experiential know-how. This intuitive blending of the abstract with the concrete forms the cornerstone of real-world expertise. *Techne* and *mētis* are complementary, not mutually exclusive, an insight that Setmariam alludes to in his call to include both theoretical and practical knowledge in the training of aspiring jihadis.<sup>71</sup>

### Accurate Artifacts?

The preceding discussion assumes that militants' online instructional materials are accurate. This claim is consistent with much of the literature on Islamist terrorism and the Internet, which presumes that if an explosives recipe or video is posted online it must be correct—and dangerous. With few exceptions, studies typically describe different manuals and instructional videos militants can obtain through password protected websites and discussion boards, without evaluating their accuracy. Gabriel Weimann, a leading scholar in this area, provides an indelible example with his discussion of *The Nuclear Bomb of Jihad and the Way to Enrich Uranium*, an online manual written in Arabic by someone who calls himself “the Lion of Islam.” In preparing his manual, the Lion claims he spent two years “studying nuclear physics through various scientific forums and Jihadist forums,” compiling a document he boasts will teach readers how to prepare nuclear weapons through “simple” experiments they can conduct “even in the kitchens of their homes.”<sup>72</sup> Rather than questioning these outlandish claims, which fly in the face of numerous studies detailing the daunting challenges terrorists face in manufacturing weapons-grade fissile

material and assembling nuclear bombs, Weimann suggests that the manual and other references to WMD terrorism on jihadi web sites are “alarming” and “should be taken seriously.”<sup>73</sup>

But what if such manuals contain imprecise or even inaccurate information? In reality, they often do. Anne Stenersen of the Norwegian Defense Research Establishment (FFI) examines the same manual that Weimann highlights, reaching a decidedly different conclusion. Stenersen, who is fluent in Arabic and read a longer version than the manual cited by Weimann, describes the artifact as a randomly organized “collection of texts, illustrations and articles” assembled from a hodgepodge of sources “without much regard as to whether the information is correct or not.”<sup>74</sup> Among the Lion’s “numerous technical errors” is his claim that melting 80.1 kilograms of radium with iron oxide and aluminum will produce a nuclear explosion similar to the Hiroshima bomb, demonstrating his basic ignorance of the gun-type and implosion methods of nuclear bomb ignition.<sup>75</sup> The Lion also instructs his readers to prepare a “dirty bomb” by placing some uranium “under the bed of the person you want to get rid of,” which will kill the victim “instantly and without a scar.” “This is of course utter nonsense,” Stenersen politely adds.<sup>76</sup> *The Nuclear Bomb of Jihad*, she concludes, “does provide a general introduction to nuclear physics and the history of the nuclear bomb, but not much more,”<sup>77</sup> belying both the Lion’s stated intent in compiling the manual and Weimann’s alarmist characterization of it.<sup>78</sup>

To her credit, and our benefit, Stenersen does not limit her critical gaze to such easy-to-refute cases as online nuclear weapons manuals. In separate articles, one of them published in this journal, she considers precisely the sorts of artifacts that have received substantial attention in news reports and academic circles in recent years: training manuals on chemical and biological weapons (CBW) and instructional videos on conventional weapons and explosives. Stenersen characterizes the eight online CBW manuals she inspects as “crude amalgamations of widely available, open-source material” that “rarely provide sufficient detail to allow safe and successful production” of chemical and biological agents, “much less help the reader to weaponise or deliver them.”<sup>79</sup> “[T]he threat posed by CBW manuals available on jihadist websites,” she notes, “tends to be exaggerated.”<sup>80</sup>

Of the twenty-seven videos on bombs and weapons Stenersen reviews, she notes that the best videos, the ones that “stand out” because of their “quality,” “user-friendliness,” and “advanced weapon-making technique,” are produced by the Lebanese Hizballah, not Al Qaeda central. Yet even the Hizballah videos, she cautions, present significant challenges for aspiring bomb-makers.<sup>81</sup> The videos, which have been reproduced and redistributed by different Sunni militant groups, are missing critical information about how to prepare nitronaphthalene, a basic ingredient in the explosives compound under preparation, and assemble detonators. “Without access to these components, or detailed instructions on how to make them,” Stenersen observes, “the amateur would therefore not be able to make an explosive belt based on these Internet recipes only.”<sup>82</sup> Similarly, chemists from the German federal police believe that the instructional video the two Lebanese militants used to build their gas canister bombs was missing vital information on pressurized gases that led them to overlook the need to mix gasoline and oxygen in the bottles they used as makeshift detonators.<sup>83</sup> Significantly, many online videos stress the need for testing and practice, suggesting that real-world expertise will not come from the technical knowledge contained in the videos alone, but only when militants combine this *techne* with the *metis* they develop from building bombs themselves.

Stenersen's detailed, dispassionate assessment of online manuals and instructional videos is a welcome corrective to the exaggerated, superficial descriptions of others.<sup>84</sup> But the Norwegian defense analyst is no radical. She supports the counterterrorism community's consensus view that the Internet functions as a virtual "library" where instructional materials "can be easily accessed from anywhere in the world," as well as "an interactive environment where people can discuss training-related issues".<sup>85</sup> Yet, Stenersen also recognizes that the quality of these online artifacts varies substantially and that the "vast amount" of material available to jihadis contributes to information overload, making it "hard for beginners to separate good-quality training material from the rest."<sup>86</sup>

Some terrorism analysts argue that online discussion forums allow novices to separate the wheat from the chaff by interacting with "trainers" that share their expertise in bomb-making and weapons-handling. Others suggest that chat rooms allow militants to share their expertise through virtual storytelling. But Stenersen, who has monitored popular *jihadi* boards like al-Firdaws for years, emphasizes that "online 'experts' seem to have little field and practical experience, if any at all."<sup>87</sup> The "information that is exchanged on these forums," she adds, "tends to be very basic," if not spurious.<sup>88</sup> To cite but one example, an "expert" contributor on one board responded to a question about personal protection from radioactive material by suggesting that putting the material in a freezer would be enough to prevent radiation.<sup>89</sup> Such nonsense, no matter how freely shared through virtual storytelling, is not likely to increase the operational capacity of many militants. The informational value of online chat rooms is only as good as the real-life expertise of those who participate.

Like her FFI colleague Petter Nesser, and jihadis themselves, Stenersen understands that the Internet is no substitute for hands-on instruction; it is "for teaching basic skills and knowledge" before militants "move on to real-life training."<sup>90</sup> Of course even the most basic training is lacking when it is littered with specious claims and falsehoods. In a biting allusion to the anxious portrayals by Weimann and others, Stenersen concludes that the Internet more closely resembles a "'pre-school of jihad' rather than a 'university.'"<sup>91</sup>

If some scholars lack Stenersen's nuanced understanding of online artifacts, many security professionals, thankfully, do not. Law enforcement and intelligence officials I interviewed spoke of the Internet's value for Islamist militants as a source of general information about the West and operational information for planning attacks. They "rely on the media for information, *El País*, *El Periodico*, the press that is available on the Internet, which makes it easier to get the information," explains one State Department official based in Madrid.<sup>92</sup> "The Islamists are good at knowing what we know," his colleague adds. "They gather information about police activities and Western society in general through the press, books, and movies."<sup>93</sup> A counterterrorism officer based in Ceuta, a Spanish enclave in northern Morocco, emphasizes that militants also use the Internet to gather information in preparation for attacks. "They download operations manuals, instructions for bomb-making" from websites and watch "videos that show how to build bombs and participate in chat rooms that discuss bomb-making techniques."<sup>94</sup>

Yet when questioned about the accuracy of online manuals and instructional videos, the same respondents point out that these artifacts are prone to errors. The Spanish counterterrorism officer acknowledges the poor quality of many online IED manuals. "I wouldn't build a bomb with my own hands based on an Internet manual," he insists, a sentiment echoed by his colleague, another officer investigating

Islamist militancy in Ceuta.<sup>95</sup> “The Internet is what the Internet is,” explains a Metropolitan Police official, “people put things up there that are not necessarily accurate.”<sup>96</sup> “One problem with downloading manuals off the Internet regards the accuracy of the manual you’re reading,” adds a British counterterrorism analyst in a separate interview.<sup>97</sup> An FBI official in London agrees. There are lots of explosives recipes “out there,” he says, but their technical accuracy “is another matter.” “Many of these contain problems,” he adds charitably.<sup>98</sup>

Indeed, one explosives expert I interviewed, a leading authority on IEDs with extensive experience consulting for American and British military agencies, characterizes many online bomb-making recipes as “absolute rubbish.”<sup>99</sup> Recognizing my own lack of *mētis* in this area, I spent several hours with this expert, poring over online bomb-making manuals, including *The Islamic Terrorist Explosive Manual*, *The Muhajadeen Explosives Handbook*, and a chat room transcript from a militant web site, to assess the accuracy of their preparations. The introduction to *The Islamic Terrorist Explosive Manual* highlights the professionalism and quality of the document, remarking that the manual’s authors are university-educated explosives experts. Notwithstanding the authors’ reputed laurels, many of their recipes are riddled with mistakes, leading the consultant to compare their “expertise” to school-boys “just learning chemistry.”<sup>100</sup>

The manual routinely, and mistakenly, refers to agricultural sulfate, when the authors really mean sulfur. One recipe provides instructions for making methyl nitrate, rather than nitro methane, the compound the authors claim to be making. The manual frequently, and confusingly, combines recipes for different types of explosives into a single preparation, without clearly specifying where one recipe leaves off and the next begins. The diagrams in the document are crude and not drawn to scale, suggesting that the authors lack formal scientific training. In *The Muhajadeen Explosives Handbook*, a recipe for nitro-glycerine claims that this liquid will detonate when poured over a sharp edge. “Now that is complete rubbish,” the explosives expert responds. “Scientifically, liquids don’t go off when you pour them over sharp edges.”<sup>101</sup> The document also suggests that this liquid “explosive” can be poured into and detonated from the cracks of a wall. These are “glaring mistakes,” the consultant emphasizes. “Somebody with a degree in chemistry or . . . someone who specialized in high school in chemistry should be able to see that some of these things can’t be right.”<sup>102</sup>

Asked whether an amateur would be able to build a bomb from simply reading the online artifacts we examined, the consultant explains this would be very difficult. The recipes contain numerous errors that he, a formally trained chemist, can recognize but that a novice would not, preventing him from constructing a bomb based on the recipes alone, without any supplemental knowledge from other sources. Militants with the knowledge necessary to identify such mistakes would not likely need the online manual in the first place, or at least know where to acquire more accurate *techne*.<sup>103</sup> While the consultant stresses that some of the recipes are “accurate enough” that a “competent” person following them carefully could build dangerous explosives, he adds that for every recipe that works there are four or five others that are useless. “Most of it,” he concludes “is the blind teaching the blind.”<sup>104</sup>

## Conclusion

The munitions expert I interviewed and Anne Stenersen review only a portion of the online artifacts available to aspiring terrorists. Given this small sample size, and my



focus on Islamist terrorism in Britain and Spain, these findings are suggestive—not conclusive. It is always possible, as Stenersen warns, that there are “more sophisticated” manuals, videos, and discussion threads on the Internet that “lie beyond the reach of most academic researchers.”<sup>105</sup> What we do know is that many online documents within our reach are less sophisticated—and less reliable—than commonly supposed. Additional research, involving more artifacts and more explosives experts that can reliably appraise them, is sorely needed. Candid interviews with former bomb-makers that have been implicated in terrorist attacks, a tall order for most researchers, would also be helpful. The Internet is an important tool for Islamist militants, one that is likely to become even more important in the future. Our understanding of this phenomenon remains inadequate and must be improved.

For now, a note of caution is in order when considering online artifacts allegedly used by militants to build bombs and fire weapons. Such caution is largely absent from existing studies. Many reporters—and scholars—proclaim the operational value of these manuals, videos, and discussion boards without examining, even in cursory fashion, the accuracy of the information they contain. In doing so, they imply that militants can easily use these artifacts to build bombs and other devastating weapons, playing into terrorists’ hands by intensifying the psychological impact of their propaganda. If online manuals, particularly those focused on hard-to-produce chemical, biological, and nuclear weapons, are compiled more for the purpose of psychological warfare than actually building these weapons, it is incumbent upon researchers to recognize—and highlight—this fact in their analyses.

We need not be cowed by terrorists’ crude attempts at disinformation. Many existing biological, chemical, and nuclear weapons manuals available to Islamist militants are more aspirational than operational. While online artifacts dealing with conventional weapons are more abundant and accessible, one cannot become an effective bomb-maker simply by reading online manuals or watching instructional videos, no matter how detailed and reliable their preparations. Developing explosives expertise requires a minimum level of abstract technical knowledge of chemistry, generally obtained through formal scientific education, along with ample opportunities to practice building bombs using locally available materials, conditions that elude many present-day militants. “Keen amateurs” that rely solely on the *techne* contained in Internet artifacts will not achieve the same level of technical expertise in chemistry as formally educated specialists; nor will they obtain the operational skill of those that have received hands-on training and practiced what they have learned. Some Internet-directed amateurs may succeed in building crude devices with the power to maim and kill, but the quality—and lethality—of these munitions will be limited by the perpetrators’ lack of technical knowledge and practical experience. The danger we face from Islamist terrorism comes less from virtual dilettantes and more from local militants that receive paramilitary instruction from knowledgeable veterans. If aspiring terrorists no longer need Afghanistan to learn how to build bombs and fire weapons, it is not because they have the Internet, but because they have the Federal Administered Tribal Areas in Pakistan, war-torn Somalia, and other real-world locations where they continue to train and practice.

The counterterrorism community’s focus on militant web sites as sources of *operational* knowledge of terrorism is misplaced. Even when the information contained in these online artifacts is correct, which often times it is not, most militants learn terrorism by doing terrorism. Web sites may provide counterterrorism analysts with convenient sources of data, information they often “analyze” with a

remarkably uncritical eye, but they do not provide terrorists with the *mētis* they need to carry out attacks. The Internet contains lots of ideological information for Islamist militants, along with technical knowledge of variable quality. But at the end of the day you don't have to be an ideologue or a chemist to make a good terrorist. Instead, you need access to reliable *techne*, along with plenty of hands-on experience. Sometimes long articles have short lessons.

## Notes

1. Examples include, but are not limited to: John Arquilla and David Ronfeldt, *Networks and Networks: The Future of Terror, Crime, and Militancy* (Santa Monica: RAND, 2001); Evan F. Kohlmann, "The Real Online Terrorist Threat," *Foreign Affairs* 85, no. 5 (Sep/Oct 2006); Kevin Soo Hoo, Seymour Goodman, and Lawrence Greenberg, "Information Technology and the Terrorist Threat," *Survival* 39, no. 3 (Autumn 1997), 135–155; Timothy L. Thomas, "Al Qaeda and the Internet: The Danger of 'Cyberplanning,'" *Parameters* 33, no. 1 (Spring 2003), 112–123; and Gabriel Weimann, *Terror on the Internet: The New Arena, the New Challenges* (Washington, D.C.: United States Institute of Peace, 2006).

2. See Gabriel Weimann, "www.terror.net: How Modern Terrorism Uses the Internet," *United States Institute of Peace Special Report 116* (Washington, D.C.: United States Institute of Peace, March 2004): 1-12; and Maura Conway, "Terrorism and the Internet: New Media, New Threat?" *Parliamentary Affairs* 59, no. 2 (2006), 283–298.

3. "It is not necessary...for you to join in a military training camp, or travel to another country," Al Qaeda leader Abu Hadschir al Muqrin reportedly declared, "you can learn alone, or with other brothers, in [our arms] preparation program." Likewise, the spread of online training manuals, videos, and other instructional materials "means you don't need Afghanistan anymore to teach people how to make bombs and chemical agents," observed Magnus Ranstorp, then director of the Centre for the Study of Terrorism and Political Violence at the University of St. Andrews. For the al Muqrin comment, see Weimann, *Terror on the Internet* (see note 1 above), 127. For the Ranstorp quote, see Judith Miller, "Qaeda Videos Seem to Show Chemical Tests," *New York Times* (19 August 2002).

4. Weimann, *Terror on the Internet* (see note 1 above), 127; and Rita Katz and Josh Devon, "The Online Jihadist Threat," testimony prepared for *Weapons: The Internet as a Tool for Violent Radicalization and Homegrown Terrorism*, hearings before the U.S. House of Representatives, Homeland Security Committee, Subcommittee on Intelligence, Information Sharing and Terrorism (6 November 2007).

5. See Joshua Alexander Geltzer, "Six Rather Unexplored Assumptions about Al-Qaeda," *Critical Studies on Terrorism* 1, no. 3 (Dec. 2008), 393-403; Petter Nesser, "How did Europe's Global Jihadis Obtain Training for their Militant Causes?" *Terrorism and Political Violence* 20, no. 2 (2008), 234–256; and Anne Stenersen, "The Internet: A Virtual Training Camp?," *Terrorism and Political Violence* 20, no. 2 (2008), 215–233.

6. Clifford Geertz, "Thick Description: Toward an Interpretive Theory of Culture," in *The Interpretation of Cultures: Selected Essays by Clifford Geertz* (New York: Basic Books, 1973): 29. For an extended discussion of the research methods used in this study, see Michael Kenney, *Organizational Learning and Islamic Militancy*, final report submitted to the National Institute of Justice, U.S. Department of Justice, Washington, D.C.: May, 2009 (NCJ 226808), available at: (<http://www.ncjrs.gov/pdffiles1/nij/grants/226808.pdf>).

7. Explicit knowledge refers to formal knowledge that is easily shared between people through written and oral language. Explicit knowledge is preserved in artifacts and readily taught through formal instruction. Tacit knowledge refers to personal hunches and insights that are difficult for people to express, let alone share, in part because they are not fully aware of it. Tacit knowledge is implicit; it lies beyond what is consciously known. For discussion of tacit and explicit knowledge, see Ralph D. Stacey, *Complex Responsive Processes in Organizations: Learning and Knowledge Creation* (New York: Routledge, 2001), 206; Ikujiro Nonaka and Hirotaka Takeuchi, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (New York: Oxford University Press, 1995); and Michael Polanyi, *Knowing and Being*, edited by Marjorie Grene (Chicago: University of Chicago Press, 1969).

8. See Brian A. Jackson, *Aptitude for Destruction, Volume 1: Organizational Learning in Terrorist Groups and Its Implications for Combating Terrorism* (Santa Monica: RAND Corporation, 2005), 14–15.

9. James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1998), 320.

10. Ibid.

11. Author interview with counterterrorism analyst, Foreign and Commonwealth Office, London, England, 24 July 2007.

12. Marcel Detienne and Jean-Pierre Vernant, *Cunning Intelligence in Greek Culture and Society*, translated from the French by Janet Lloyd (Sussex: The Harvester Press, 1978), 20.

13. Scott (see note 9 above), 313.

14. Detienne and Vernant (see note 12 above), 20.

15. For more on the adaptive cunning involved in *mētis*, see Detienne and Vernant (see note 12 above); and Michael Kenney, *From Pablo to Osama: Trafficking and Terrorist Networks, Government Bureaucracies, and Competitive Adaptation* (University Park: Pennsylvania State University Press, 2007).

16. See Abu Mus'ab al-Suri [Mustafa Setmariam Nasar], "The Military Theory of The Global Islamic Resistance Call," translated in English and reprinted in excerpts as Chapter 10 in Brynjar Lia, *Architect of Global Jihad: The Life of al-Qaida Strategist Abu Mus'ab al-Suri* (New York: Columbia University Press, 2008), 347–484.

17. Brynjar Lia claims that by 2007 Setmariam was "probably the world's foremost 'jihadi theoretician,'" an observation he draws from participants on several militant web sites. Marc Sageman counters that Setmariam is "not widely followed" by Islamist terrorists "because he is not popular with them and difficult to follow." In this article, I discuss Setmariam's writings regarding *mētis* and *techne* without claiming special knowledge of his influence over Islamist fighters. Brynjar Lia, *Architect of Global Jihad: The Life of al-Qaida Strategist Abu Mus'ab al-Suri* (New York: Columbia University Press, 2008), 8; and Marc Sageman, personal communication, November 2009.

18. Lia (see note 17 above), 2.

19. Lia (see note 17 above), 9.

20. Al-Suri [Setmariam] (see note 16 above), 474–475.

21. Al-Suri [Setmariam] (see note 16 above), 475.

22. Lia (see note 17 above), 53; and al-Suri [Setmariam] (see note 16 above), 475.

23. Al-Suri [Setmariam] (see note 16 above), 483.

24. Al-Suri [Setmariam] (see note 16 above), 434–435.

25. Abu Mus'ab al-Suri [Mustafa Setmariam Nasar], "Chapter 2: Lessons Learned from the Jihad Ordeal in Syria," *Harmony document AFGP-2002-600080* (West Point, NY: Combating Terrorism Center, United States Military Academy, 2002), 24–25; also see al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 435.

26. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 480–481.

27. Ibid. In his earlier study on the Syrian jihad, Setmariam describes a similar, more detailed process among members of the Combatant Vanguard, an Islamist rebel group in Syria to which he belonged: "The members were trained to disassemble then reassemble weapons in safe houses, then they would be taken along on a military operation (e.g., assassination attempt) as an observer, this breaks the psychological brier [sic]. The second time, the trainee will be armed but this time he has a mission: to protect those people carrying out the military operation, then he will be asked by the seniors of his group to carry out the assassination himself. Many times the 1st shots fired by the mujahideen hit the heads of the infidels, very quickly trainees will learn." See al-Suri [Setmariam], "Chapter 2: Lessons Learned" (see note 25 above), 25.

28. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 458.

29. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 480; and Kenney (see note 15 above), 146.

30. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 476.

31. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 363, 465.
32. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 477, 482, 483.
33. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 483–484.
34. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 477, 478.
35. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 478.
36. Ibid.
37. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 477.
38. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 483. Emphasis in the original translation provided by Brynjar Lia.
39. Al-Suri [Setmariam], "The Military Theory of The Global Islamic Resistance Call" (see note 16 above), 484.
40. Author interview with counterterrorism analyst, Foreign and Commonwealth Office, London, England, 24 July 2007.
41. Author interview with detective superintendent, Counterterrorism command, Metropolitan Police, London, United Kingdom, 19 July 2007.
42. Dame Eliza Manningham-Buller, "The International Terrorist Threat to the UK," speech by the Director General of the Security Service at Queen Mary's College, London (9 November 2006).
43. Author interview with counterterrorism analyst, Royal United Services Institute for Defence and Security Studies, London, United Kingdom, 2 Aug. 2007.
44. Author interview with Federal Bureau of Investigation official, US Embassy, London, UK, 29 Oct. 2007.
45. Author interview with senior investigative officer, Counter-Terrorist Command, Specialist Operations, Metropolitan Police, London, United Kingdom, 5 Sep. 2007.
46. Bruce Hoffman, "A Counterterrorism Strategy for the Obama Administration," *Terrorism and Political Violence* 21, no. 3 (2009), 363.
47. Testimony of Mohammed Junaid Babar, Operation Crevice trial, Central Criminal Court, London, 4 April 2006, courtesy Jason Burke, senior reporter for *The Observer*; and Marc Sageman, *Leaderless Jihad: Terror Networks in the Twenty-First Century* (Philadelphia: University of Pennsylvania Press, 2008), 128.
48. Testimony of Mohammed Junaid Babar (see note 47 above).
49. Regina v. Omar Khyam *et al.*, "Opening Note," published in *Ottawa Citizen*, "Momin Khawaja constitutes the Canadian end of the conspiracy" (23 March 2006); Elaine Sciolino and Stephen Grey, "British Terror Trial Traces a Path to Militant Islam," *New York Times* (26 November 2006).
50. Author interview with former Metropolitan police official, Specialist Operations, 26 July 2007.
51. Testimony of Mohammed Junaid Babar, Operation Crevice trial, Central Criminal Court, London, 28–29 March 2006, courtesy Jason Burke, senior reporter for *The Observer*.
52. Ibid.
53. José María Irujo, *El Agujero: España invadida por la yihad* (Madrid: Aguilar, 2005), 292; Manuel Marlasca and Luis Rendueles, *Una historia del 11-M que no va a gustar a nadie* (Madrid: Temas de Hoy, 2007).
54. Author telephone interview with former counterterrorism official, U.S. State Department, 13 Aug. 2008.
55. Author interview with former Metropolitan police official, Specialist Operations, London, United Kingdom, 26 July 2007.
56. *Indictment 20/2004*, Committal for Trial (*Auto de Procesamiento*), Juzgado Central de Instrucción Número Seis, Audiencia Nacional, Madrid, signed by magistrate Juan del Olmo (April 10, 2006), 502–506; Pere Escobar Solsona, "Tras el rastro electrónico de un atentado," *El País* (October 25, 2007); Marlasca and Rendueles (see note 53 above), 145.
57. *Indictment 20/2004* (see note 56 above), 490; Lia (see note 17 above), 26.

58. Marc Sageman, *Understanding Terror Networks* (Philadelphia: University of Pennsylvania Press, 2004), 53–54; Sageman (see note 47 above), 110, 113–114; *New York Times*, “30 people detained after Egypt bombing” (April 13, 2005).

59. Kenney (see note 6 above), 86; Nesser (see note 5 above), 244–245; and Jeffrey M. Bale, “Jihadist Cells and ‘I.E.D.’ Capabilities in Europe: Assessing the Present and Future Threat to the West,” unpublished report (Monterey, Calif.: Monterey Institute of International Studies, 2009), 66–68.

60. Nesser (see note 5 above), 235.

61. Nesser (see note 5 above), 250.

62. Bale (see note 59 above), 70–71.

63. *Ibid.*, 71.

64. *Ibid.*; Carter Dougherty, “German Police See Possible Lebanon Link to Failed Train Bombs,” *New York Times* (19 Aug. 2006); Associated Press, “Third suspect in failed bomb attack identified as Syrian,” *USA Today* (26 Aug. 2009); Gunther Latsch, *et al.*, “Every Investigator’s Nightmare,” *Der Spiegel* (August 28, 2006).

65. Nesser (see note 5 above), 249, 248, 250.

66. James Sturcke, “Gas canister bomb ‘an amateur job’,” *The Guardian* (29 June 2007).

67. See John F. Burns, “British doctor is convicted in attack on Glasgow airport,” *New York Times* (16 November 2008); Michael Seamark and Emily Andrews, “The Doctors ‘Who Plotted Carnage,’” *Daily Mail* (10 October 2008); Fiona Hudson, “London Terror: The Medical Sleeper Cell,” *The Daily Telegraph* (4 July 2007); David Smith, March Townsend, and Jo Revill, “‘There was a man on fire. It was terrifying,’” *The Observer* (July 1, 2007); and Sturcke (see note 66 above).

68. Author interview with former Metropolitan police official, Specialist Operations, London, United Kingdom, 26 July 2007. Also, author interview with senior investigative officer, Counter-Terrorist Command, Specialist Operations, Metropolitan Police, London, United Kingdom, 5 Sep. 2007; author interview with counterterrorism analyst, Royal United Services Institute for Defence and Security Studies, London, United Kingdom, 2 Aug. 2007; and author interview with explosives expert, England, 21 Aug. 2007.

69. Hudson (see note 67 above).

70. Regina vs Omar Khyam, *et al.* (see note 49 above).

71. “Our theory on training,” Setmariam writes, “is based on the following building blocks: 1. Focusing on mental and ideological preparation. . . 2. Focusing on understanding the theory of jihadi guerrilla warfare. . . 3. Spreading the ideological, theoretical and military training programmes across the Islamic Nation by various means. 4. Relying on the methods of secret training in houses and in limited, mobile training camps. 5. Developing fighting competence through jihadi action and through participation in battle. Al-Suri [Setmariam], “The Military Theory of The Global Islamic Resistance Call” (see note 16 above), 474.

72. Gabriel Weimann, “Virtual Disputes: The Use of the Internet for Terrorist Debates,” *Studies in Conflict and Terrorism* 29 (2006), 635. Weimann’s source for the manual is “On Islamic Websites: A Guide for Preparing Nuclear Weapons,” *MEMRI Special Dispatch - No. 1004* (12 October 2005).

73. Weimann, “Virtual Disputes” (see note 72 above), 636. Studies that document the myriad challenges involved in producing or obtaining fissile material and manufacturing or stealing nuclear weapons include Jessica Stern, *The Ultimate Terrorists* (Cambridge, MA: Harvard University Press, 1999); Annette Schaper, “The Technical Challenges of Nuclear and Radiological Terrorism,” in *Teaching Terror: Strategic and Tactical Learning in the Terrorist World*, edited by James J.F. Forest (Lanham, MD: Rowman & Littlefield, 2006), 155–168; Gavin Cameron, *Nuclear Terrorism: A Threat Assessment for the Twenty-First Century* (New York: St. Martin’s Press, 1999); and Karl-Heinz Kamp *et al.*, “WMD Terrorism: An Exchange,” *Survival* 40, no. 4 (Winter 1998–1999), 168–183. For a similar discussion focused more on chemical and biological weapons, see David C. Rapoport, “Terrorism and Weapons of the Apocalypse,” *National Security Studies Quarterly* 5, no. 3 (Summer 1999), 49–67.

74. Anne Stenersen, “Al-Qaeda’s Thinking on CBRN: A Case Study,” in Magnus Ranstorp and Magnus Normark, eds., *Unconventional Weapons and International Terrorism: Challenges and New Approaches* (New York: Routledge, 2009), 56.

75. *Ibid.* For a lucid discussion of the ignition technology in nuclear weapons, see Schaper (note 72 above).

76. Stenersen "Al-Qaeda's Thinking on CBRN" (see note 74 above), 56.
77. Ibid.
78. In responding to an earlier version of this paper, Professor Weimann acknowledges the poor technical quality of *The Nuclear Bomb of Jihad* and other instructional manuals. In a personal communication he writes, "I read several 'manuals' devoted to preparing nuclear bombs and I know that I could spend years reading them without being able to produce such devices." Weimann also raises an important point regarding the propaganda value of such manuals, irrespective of their technical accuracy: "some of these 'manuals' are meant for psychological warfare purposes (e.g., to scare audiences) and for propaganda purposes (we are powerful enough to consider and plan WMD)." I return to this issue in the conclusion. For an insightful discussion of the psychological dimension of another overstated phenomenon, see Gabriel Weimann, "Cyberterrorism: The Sum of All Fears?" *Studies in Conflict and Terrorism* 28 (2005): 129-149.
79. Anne Stenersen, "Chem-Bio Cyber Class: Assessing Jihadist Chemical and Biological Manuals," *Jane's Intelligence Review* (Sep. 2007), 9.
80. Stenersen, "Chem-Bio Cyber Class" (see note 79 above), 13.
81. Stenersen, "The Internet" (see note 5 above), 220.
82. Stenersen, "The Internet" (see note 5 above), 221.
83. Bale (see note 59 above), 71.
84. See, for example, Steve Coll and Susan B. Glasser, "Terrorists Turn to the Web as Base of Operations," *Washington Post* (7 Aug. 2005); Katz and Devon (see note 4 above); Kohlmann (see note 1 above); and Stephen Ulph, "A Guide to Jihad on the Web," *Terrorism Focus* 2, no. 7 (31 March 2005).
85. Stenersen, "The Internet" (see note 5 above), 216.
86. Stenersen, "The Internet" (see note 5 above), 228.
87. Stenersen, "The Internet" (see note 5 above), 230; and Stenersen, "Chem-Bio Cyber Class" (see note 79 above), 11.
88. However, Stenersen concedes that her characterization cannot be considered definitive for all online artifacts since her study is limited to "publicly available websites" like al-Firdaws and does not include private sources, such as PalTalk and email. Stenersen, "The Internet" (see note 5 above), 230, 228.
89. Stenersen, "Al-Qaeda's Thinking on CBRN" (see note 74 above), 59.
90. Stenersen, "The Internet" (see note 5 above), 225.
91. Stenersen, "The Internet" (see note 5 above), 231.
92. Author interview with U.S. State Department official, Madrid, Spain, 25 June 2007. Also, author interview with American official, London, United Kingdom, 24 Oct. 2007.
93. Author interview with U.S. State Department official, Madrid, Spain, 25 June 2007.
94. Author interview with counterterrorism police inspector, Ceuta, Spain, 18 June 2007. Also, author interviews with former high-ranking security official in the Aznar administration, Madrid, Spain, 8 June 2007, and former official, Guardia Civil, Madrid, Spain, 25 June 2007.
95. Author interview with counterterrorism police inspectors, Ceuta, Spain, 18 June 2007.
96. Author interview with senior investigative officer, Counter-Terrorist Command, Specialist Operations, Metropolitan Police, London, United Kingdom, 5 Sep. 2007.
97. Author interview with counterterrorism analyst, Royal United Services Institute for Defence and Security Studies, London, United Kingdom, 2 Aug. 2007.
98. Author interview with Federal Bureau of Investigation official, US Embassy, London, United Kingdom, 29 Oct. 2007.
99. Author interview with explosives expert, Britain, 21 Aug. 2007.
100. Ibid.
101. Ibid.
102. Ibid.
103. Indeed, there is evidence that some terrorist plotters, such as Dhiren Barot, an experienced militant who pleaded guilty to planning several attacks in Britain and the United States, researched information about explosive devices from standard reference books, many of which are available in libraries and for purchase from online retailers.
104. Author interview with explosives expert, Britain, 21 Aug. 2007.
105. Stenersen, "Al-Qaeda's Thinking on CBRN" (see note 74 above), 60.