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Contrasting Trends in WMD Proliferation in the Middle East: Iran and Libya

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Image vs. Reality of Iranian Chemical and Biological Weapons

Iran represents a case study in which the very enigmas concerning its chemical and biological weapons (CBW) capabilities reflect a sharp contrast between a façade and its full-scale CBW programs, particularly in conjunction with its ongoing ballistic upgrading and essential strategic outlook. Within that context, this extraordinary case is configured by a scarcely graspable gap between the vague reality relating to Tehran's unconventional weapons augmentation, and the respectful image it renders, making it an intriguing intelligence arena. In a way, Iran thus poses an extreme paradox. First, it is perceived as a potential danger to global stability—due chiefly to its determined, tireless, and irreversible pursuit of far-ranging weapons of mass destruction (WMD) and its methodical support of international terrorism. Yet, the United Nations (UN) still exhibits, for example, through the Organization for Prohibition of Chemical Weapons, a perfect backing of Iran's conduct with regard to its supposed fulfillment of the Chemical Weapons Convention (CWC). Thus, in spite of the identification of Iran's grand strategic menace, Tehran's leadership is doing persistently well, concomitantly, in perpetuating an image of moderation and obedience, if not decency. Well-concealed slyness, masking, and elegance are apparently the name of the Iranian game. Actually, Iran represents, then, the widest gap—compared to any other country worldwide—regarding its four concurrently progressing

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WMD programs (chemical, biological, nuclear, and ballistic), as against its meticulously fostered positive self-behaved mirage. In that particular tangled case, subtly calculated, remarkably sophisticated diplomacy presumably serves for hardly detectable unconventional arms acquisition.

AN UNSOUND HYPOTHESIS?

In terms of intelligence, this is a very challenging issue indeed, and one of paramount importance. Moreover, this challenge is sharpened in light of the debate aroused about the still unverified—for now—intelligence provided by the United States's Central Intelligence Agency (CIA) about Iraq's WMD capabilities. The Iranian file is, basically, no less complex. To start with, full distinction ought at any rate to be made between national needs—defensive, offensive, objective, subjective, justifiable, or false—and pragmatic advance along the route culminating in operational intercontinental ballistic missiles tipped with chemical, biological, nuclear (CBN) warheads. Obviously, the second element of that distinction is much more meaningful than the first, at least in the sense that national needs may broadly change and be variedly presented, regarded, or elucidated, whereas an operational capacity for delivering missiles is a steady, solid factor, as long as the ballistic-plus-CBN arsenal persists. Too many signs indicate that such an arsenal is what Iran is vigorously striving for—irrespective of its "needs"—while constantly and cynically denying those efforts. Recent revelations pertaining to Iran's nuclear effort, achieved thanks to broadened intelligence, illustrate this severe discrepancy, and are worth pursuing with regard to its CBW effort as well.

GEOSTRATEGIC AND DOMESTIC FACTORS

Iran, situated in the eastern corner of the Middle East, constituting a direct bridge toward the Far East, and toward the formerly Soviet Moslem states, is the largest state in the Middle East, in terms of territory combined with population. Its scientific and technological infrastructures rank second only to Pakistan's as the most advanced in the Moslem bloc in terms of both the top-level domestic stratum and the whole formed, qualitatively and quantitatively, by the totality of its local resources. Those features permit Iran's remarkable absorptive capacity of the foreign WMD-related technologies it procures. Its outstandingly diffused system is operated in application of those technologies, in conjunction with its indigenous capabilities. Taken together then, these advantages make Iran a regional power, and perhaps the most significant Moslem country in the Middle East, even worldwide.

Along with Syria (and two years ago, Iraq), Iran shapes a subtle, gradually emerging new East–West frontline, against Israel, Turkey, and Jordan, with

Saudi Arabia likely to join that anti-Western bloc in due time. That process is marked predominantly by ongoing assistance from Russia, North Korea, China, and Pakistan in augmenting the bloc's WMD, as well as the ballistic capabilities of Iran, Syria, and Iraq (until the U.S. invasion). Unquestionably, the crucial, continuing technological support provided for that growth is not casual or transient. Methodical and profoundly calculated, it is fueling the elegant formation of a powerful, not yet crystallized, new Eastern bloc.

Iran is a cardinal component within that system. Propelled by authentic hatred toward the West since the rise of the ayatollahs in 1979, Iran as configured its fanatic Pan-Islamic ideology in a way that fully legitimizes is extraordinary military augmentation in general, and particularly the major strategic segment within it—ballistic plus mass destruction weapons. Paradoxically, the outset of Iran's WMD acquisition was its CW program, initiated in 1984 by Moslem (in this case, Iraqi) use of CW against Tehran's troops. Iraq's WMD capabilities indeed were, for long and to an appreciable degree, an important stimulus to Iran's WMD layout and concept. Though at times somewhat diplomatic when approaching each other, Iran and Iraq maintained reciprocal fears. Each did not tolerate indifferently its neighbor's possession of WMD. Iran takes basically the same, though more friendly, stance toward its eastern neighbor, Pakistan. Further, extreme Iranian enmity prevails toward Israel, regionally, and the U.S. globally. This stems from the Iranian perception that nullifies the very existence of Israel and any legitimate U.S. involvement in the Moslem world. Hence, the construction of appropriate Iranian military might needed for confronting and countering those anti-Moslem menaces is deemed essential and perfectly justified by Tehran's outlook.[1] As pro-Western states, Turkey and Jordan might also be included within Iran's strategic paradigm. Actually, the viable WMD menace posed by Iran toward Turkey has been thoroughly accentuated, as has Turkey's need for adequate countermeasures.[2]

So far, Iran's genuine Moslem-anti-Israeli plus anti-Western concept and its overt manifestation are fully compatible. Yet, at that point transparency fades away and deception emerges. Refined, malignant diplomacy then substitutes for political integrity, thereby sustaining the viability of Iran's WMD programs.[3] Apparently, Iran's primary consideration—given its intention to carry out all three WMD programs, namely chemical, biological, and nuclear—is the political usefulness of joining the three respective international treaty conventions. This step must be implemented in a fairly specific manner. Or, as a senior U.S. administration official put it, concerning Iran's BW program: "Iran has an offensive BW program. Iran would not be signing a document that prevents it from cheating."[4] That comment hits the very core of Iran's diplomacy with regard to the

at-large WMD conventions. Thus, outwardly, Tehran appears to support or follow most international conventions and regulations. The benefits of doing so are clear: a positive international image and the privileges of a national state, in terms of trading, challenging other states whenever advantageous, and expediently modifying certain segments of the conventions, as far as possible. The costs of operating this way tolerated by Iran include many investments aimed at disguising its activities, an enormously fortified counterintelligence system, and some bearable risk.

Ayatollah Ruhollah Khomeini's succession by "moderates" gave birth to hopes and assessments that the radical approach would subside; but this, in fact, did not happen. On the contrary. Showing tolerance and openness in some respects, while at the same time proceeding with the entire scope of WMD programs, his successors misled many observers, who had hoped that the more relaxed attitudes would be applied in the context of WMD, as well. Ironically, their principal common denominator, together with the ostensibly competing "radical" stratum has been, and still is, the essence of Iran's WMD programs. A powerful domestic conjunction has thus been formed, one that accepts previously unthinkable budgets for that purpose. In that sense, then, any move to further strengthen the moderates would impair that common denominator.

The outset of that joint course took place in 1991, shortly after Iraq's WMD capabilities were partially revealed, when the incredible sum of 120 billion dollars was devoted by Iran's regime for military augmentation, intended to occur in five to ten years, or more. Ballistic missiles and WMD comprised the main substance of that gigantic endeavor.[5] This plan signified both the maturity of Iran's new strategic ideology and its practical realization. Iraq's WMD capabilities played a secondary, though not negligible, role, and provided, contemporarily, a good excuse. Available Western data relating to the period 1998–2001 are compatible with that enormous budget,[6] while figures referring to the period 1992–1997, published by the Iranian Parliament and the Iran Central Bank, seem unsound.

How was that strategy reflected through various statements made by the Iranian leadership? In 1988, while still regarded as a "moderate," Ayatollah Ali Akbar Rafsanjani stated that

> chemical and biological weapons are poor man's atomic bombs and can easily be produced. We should at least consider them for our defense; although the use of such weapons is inhuman, the war [against Iraq] taught us that international laws are only scraps of paper.[7]

Thirteen years later, Rafsanjani had made some progress. By 2001, as Chairman of Iran's powerful Expediency Council, he declared that "nuclear weapons employed against the Moslems would be harmful, while the use of even one nuclear bomb inside Israel will destroy everything."[8]

Saying this, he was most probably not referring to a Pakistani "nuclear bomb." It so happened that those thirteen years, 1988–2001, indeed reflected an extreme progression, from something relatively "easy to produce" (according to Rafsanjani)—and produced by Iran, namely CBW—to something much more complicated, yet expediently and effectively being developed in Iran, meaning, nuclear weapons. Moreover, Rafsanjani was very accurate and foreseeing in noting that, from Iran's perspective, "international laws are only scraps of paper." Iran has indeed adopted and implemented Rafsanjani's views.

Rafsanjani's follower, President Mohammad Khatami, though fully matching him in strategic ideology, is playing a somewhat different role. He is apparently the key figure within the Iranian system in general, and in cultivating the country's facade, in particular. Ostensible integrity—or, rather, "plausible deniability," as Michael Rubin has put it—are the crucial, practical elements underlying the Iranian image:

> Khatami maintains plausible deniability with regard to Iran's chemical and biological weapons.... With a gentle air, rhetorical flair, and numerous trips abroad, Khatami has succeeded unlike any predecessor in softening the image of the Islamic Republic and wooing Western sympathy and support.... Though a signatory to both the Chemical and Biological Weapons Conventions, Iran continues to contravene the treaties' obligations.... Unfortunately, it is likely no coincidence that the acceleration of Iran's WMD program coincided with both Europe's engagement policy and Khatami's call for a "Dialogue of Civilizations." While the words out of Tehran are soft, recent developments in Iran's unconventional weapons programs indicate that the Islamic Republic's ambitions have not followed suit.... When it comes to Iran's pursuit of unconventional weapons and ballistic missiles, President Khatami has chosen to endorse Iran's expenditures.[9]

This illustration considerably resembles Iran's entire profile with respect to its WMD and ballistic programs. While delivering a call for a "dialogue of civilizations," Khatami also indicated that he favors Iran's strategic weapons program. And following the test of the Shihab-3 missile, capable of striking Israel and Turkey, he said: "Iran will not seek permission from anyone for strengthening its defense capability."[10] On his visit to New York, and speaking before the United Nations General Assembly, Khatami stated: "We have over and over again expressed our concern that Israel has become a center for nuclear weapons and for WMD. We, too, have the right to defend ourselves."[11] Several years later, in 2002, he boasted: "Today our army is one of the most powerful in the world.... It has become self-sufficient, and is on the road to further development."[12] Thus, under Khatami, Iran's military geostrategic outlook

did not change; instead, under Khatami, the processes of WMD and the acquisition of missiles accelerated. The major influence of technocrats, both radical and moderate, is apparently enhancing the weapons programs by making possible the appointment of individuals selected more for their technical expertise than for their religious or political affiliations.[13] While a lack of money, difficulties in integrating complex systems, and constraints imposed by Western technology transfer controls have somewhat slowed the programs, those factors have not—and in all probability will not—hamper the ultimate accomplishment of Tehran's WMD programs.

Program Goals

Four categorical drives appear to underlie Tehran's CBW programs:

1. *Defensive and deterring capacities.* Having experienced various confrontations with and threats from regional countries, the former Soviet Union, and the U.S., Iran's geostrategic approach is, to an appreciable degree, based on the necessity of meaningful deterrence and defense capabilities. Hence, Iran has acquired powerful marine forces, along with diverse ballistic missiles and WMD of all types—chemical, biological, and nuclear.
2. *Offensive and retaliatory capacities.* A substantial component of Tehran's geostrategic philosophy is the attainment of both offensive and retaliatory capacities, particularly against Israel, as well as more remote countries. This goal is plainly reflected in the present and anticipated ranges of its ballistic missiles. In addition to retaliatory capacities, a purely offensive potential has been implied through its various leaders' statements and activities. Iran's ballistic capabilities, CBW stockpiling, and guerilla-plus-terrorism warfare abilities are equally indicators of its agenda.
3. *Independence and self-reliance* are regarded of paramount importance by Iran, particularly since the 1980s war with Iraq and its repercussions. As a cardinal expression of that orientation, Tehran strives for WMD, as well as for possession of the full domestic capacities to manufacture them. WMD are thus reckoned by Iran as a central means of realizing independence and self-reliance in the military sphere, and of serving the nation's supreme interests. The acquisition of CBW is only the essential first step; their strategic value is intended to be entirely retained after the procurement of nuclear weapons.
4. *Superiority and prestige.* Iran's pursuit of military might, largely reflecting its desire for superiority and prestige, is to a considerable extent materialized by its unconventional weapons programs. A distinct unconventional and ballistic-inclined armament thus compensates for a dearth of budgetary resources for building a grand conventional army. As a result, Iran has devoted many of its available resources to missiles and WMD, a meaningful compensation for its limited might in the conventional military sphere. Through these means regional hegemony may be established as well.

Both regionally and globally, the second of those four factors emerges as the most meaningful.

Strategic Options

One option Iran could carry out is a temporary closing of the Strait of Hormuz, especially if it were willing to use chemical or biological weapons against shipping. Iran's storage of chemical weapons on Abu-Musa, an island in the Persian Gulf off the coast of Dubai, suggests that Tehran would use such weapons long before the regime's security became precarious.[14] In addition to missiles, aerial bombs, and artillery rounds, various nontraditional CBW means of delivery, such as saboteurs, unmanned aerial vehicles, and boats could be used by Iran.[15]

In seeking to inflict heavy casualties on an opponent, Iran could employ its chemical, and particularly biological, weapons. Pointing to that possibility, and examining the relation between WMD and oil in the Middle East, Gawdat Bahgat has observed that the Western powers have both the political will and the military might to protect energy resources in the region. Indeed, an increase in the security of energy supplies has already taken place. Yet, the rising threats of chemical, biological, and nuclear weapons (and the missiles that carry them) may interfere with those measures. Conflicts that may be generated between Iran and its neighboring or other hostile countries would likely involve chemical and biological warfare, which could then lead to an escalation of the intensity of the fighting to the point—potentially—of a nuclear exchange.[16] Since Iraq has already defied the teachings of Islam and employed WMD, Tehran's rulers clearly have no compunction against the future use of these kinds of weapons. For instance, an attack against infidels may, in fact, be considered even more acceptable than an attack against Iraq's Muslim troops.

How much more so prone are such non-Islamic nations as Israel and the U.S.? Revolutionary Guard leader Rahim Safavi has indicated that Iran would employ offensive missiles if Israel or the U.S. endangers Iran's security or vital interests. In 1999, he further stated that "Iran's powerful missiles were capable of striking an unbearable crushing blow." Four years later, Ayatollah Rafsanjani vowed that if Israel should dare to attack Iranian nuclear facilities, Iran would inflict in response "a blow which Israel would never forget."[17] Yet, Iranian officials have stated previously and privately that Iran will not deploy ballistic missiles capable of reaching Israel in order to avoid creating a pretext for preventive attack.[18] At any rate, "powerful missiles" constitute the core of Safavi's phrasing, with "powerful" the key attribute. Rafsanjani's statement does not lag much behind, hinting, apparently, at Iran's present, prenuclear, CBW capabilities, which are now fully operational.

The Policy Apparatus

Indeed, Iran believes that its ballistic plus unconventional weapons programs are essential to its existence, irrespective of imminent dangers posed by those

programs to the GCC, Israel, Iraq, and the West.[19] The aspect of their constituting true, "national needs" is, in that context, rather academic, though certainly not negligible. Moreover, Tehran's CB warheads constitute a cardinal part of a coordinated military rebuilding intended to convey defiance towards the U.S.'s growing role in the Middle East.[20] Coping with Iran's endeavor to implement and advance its WMD programs, coupled with the potential proliferation of those weapons to other "rogue" states and terrorist organizations, requires a sophisticated understanding of Iran's decisionmaking processes.[21] The emphasis is on "sophisticated"; it pertains to any context of those processes, ranging from the very essence of Iran's grand-odyssey concept, to its strategic corollaries, its military expressions, and to any tactical step conducted by its diplomats.

Iran's policy hierarchy is somewhat complex. The nation's Constitution empowers the Supreme Leader, Ayatollah Ali Khamene'i, as the commander-in-chief of the armed forces, while the Ministry of Defense and Armed Forces Logistics supervises those forces, including the regular military and the Islamic Revolutionary Guard Corps (IRGC), with its paramilitary Basij militia.[22] Those bodies, together with the Supreme National Security Council, the President, and the Revolutionary Foundations (*Bonyads*) crystallize Tehran's strategic outlook with regard to CBW.

The IRGC's responsibility is to "guard the Revolution and its achievements." It was established to maintain internal security, keep the ideological purity of the revolution, and counterbalance the regular military. The IRGC is deployed, therefore, to protect the regime, and its units are placed near all major cities and sites. Hence, the IRGC was put in charge of Iran's missile forces and non-conventional weapons programs, which it controls to the present. Within that framework, a tangled, diffused network of chemical and biological facilities is operating. Many of them are heavily guarded and protected by anti-aircraft batteries.[23] That paradigm bears the fundamentals of Iran's mechanisms for carrying out its CBW-plus-ballistic programs.

In addition to the IRGC, the concerned state organs include parts of the Defense Industries Organization and Ministry of Heavy Industries, as well as segments of the Ministry of Science, Research and Technology, namely the Iranian Organization for Science and Technology (IROST), the Technology Cooperation Office, and dedicated laboratories in universities. The IRGC comprises two main wings—the Chemical, Biological, Radiological Division and the Jihad Daneshgahi (Jihad Universities) Division. The former is structured of three groups—researching, teaching, and industrial—while the latter controls some seven universities, most of which are involved in CBW research and development. Certain institutes and facilities affiliated with the Ministry of Health and the Ministry of Agriculture are involved as well. The whole system is well integrated, structurally and functionally. Offshoots of internal intelligence branch throughout that ramified setup.

Tehran has also formed an exceptional grand-network of combined intelligence and sabotage elements. Terrorism by means of WMD is a developing feature within Iran's broad concept. From 1979 onwards, Iran has greatly favored sabotage and terrorism for clandestinely implementing its rivalry toward various regional and global adversaries. Enormous preparations have been made toward that objective, including the option of CB terrorism. Iran's attitude toward terrorism at large likely stems from the use of shadowy and violent pressure groups in its domestic politics, and may therefore represent a manifestation of an established national political culture.[24] Strong bonds were formed between Tehran and Arab terrorist organizations to vigorously counter the Arab–Israeli peace process; among them are Palestinian Islamic Jihad, Hamas, Tanzim, Fattah, and, especially, the Hezbollah. In 2000, Tehran redoubled its efforts to encourage these groups to work together and coordinate their activities in order to undermine the Israeli–Palestinian peace talks.[25]

The potential threat of CBW use by Middle East Islanic terrorist groups has been indicated by the immediate past director of the CIA, George J. Tenet.[26] Also, R. James Woolsey, a former head of the Agency, has pointed to Hezbollah being "most likely suitable to conduct biological terrorism, which is an easy way to kill many people."[27] Already, by the late 1980s Israeli sources were said to believe that Hezbollah had acquired CW from Iran.[28] By 1997, major concern that terrorist organizations—perhaps equipped by Iran or Syria—would use CBW against Israel had been expressed by very senior Israeli officials. Consequently, an unequivocal message was reportedly delivered by Israel that a strong response against sponsoring states would be made.[29] Tracking a sponsoring state could be difficult, however. Recently, in the aftermath of the 2003 Iraq War, the Israeli intelligence community tightened its monitoring of the increased interface Iran maintains with those organizations, including its massive financial support, the infiltration of Iranian agents into Palestinian territories, and the supply of various weapons.[30]

As for WMD, Israel's Defense Minister maintained in 2003 —probably in accordance with an Israel Defense Forces (IDF) intelligence assessment— that a strategic treaty had been established between Iran and Yasser Arafat, in the belief that only after Iran is fully equipped with WMD can a Palestinian–Israeli agreement be desirable, one that would be based, thus, on Iran's anticipated weapons superiority.[31] Iran's intense, outstanding affinity to terrorist organizations, mostly Hezbollah, Islamic Jihad, and al-Qaeda has been duly maintained, as has its supportive attitude toward terrorism at large.[32] This affinity inevitably prevails in its practical activities, those apparently concerned with preparing concrete options for the conduct of chemical and biological sabotage. Various devices for employing CBW through guerilla warfare have indeed been developed. The general results

have recently been emphasized by the head of Israel's General Security Service: "Iran is distinctively the number one terror-state worldwide, and connecting this to other capabilities being developed by her—purportedly, WMD—results in an Iranian threat which is by far sharpened."[33]

Finally, Tehran's position as regards some other states needs elaboration. Its interfaces with Russia and China, as technology suppliers, are fully coordinated; they display a line of total innocence, while granting the assistance desired by Iran. Thus, in 1999, Russian agents recruited scientists for work on Iranian CBW and missile programs, in accordance with Tehran's request, and with the complete awareness of the Russian government authorities. Consequently, substantial numbers of Russian scientists are now active in Iran, developing its CBW and missile programs. Israel's Ministry of Defense confirmed that Russia is assisting Iran's CBW programs. Yet further, in 2001, Russia and Iran signed a new military cooperation agreement reportedly involving $300 million of arms sales to Tehran. Iran's Defense Minister, Ali Shamkhani, told reporters on 2 October 2001: "Today our cooperation is becoming more urgent. The [global] situation prompts that [conclusion]...." A Russian Foreign Ministry statement of 5 October 2001 insisted that "military–technological cooperation between Russia and Iran is strictly consistent with current international legal norms and aims at the consolidation of regional security and international stability."

The formerly Soviet, Islamic sisters, mainly Kazakhstan and Turkmenistan, are geostrategically of vital importance to Iran. Ethnically related to them rather than to the Arabs, Iran recognized their capacities in the WMD area—particularly after they gained independence—and accordingly formed ties. Rafsanjani, visiting Ashkhabad in June 1992, found merit in declaring, together with their leaders, that all three states would make efforts to counter accumulation and employment of both CB and nuclear weapons.

Similarly, in China, in June 2000, while President Khatami was on a state visit at the invitation of President Jiang Zemin, a joint communiqué stated that the "two sides are committed to a world free from chemical, biological and nuclear weapons." The statement emphasized that "the international regime for eliminating and prohibiting the proliferation of WMD should be permanently and indiscriminately applicable to all regions and countries with no exception." Yet, at the same time, both sides took note of the "legitimate rights of any country for peaceful uses of nuclear energy, chemical, and biological technology in a transparent manner under the supervision of the relevant international organizations."

Toward the bordering Islamic and compatibly oriented Arab block, Iran exhibits, in general, positive interfaces.[34] Even toward Iraq, its grand adversary, Iran seemed to be mild, stating:

> Although the issue of Baghdad's acquisition of WMD, including chemical, biological, and probably nuclear weapons, is very important and can endanger the security of the world, especially the security of the Middle East, nevertheless, Baghdad knows very well that this issue is only an excuse put forward by the White House in order to attack Iraq. All evidence shows that whether Iraq possesses or does not possess such weapons, this will not make much difference in Washington's ultimate decision to attack Iraq.[35]

Moreover, the flight to neighboring Iran of the Iraqi scientist who headed Saddam Hussein's long-range missile program, Dr. Modher Sadeq-Saba al-Tamimi,[36] was perhaps significant for other Iraqi CBW experts who likewise rescued their lives and were adopted by Iran for their skillfulness.

Still, Iran maintains a salient strategic triangle with Syria and Libya. Thus, in 1988, Iran and Syria established a joint strategic program leading to the unlimited reciprocal transfer of technologies related to CBW, particularly in conjunction with ballistic missiles. In mid-2004, U.S. officials indicated that Iran had transferred expertise and technology to Syria in the field of nonconventional warheads, together with solid-fuel engine for missiles and guidance systems. Some of the transfers by Iran reflect indigenous capabilities, while others were obtained directly from such countries as China, Russia, and North Korea.[37]

Tehran's CBW interface with Libya, which also began in the 1980s, culminated in 2004 with the agreement for Libya's procurement from Iran of ballistic missiles, possibly tipped with chemical warheads; training of Libyan teams intended to operate the missiles; and instructing Libyan experts in CW manufacturing. The deal exceeds 13 billion dollars.[38] An Iranian–Libyan nuclear interplay flourished as well, but all WMD-related interactions were abated in mid-2004, consequent to Qaddafi's shift on proliferation. Nevertheless, the Iran–Syria interface is widening.

In 1998, Eric Arnett argued that "Iran's political position is such that there is no hope of positive security guarantees, and no matter what it does to rebuild its military after the war with Iraq and the simultaneous US action against its naval forces, it will be seen as threatening in some quarters. In several cases, concern would seem to be justified." Yet, he added, "Iranian military technology must be considered in the context of plausible scenarios of armed conflict."[39]

INTELLIGENCE MONITORING AND THREAT ASSESSMENTS

Among the countries maintaining current and profound intelligence monitoring of Iran, only the U.S. and Israel are completely capable of revealing the full severity of the evolving Iranian threat, as long as being so does not endanger their intelligence resources or aid Iranian counterintelligence. Other countries are antagonistic (like Russia and China) or reluctant (Germany and France) toward that approach. As a result, and

though sometimes tendentious, the U.S. and Israeli threat assessments pertaining to Iran are the most reliable. Moreover, the tendentiousness they bear, if any, is shaped by political and strategic considerations, without any twisting of the authentic content. Further, the chances that the content is divorced from reality are slim, in reference to Iran's basic WMD-oriented attitude and the very existence of the ongoing programs. Any recurrent incorrect forecasting of the timetable relating to the development and ripening of Iran's WMD pertains mainly to its nuclear and ballistic weapons; at any rate, it does not impair the validity of the assessment of substantial threat. Those discrepancies are chiefly an outcome of Iranian sophistication and of monitoring difficulties, rather than of objective failure.

Germany houses the most important concentration of private technology-supplying companies for Iran's CB weapons programs, and is an arena of darkly related activities. The German intelligence community is aware of that situation, in principle. Practically, it maintains a constant but limited monitoring, in terms of hampering Iranian materials procurement. In a sense, this is a repetition of the 1980s German–Iraqi interface. That the German authorities have defined the inquiries into the Iranian–German interface as "particularly difficult" is not at all surprising.[40] Similarly, though within another dimension, the U.S. Intelligence Community has repeatedly failed to gather through its spying satellites crucial information regarding Iran, Russia, North Korea, and China, due to these nations' adherence to the concept of underground strategic facilities.[41]

A critical catch relates to Russia, concerning not only its denial of supplying BCW-applied (or BCW-intended) technologies, but in its demands—logically, yet paradoxically—that it be well-informed about its implicated technological contributors, namely, to gain "intelligence transparency." Ostensibly, such demand serves to facilitate institutionalized Russian interference in technology transfer (an objectively correct policy), while being actually aimed at enhancing counterintelligence—uncovering any monitoring and threat assessments conducted by its adversaries. Thus, in November 2001, President Vladimir V. Putin maintained: "We have not ever sold anything to Iran...that would help Iran develop missiles or CBW."[42] Quite naturally, then, Russian intelligence would not comment on such statements.

SECRET TRANSFERS OF WMD

Covert moves of technology transfer, including expertise, materials, equipment, or components, may be categorized as follows, in terms of intelligence monitoring:

a. Moves that have successfully been monitored and foiled;
b. Moves that were fully monitored, yet have not been foiled;

c. Moves that were detected but could not be fully monitored (and, therefore, have not been foiled);
d. Moves that have not at all been detected.

The first two categories directly express the intentions of the technology-absorbing country, while the second also demonstrates the expedient practical advancement of the related program, be it a CW or BW program.

In spite of the difficulties described, a sound reflection of the evolving profile of intelligence assessments referring to Iran may be achieved through the following exceptions.

Former Israeli Prime Minister Binyamin Netanyahu held that Iran constitutes the most concrete existential threat to Israel since the 1948 War of Independence. With the disintegration of the Soviet Union, the previous leakage of biological, chemical, and nuclear weapons, plus ballistic missile technologies, has become a great and torrential stream. Now that the USSR, which reined in Iran, Iraq, North Korea, and several other countries, no longer exists, the missile and nonconventional weapons threat has become the primary and most significant threat facing Israel—an existential threat in every sense. As soon as a radical state like Iran acquires a nuclear and missile umbrella, its ability to implement other means—primarily biological and chemical—in order to topple regimes or to threaten them is much greater.[43]

The head of the analysis division of Israeli military intelligence portrayed Iran as an intelligence objective of unquestionably utmost importance due to its radical ideology, declared policy, deeds, determination, and coherent geostrategic concept, in conjunction with its persistent building, upgrading and scaling up of chemical, biological, nuclear, and ballistic capabilities. He further commented that, having a remarkably extensive chemical industry, Iran would successfully conceal its CW capabilities while being hospitable to inspection missions. Likewise, it would not disclose its BW capabilities, knowing that they are scarcely detectable.[44]

He also called Iran a menace to the Middle East and globally, taking into consideration that Tehran is augmenting its strategic capabilities. When Iran achieves full WMD plus ballistic capacity, Arab states, particularly those friendly to Iran, might then polarize their strategic outlook.[45]

The head of Israel's Mossad has held that Iran constitutes an essentially irrational threat, combining Islamic fundamentalism with all forms of nonconventional weapons and surface-to-surface missiles. The existential threat posed by Iran warrants its supreme ranking among Israel's national concerns.[46]

The Israeli Minister of Defense's recent portrayal of Iran as a country that "would do anything to develop WMD capabilities of all types" seems to pertain to Tehran's efforts at both attaining those weapons and denying them, at the same time.[47]

Threat assessments by the U.S. Intelligence Community consistently trace Iran's continuing endeavor. Already by 1987, the CIA had determined that Iran was a chemical power in formation, capable of fitting a chemical warhead onto its Scud-B missiles. In February 1989, Director of Central Intelligence (DCI) William H. Webster stated that Iran was currently producing chemical warfare agents and weaponizing them.[48] Robert M. Gates, Webster's successor as DCI, testified before Congress in April 1992 that Iran would be capable of developing chemical warheads for its Scud-C missiles within a few years.

Iran's biological threat was addressed, as well. As of 1996, CIA testimony indicated that Iran was believed to have weaponized both live agents and toxins for artillery and bombs, and might even then be pursuing biological warheads for its missiles. Iran was believed to be holding some stocks of biological agents and weapons, and to have developed the technical infrastructure to support a significant BW program with little foreign assistance.

In 1996–1997, the U.S. Defense Department commented:

> Iran has considerable expertise with pharmaceutical, as well as the commercial and military infrastructure needed to produce basic biological warfare agents. Iran already has an offensive biological weapons program and may have produced small quantities of biological agent. Iran might be ready to deploy biological weapons. There are efforts to establish a wide program to put chemicals into battlefield weapons. Iran continues to upgrade and expand its chemical warfare production infrastructure and munitions arsenal.[49]

A 1998 report from the Central Intelligence Agency noted that Iran "has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents."[50] Then-DCI George Tenet observed: "Iran remains a serious concern because of its across-the-board pursuit of WMD and missile capabilities. We assess that Tehran—no matter who is in power—will continue to develop and expand its WMD and ballistic missile programs as long as it perceives threats from U.S. military forces in the Gulf, and a nuclear-armed Israel. In addition, the deterrence posture or prestige factor associated with some of these programs are probably viewed by Iranian leaders as a means to achieve their goals of becoming the predominant power in the region, asserting Iran's ideological leadership in the Muslim world, and diminishing Western—particularly US—influence in the Gulf."[51]

In 1999, Tenet added: "Iran's reformists and conservatives agree on at least one thing: weapons of mass destruction are a necessary component of defense and a high priority. The development of WMD and delivery systems has strong support in Iran."[52] The 1999 report to Congress by the CIA's Nonproliferation Center identified Iran as perhaps the world's most aggressive developer of nonconventional weapons capability. It was expanding a

chemical weapons arsenal that already included stockpiles of "blister, blood and choking agents and the bombs and artillery shells for delivering them."[53]

The report pointed to the emergence of independent or quasi-government entities in Russia and China as exporters of CBW technologies. Some Chinese organizations have direct ties to the Beijing government, while others have more diverse organizational structures. Despite U.S. sanctions imposed in 1997 on seven Chinese entities, the CIA reported that some of these organizations continued to supply Iran and Syria with chemical weapons-related materials, including the basic ingredients for certain chemical weapons. The report listed Russia, China, and North Korea as the key "supplier nations" for weapons of mass destruction, with Iran and others as the key consumer nations.[54]

Special reference was made to Iran's BW in February 2000 when the CIA's National Intelligence Officer (NIO) for Strategic and Nuclear Programs, Robert Walpole, testified at a hearing of the Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services. Referring to Iran's biological capabilities, Walpole commented:

> Although non-missile means of delivering weapons of mass destruction do not provide the same prestige or degree of deterrence and coercive diplomacy associated with an ICBM, such options are of significant concern. Most are less expensive than ICBMs; can be covertly developed and employed; probably would be more reliable, accurate, and effective for disseminating biological warfare agents; and would avoid missile defenses.[55]

A more comprehensive picture emerged later that year with the testimony of Norman Schindler, Deputy Director of the DCI Nonproliferation Center, before the same panel. On 21 September 2000 he said:

> The Iranians regard their CBW programs as extremely sensitive and go to great lengths to hide them from us. As a result, our knowledge of these programs is based on extremely sensitive sources and methods. This precludes me from providing many details on the programs in open session.
>
> We believe the program remains active despite Tehran's decision to ratify the Chemical Weapons Convention (CWC). Iran has a large and growing CW production capacity and already has produced a number of CW agents, including nerve, blister, choking, and blood agents. We believe it possesses a stockpile of at least several hundred metric tons of weaponized and bulk agent.
>
> Tehran's goals for its CW program for the past decade have been to expand its production capability and stockpile, reach self-sufficiency by acquiring the means to manufacture chemical production equipment and precursors, and diversify its CW arsenal by producing more sophisticated and lethal agents and munitions.

- Tehran continues to seek production technology, training, expertise and chemicals that could be used as precursors from entities in Russia and China. It also seeks, through intermediaries in other countries, equipment and material that could be used to develop a more advanced and self-sufficient CW infrastructure.
- Thus far, Iran remains dependent on external suppliers for technology, equipment, and precursors. However, we judge that Tehran is rapidly approaching self-sufficiency and could become a supplier of CW-related materials to other nations.

Iran's BW program also was initiated in the 1980s during the Iran–Iraq war. The program is in the late stages of research and development, but we believe Iran already holds some stocks of BW agents and weapons. Tehran probably has investigated both toxins and live organisms as BW agents, and for BW dissemination could use many of the same delivery systems—such as artillery and aerial bombs—that it has in its CW inventory.

- Iran has the technical infrastructure to support a significant BW program. It conducts top-notch legitimate biomedical research at various institutes, which we suspect also provide support to the BW program.
- Tehran is expanding its efforts to acquire biotechnical materials, equipment, and expertise from abroad—primarily from entities in Russia and Western Europe. Because of the dual-use nature of the equipment, Iran's ability to produce a number of both veterinary and human vaccines also gives it the capability to produce BW agents.
- Tehran continues to develop its BW capability despite being a party to the Biological Warfare Convention (BWC).[56]

In October 2000, the U.S. Senate Foreign Relations Committee's Subcommittees on Near East and South Asia Affairs and European Affairs held a joint hearing on the "Iranian Weapons Programs: The Russian Connection." Testifying were Robert Einhorn, Deputy Assistant Secretary of State for Non-Proliferation, and John Lauder, Special Assistant to the Director of Central Intelligence for Nonproliferation. Einhorn described Iran's chemical weapons program as "one of the largest in the developing world" and said that Iran seeks "the ability to produce indigenously more sophisticated and lethal agents." According to Einhorn, "This trend toward self-sufficiency is worrisome, since it means that Iran could eventually become a supplier of CW-related materials to other nations." On biological weapons, he observed, "The pace of Iran's biological program probably has increased since the 1995 revelations about the extent of Iraq's biological weapons program."

Much of John Lauder's testimony mirrored that previously given to the Senate Governmental Affairs Committee by Norman Schindler. But he

added more detail on the Iran–Russia relationship. With reference to CW, Lauder stated: "Numerous Russian entities have been providing Iran with dual-use industrial chemicals, equipment and chemical production from its study of the impact of Agent Orange on the technologies that could be diverted to Tehran's offensive CW program. In 1999, for example, Russian entities provided production technology, training, and expertise that Iran could use to create a more advanced and self-sufficient CW infrastructure." On biological weapons, Lauder said:

> Iran is seeking expertise and technology from Russia that could advance Tehran's biological warfare effort. Russia has several government-to-government agreements with Iran in a variety of scientific and technical fields. Because of the dual-use nature of much of this technology, Tehran can exploit the agreements to procure equipment and expertise that could be diverted to its BW effort. Iran's BW program could make rapid and significant advances if it has unfettered access to BW expertise resident in Russia.[57]

Finally, during 2002, assessments were further strengthened. On 30 January 2002, the U.S. National Intelligence Council released its unclassified six-month survey, *The Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*. The report stated bluntly:

> Iran remains one of the most active countries seeking to acquire WMD technologies from abroad. In doing so, Tehran is attempting to develop a domestic capability to produce various types of weapons—chemical, biological, and nuclear—and their delivery systems. During the reporting period, the evidence indicates determined Iranian efforts to acquire WMD-related equipment, materials and technologies focused primarily on entities in Russia, China, North Korea, and Western Europe.[58]

Lisa Bronson, Deputy Undersecretary of Defense, referred to Iran's possession of BW capabilities as a solid fact,[59] while CIA Director Tenet reported that, in spite of U.S. sanctions, China continued to supply Iran with CW production equipment.[60] Also, Carl W. Ford Jr., Assistant Secretary of State for Intelligence and Research, in testimony before the Senate Committee on Foreign Relations hearing on reducing the threat of CBW, 19 March 2002, referred to those aspects. He noted:

> Iran continues to seek production technology, training, expertise, equipment, and chemicals from entities in Russia and China that could be used to help Iran reach its goal—an indigenous nerve agent production capability. Tehran continues to seek considerable dual-use biotechnical materials, equipment, and expertise from

> abroad—primarily from entities in Russia and Western Europe—ostensibly for civilian uses. We believe that this equipment and knowhow could be applied to Iran's BW program. Iran likely has evolved beyond agent research and development to the capability to produce appreciable quantities of biological warfare agents, and may have some capability to weaponize those agents.[61]

The Defense Intelligence Agency (DIA) does not lag behind. In 2003, its assessment of the Iranian threat was expressed by General John Evizide: "Iran possesses long-range means for delivering WMD. Though state-party to the CBW conventions, Iran will continue to develop more advanced chemical and biological warfare agents."[62]

Eventually, the NATO member state bordering Iran, Turkey, referred, on a rare occasion, to the strategic menace posed by Iran: "Iran is deploying WMD (meaning CBW) as an element of threat against Turkey," as the *Istanbul Milliyet* reported on 19 July 2000. The newspaper continued:

> According to a report prepared by Turkish intelligence units, Iran possesses more than 500 tons of chemical weapons. A major part of these weapons consists of nerve gases. The rest consists of other gases such as those that poison the blood. The report enumerates the following facts: The production of biological warfare material is carried out in nine factories located in Iran's northern and western regions. These factories operate through secondary and phony companies. The production of these biological materials is carried out with the technical support of India, North Korea, and the People's Republic of China.[63]

In perfect contrast to those threat assessments are moves by Iran in the arena of nonproliferation diplomacy.

IRAN'S NONPROLIFERATION DIPLOMACY

Iran's overcall diplomacy within the context of CBW is marked, primarily, by a seeming pursuit of disarmament and nonproliferation. Irrespective—for a moment—of whether its approach is authentic or false, a certain caution and consistency emerge from it. This can be sensed with regard to various statements and postures posed by Iran and its representatives in the Conference on Disarmament (CD) and related frameworks, as well as on many other occasions. Iran diligently fosters that line to retain a positive image, despite its incompatibility with Tehran's genuine desires, intentions, and deeds.

Outwardly, the working papers and proposals presented by Iran at the CD and other non-proliferation forums are generally well-structured, giving the superficial impression that Iran's efforts to address the technological and strategic needs of unarmed developing countries, of which Iran is

ostensibly one, are innately benign. Tehran thus pays considerable attention to such aspects as the right, even privilege, of such countries to advance their seemingly legitimate chemical and biological infrastuctures in order to minimize their vulnerability. In exhibiting this fine-tuned diplomacy, Iran's real intention is, in fact, considerably different, as follows:

Iranian Activities Related to the CWC

In 1984, concomitant with its preparations for using chemical warfare against Iraq in retaliation, as Tehran then declared, Iran's permanent representative forwarded three letters to the CD, dated 29 March, 30 March, and 7 July. Iran there emphasized that it would not use CW of any kind or for whatever reason, and emphasized the need to make progress toward an agreed CWC.

In January 1989, Ali Akbar Velayati, Iran's former Foreign Minister, stated at the International Congress for the Prohibition of CW that Iran had never used CW, even as retaliation,[64] and on 16 February, Tehran's permanent representative to the CD, Ali Shams Ardakani, stressed the need of wiping out the threat of CW forever.

In March 1990, in the CD, Velayati stated that Iran had two principal options: (1) logical, meaning to maintain an offensive chemical capability; and (2) expedient, namely to rely on the CWC, while taking the unavoidable consequent risks. Then he declared that Iran had chosen the second option.

In August 1990, Iran forwarded to the CD a report on a trial challenge inspection conducted by its own experts in an organo-phosphate insecticide (DDVP) industrial synthesis line in Iran. The findings—reached by Iran alone—were fully compatible with the CWC, yet a well-known fact is that the precursors for that insecticide are essential for the synthesis of nerve gases.

In February 1991, Velayati, again in the CD, stressed that the CWC absolutely ought not to impose any limitation upon the legitimate development of chemical industries in developing countries, because a lack of development really means a threat to their security. Subsequently, by May, Iran (together with Egypt, Pakistan, Argentina, Britain, and Germany) participated in the first multinational trial inspection at a German operational air base. Summing up the event from Tehran's perspective, its CD representative emphasized that the task of the inspectors was to inquire into concealment issues, while refraining from impairment of the inspected country's security.

In July 1991, Iran gained participation in the CD Technical Group for Analytical Data Base and Laboratories, with three representatives; an Iranian headed the Sub-Committee for Legal Issues affiliated with

the Committee on Chemical Disarmament, and another headed that panel's working group. Various ways of ensuring unlimited horizons for the pesticides industry were emphasized.

In October 1991, Iran forwarded to the First Committee of the UN Assembly in New York its detailed position regarding chemical disarmament issues. Displaying an extremely positive attitude toward the forming CWC, Iran accentuated, concomitantly, the need to keeping civilian chemical industries intact: "Our profound conviction is that in reward of the obligations and commitments developing countries have to follow, exceeding rights and privileges needed for developing their chemical industries must be reassured."[65]

In January 1992, a very similar and comprehensive posture, favoring particularly the production of organo-phosphate insecticides and medicines, was taken by Hassan Mashahdi, Iran's permanent representative to the CD, while participating in the international Pugwash Conference. Likewise, a working paper analyzing an ostensibly hypothetical production line of dual-use mustard precursor (TDG) was forwarded to the CD's Committee on Chemical Disarmament Verification in March 1992.

The conversion of CW facilities into installations whose activities are allowed by the CWC was broadly addressed by a senior Iranian scientist, Amir Sakhafinia, together with French and Argentinean experts, in a joint working paper in June 1992. Other working papers by Iran, India, and Egypt pertained to issues of definitions and criteria, guidelines for categorizing prohibited chemicals, and prohibited activities. Preciseness was vital so as to perfect awareness of what is forbidden and, equally, permitted.

Soon thereafter, in August, Iran forwarded two working papers to the Committee on Chemical Disarmament. One dealt with the definition of CW, demanding unambiguous formulations of CW. The second pointed to redundancy and the negative impact of limiting ethanolamines (the precursors of nitrogen mustard, concomitantly procured by Iran).

Iran signed the CWC in January 1993 and ratified it four years later, in November 1997. A statement submitted to the CWC secretariat in 1998 consisted only of questions in Farsi as to the nature of the required compliance. Upon signing, Tehran had emphasized its right to withdraw from the convention at any time. In its initial declaration to the OPCW, it declared its nonpossession of CW stocks, indicating that all past Iranian stockpiles of CW were destroyed prior to the Convention entering into force. By August 2000, Iran was one of ten countries that had declared a total of 61 chemical weapons production facilities. The results of all OPCW inspections conducted in the country so far have been favorable, and the OPCW has deemed Iran to be in full compliance with the terms of the CWC, according to Jose M. Bustani, Director-General of the OPCW.[66]

And, despite U.S. accusations of total Iranian noncompliance, no member state has yet exercised its right to publicly challenge Iran's compliance by calling on the OPCW to undertake a challenge inspection.

In May 2000, a draft resolution on the fostering of international cooperation was submitted by Iran, Pakistan, and Cuba to the CD's third session subsequent to their expression of concern about the continuing absence of formal agreement between the UN and the OPCW.

Finally, on 22 April 2002, following Bustani's removal from office, Iran, which voted against the motion, complained bitterly at the outcome: "It is a major blow to multilateralism. What we lost during this process was the confidence in the independence of the Director-General."[67] Russia, which also voted to save Bustani, was equally unhappy, questioning, with seeming innocence, both the politics and legality of the decision.[68]

The international OPCW's First CWC Review Conference took place in 2003. The U.S. was confronted during the conference—consequent to its statement accusing Iran for continuing to seek CW-related chemicals, production technology, training, and expertise from abroad.[69] So as to remove any doubts whatsoever concerning the absence of Iranian offensive CW capabilities, Tehran hosted the international Annual OPCW Course on Medical Aspects of Defense Against CW. Obviously, medical knowhow and the means for countering CW are essential for defending both soldiers on battlefields and workers on CW production lines. Notably, the course was approved after Iran, together with the Western-oriented states of Kuwait and Qatar, approached the OPCW secretariat with requests for the provision of experts, advice, and assistance for the development and improvement of "national protective capacities."[70] Accenting the purely protective and defensive purposes of its overall deeds, Iran then aggressively replied to the U.S. accusation in the OPCW CWC Review Conference:

> It was Washington, not Tehran, which bore responsibility in recent years for withdrawing from, weakening or refusing to embrace multilateral agreements. It was the U.S. national legislation which ran contrary to the convention. A previous Iranian CW capability had been developed in response to Western indifference to Iraqi CW use against Iran in the 1980s; all relevant material and facilities, including CW production sites, had been declared to the OPCW and destroyed under its verification.[71]

Another Iranian move during the conference, together with Pakistan, China, India, Malaysia, and Brazil, as against the U.S., UK, and others, was nullifying the Australian Group as an instrument through which CWC state parties might fulfill their nonproliferation obligations stemming from the convention.[72] For Iran, in particular, the Australian Group was

reckoned to be an unneeded obstacle on Tehran's road to proliferating its CW arsenal, In practice, the Australian Group functions as both a non-proliferation organ and, informally, an effective intelligence apparatus.

Iranian Activities Related to the BWC

During the reign of Shah Mohammed Reza Pahlavi Iran signed the Biological Weapons Convection (BWC) in April 1972 and ratified it in August 1973, having no intentions relating to BW. Later, however, that innocent act became meaningful. In April 1992, the year its BW program crystallized perfectly, Iran forwarded a working paper to the BWC Governmental Expert Group entitled: "Concerns and views of a vaccine producer of the developing country." It recommended that "The developing countries must become self-sufficient in production of vaccines and sera for their domestic use."[73] Whether objectively postulated or not, this recommendation actually pertained to the biotechnology which almost entirely overlaps the one needed for the production of BW.

By 1998, while continuing to nourish its BW program, Iran's Permanent Mission to the United Nations asserted that allegations that

> Iran intends to acquire biological weapons are simply distorting the actual activities of biological industry in Iran, and therefore it is categorically rejected. Iran's peaceful biological program falls within the provision of Article X of the BWC to which Iran is a party. The convention also provides for the state parties to the convention undertake to facilities, and have the right to participate in, the fullest possible exchange of equipment, materials, and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. . . .
>
> Iran is actively engaged in all international efforts to strengthen the verification system of the BWC. It is self-evident that no nation can nowadays deprive itself of the benefits of progress in the field of biology and biotechnology, which directly correlate with the standard of everyday life. Iran is no exception, and accordingly attempts–to the degree that its limited resources allow–to take advantage of this scientific progress. In this context, Iran like many other states has benefited from the knowledge and cooperation of scientists from all over the world including from Russia and Western countries.[74]

Tehran's diplomatic activities gathered momentum during 2000, even while concomitantly commencing serial production of BW. In January 2000, Iran participated in what might be regarded as a "key seminar." The Hague-based Netherlands Institute for International Relations (*Clingendael*) and the Netherlands Foreign Ministry convened a seminar "Strengthening the BTWC, on the recruitment, training and operation of the future inspectorate to be established by the BWC Protocol."

Participating were BWC Ad Hoc Group delegates and other governmental officials from Iran, as well as Pakistan, India, and other countries.

Consequent to its participation in that seminar, Iran worked out and submitted the following working papers to the BWC:

WP.345 Report of a National Trial Visit to a Vaccine and Serum Production Facility
WP.344 Animal Pathogens
WP.322 Vectors and Pests
WP.321 Article II: Further Definitions
WP.426 Settlement of Disputes on Transfer Denial

Further, an Iranian working paper of particular interest, WP.434, set out an argument for an area of limited size for investigation, stating that "the ultimate traveling distance of bio-aerosols could not be more than 10 km downwind from the source of release," and hence, that the limit for bio-aerosol dispersion should not be more than 10 km. The basis for this suggestion is surprising, as it ignores the considerable literature relating to past biological warfare trials, which have demonstrated that biological aerosols under optimum conditions can travel hundreds of kilometers downwind. Reference is made, for example, to the World Health Organization's (WHO) *Health Aspects of Chemical and Biological Weapons* (1970), and *FOA, A Briefing Book on Biological Weapons* (1996).

At the BWC's Fourth Review Conference, Iran's Ambassador, Ali Ashgar Soltanieh, addressed both substantive and procedural issues, noting that "Consensus will not be reached unless a balance is made for the promotions and regulatory pillars in the texts."[75] On procedural aspects, he added that "In order to increase the efficiency of the negotiation and the probability of reaching consensus, informal consultations by the chairman could be made with maximum transparency with those delegates mostly involved in the issues in question." He ended by assuring "the full cooperation of my delegation and its readiness for a constructive negotiation with the hope of the conclusion of our deliberation not later than the timeline envisaged by the Fourth Review Conference."[76]

By 2001, Iran had sharpened its stances. In its estimation, state parties would require one year to complete the task, recommencing promptly after the Conference. While calling itself open-minded with regard to constructive proposals, Iran warned that any approaches which opened a "new avenue" or undermined the fruits of seven years of work would be "a humiliation and an insult to all state parties involved." Iran would not allow its "credibility and maturity" in supporting the negotiations to the Ad Hoc Group (AHG) in charge of negotiating a verification Protocol to the Convention to be questioned, and was not prepared to let the collective

endeavors of the last decade "be ignored and considered in vain." Like Iran, Cuba was "convinced" the AHG's mandate remained "fully valid," adding that the fight against bioterrorism "should not be detached from the premises of multilateralism."[77] During the Fifth BWC Review Conference in November 2001 Iran displayed a willingness to compromise on export controls.[78] The misleading nature of that Iranian move, similar to other moves taken by Tehran, has been confirmed by credible intelligence sources.[79]

Iran probably figured out, long ago, that being a state party to the CWC and BWC is, at any rate, worthwhile. And, given that approach, that some applicable optimal line of diplomatic and political activities may be engineered and materialized, combining a subtle balance between a desirable image of innocence plus respectfulness, and a resulting unquestioned degree of exploitation of that very status. The nomination of Iranians to influential key positions is but one corollary. Thus, Iran's contributions to the CD are usually tendentious, elegantly serving what Iran deems vital for its current CBW programs as a developing country, and for perpetuating or improving its positive international image. While Iran's acceding to the BWC in the 1970s was meaningless, its joining the CWC in the 1990s was meticulously timed.

During 2002, Iran's minister of foreign affairs displayed a remarkable posture. In a direct letter to UN Secretary General Kofi Annan, he stated: "Iran does not pursue WMD, which have no place within Iran's defense doctrine. At the same time, Iran insists on and vigorously acts for having its unquestionable right to develop its peace-oriented chemical, biological and nuclear industries."[80]

Also, Iranian academics have made statements in the scientific literature which reflect their government's apparent attitude toward BW and CW, as follows:

> Strengthening the verification and compliance provisions of the BWC should be accompanied by development of incentives for joining the strengthened BWC. The WHO and FAO should be used within their proper mandate towards helping their member states so as to develop their capacity to combat diseases and to strengthen scientific cooperation. State parties are therefore rewarded for complying with the provisions of the BWC. Non-governmental organizations should direct their attention towards assisting developing countries in capacity building for eradication of diseases. Industrial countries can enter joint projects by those developing countries adhering to the BWC, thus rewarding them.[81]
>
> Iran's commitment to the CWC is founded solidly in its national security strategy. Keeping long-term national security in sight, there is all but unanimous consensus among statesmen in Iran that national interest and security lie in full and expeditious implementation of the CWC....

> By joining the CWC, Iran sought primarily to retain the twin ends of enhanced security and unhindered trade.... maintaining delicate balance between the twin objectives of eradicating an entire class of WMD, while removing all impediments for development of chemical industry and free trade of chemical among all states.[82]

THE REALITY PER SE

"Delicate balance," indeed, is the key. In actuality, progressing programs aimed at acquiring both CW and BW of perfectly strategic, as well as sabotage-oriented, applicability have been persistently carried out by Iran since 1984. They were not discontinued at any time, though their rate has not been steady. They are plainly evolving, relying widely on Tehran's declared—yet ambivalent, in effect—"delicate balance." Following are the evolutionary courses of those programs, from their beginning up to the present.[83]

Chemical Weapons

During the post–World War II era, Iran has been the most prominent state to suffer the impact of CW. Essentially, its army was exposed, often unprotected, to many chemical attacks launched by Iraq from 1982 to 1988. Likely as not, Iranian civilian communities situated not far from the battlefields were deliberately hit by the Iraqi army.[84]

More than any other country, Iran learned a great deal from the bitter experience of six years of CW attacks by Iraq. Such cumulative experience has had ramifications on its CW program. During the war, Iran tried to manufacture its own CW, but deployed and employed such weapons on only a limited basis. Yet, by the end of the war, 1988, Iran had accumulated vast experience in readying the production of CW. Today, it has installed such weapons in mines, artillery shells, airborne bombs, rockets, and missile warheads. Since 1993, Iran has increased its chemical offensive warfare training, and has apparently deployed CW on some of its ships.[85] It has probably deployed ballistic missiles tipped with chemical warheads, as well. Today, Iran does not have long-range missile warheads capable of reaching Europe or the U.S., but it aspires to have them, and will very likely attain that menacing capability. Among the chemical warfare agents that Iran has produced are cyanide (cyanogene chloride), phosgene, sulfur mustard, nitrogen mustard, lewisite, tabun, sarin, and VX.

Tehran's CW program was plainly the result of recurrent Iraqi employment of CW against Iranians during the Iran–Iraq War. Mortar rounds containing tear gas (1982), artillery shells and aerial bombs containing mustard gas (1983), aerial bombs containing tabun nerve gas (1984), and artillery rockets containing sarin nerve gas (1987) comprised the first lessons Iranian experts had in getting acquainted with various

Iraqi chemical munitions. Many specimens and examples of those munitions—both effective and abortive—were collected and meticulously explored by Iran. Numerous Iranian casualties were concomitantly treated or autopsied, thus inevitably providing vast knowledge regarding the usability and adequacy of the Iraqi CW. Their wide diversity left little wonder about the statement made by Rafsanjani in 1984: "Iran's tolerance may be abated and hence she may use CW, especially that she has the best chemists, pharmacologists, and scientists in the Middle East."[86] Not yet having their own CW, the Iranian artillery and air forces consequently used portions of the captured Iraqi-made inventory against the Iraqi alignment. The way to a methodical Iranian CW program had been paved.

During that embryonic phase, the leading Iranian specialists were mostly affiliated with the Chemical-Biological-Radiological (CBR) Division of the IRGC (M. Akbardazeh and M. Fasilaty); the Jihad-a-Daneshgahi (Jihad University) unit of the Tehran University Faculty of Medicine (B. Eftekar); and the Institute of Biochemistry and Biophysics (IBB) of Tehran University (H. Riazy).[87] They chose six chemical warfare agents—mustard, cyanogen chloride, phosgene, tabun, lewisite, and sarin—about which they accumulated technical data.[88] The intention was to produce in Iran the first three warfare agents in that series, so as to form an initial self-made CW inventory. The first facility selected for manufacturing them was ostensibly a fertilizers factory in Marv-Dasht, which has been converted to CW purposes with help from German and Italian experts. Mustard was the prime product in the early stages.[89]

While cyanide and phosgene could be—and practically have been—produced in Iran from commonly available raw materials, the importation of thiodiglycol and thionyl chloride was necessary as precursors for mustard. Parts of the Iranian embassy in Bonn, Germany, became clandestinely a commercial headquarters for that, and many similar purposes. Through these channels, five hundred tons of thiodiglycol were supplied to Iran by the Swiss company FCA Contractor, while thionyl chloride has been procured from India. Relying on those purchased precursors, the mustard thus manufactured in Marv-Dasht, as well as the cyanide and phosgene, were used to fill, at that time, mortar rounds and artillery shells.[90] Furthermore, the pathological effects of mustard (99.8 percent pure substance) were experimentally investigated in Mashhad University for Medical Sciences[91] and in the IBB.[92]

A second, major CW factory was erected at the Alburz site of Qazvin, west of Tehran. Supposedly a pesticide plant, reportedly completed between November 1987 and January 1988, it was aimed, in effect, at synthesizing nerve agents. As to munitions, solid indications are that in 1988 Iran had built a chemical munitions plant in Damghan.[93] In addition, a large research and development facility was established under the control of

the Iranian Engineering Research Centre (affiliated with the Construction Crusade—Jihad a-Sazandegi), that had attained a significant CW production capability by 1989.[94] The Iranian government also maintains CW facilities affiliated with Polycryl Co. at Isfahan, and with the Defense Industries Organization at Parchin.[95] In Isfahan, thus, a civilian plant has been developed into a major CW production facility.[96]

Other facilities dedicated to the production of chemical warfare agents, in Arak and in Abik, were featured in Middle Eastern press reports.[97] The existence of a plant located near the Semnan missile plant and producing five tons of nerve gas per month has been reported by British sources, and a large, dual-use civilian chemical facility—the Zakaria Razi Chemical Corporation—has been identified near Bander Abbas.[98] This firm, though formally affiliated with the Oil Ministry, is actually independent. A fairly detailed and reliable report published in the British press points at additional facilities, namely in Karai (a governmental R&D center), Shiraz (the governmental petrochemical concern), and its Bander Khumeini derivative (a complex of IRGC patronized laboratories, primarily involved in providing chemical agents to the Iranian-Iraqi 1980s battlefields). Abroad, in Dubai and Singapore, research is sponsored by the Iranian governmental organization, Benoid-a-Mustazfan, so as to advance CW manufacturing.[99] Another reliable report was published in the German press implicating a factory located at Kharge, which synthesizes war gasses.[100] Generally, then, the conspicuous number and dispersal of Iranian facilities are not at all surprising, in light of Tehran's typical inclination to maximum concealment and minimal vulnerability, a line strictly respected by the IRGC.

The next step was the production of nerve gasses, tabun being the first and simplest. The Qazvin-Alburz factory, officially built for the manufacturing of organo-phosphate pesticides, was subsequently configured as camouflage. The Iranian civilian front companies, Iran Melli Agriculture and Nergan Consulting Engineers, generally did well in mobilizing the European firms Bayer, Lurgi, Ciba-Geigy, and Basf for helping the project materialize. In spite of difficulties with German authorities, most of the project had begun by 1988. Concurrently, on a laboratory scale, the Teaching Group at the CBR Division of IRGC, together with Mash'had University for Medical Sciences, had studied the toxicity of an organophosphate compound (gusation).[101] A significant triangle, composed of chemists from Tehran University, Damascus University, and the French governmental CNRS, investigated the synthesis of another organophosphate compound (1988).[102] Consequently, the preindustrial production of tabun successfully took place.

In late December 1987, Prime Minister Hussein Mussavi reflected that prognosis, stating that Iran was about to manufacture sophisticated

offensive CW.[103] President Ali-Akbar Rafsanjani subsequently emphasized Iran's readiness to swiftly produce any large amounts of CW it needed. Shortly afterwards, however, his deputy stated that the IRGC was already equipped with CW. A few months later, yet another attempt was made by the IRGC to obtain some 500 standardized U.S. Army sarin—filled aerial bombs through the American company Komex, but the deal was foiled in January 1989. Still, sixty tons of thionyl chloride, suitable for supporting the manufacturing of both mustard and nerve gasses was procured from the Indian firm, Transpek Private Company, in March 1989. But the delivery of the major portion of that shipment was halted. Several dozen tons of triethanolamine destined for Iran from Eldi Chemicals to serve as a synthesis for mustard, this time nitrogen mustard, were impounded by Dutch authorities in 1990.[104]

Coincidentally, the upgrading of the Qazvin pesticides factory failed due to increased German interference,[105] and a potentially new purveyor was discovered in South Korea. The necessary advanced technology—in the form of an enlarged insecticides plus fertilizers plan—was transferred to Iran through the Kuwang Jin Co. after approval, unfortunately, by the United Nations International Development Organization (UNIDO).[106] Lurgi and Karl Kolb of Germany continued to be contributive; and Aldrich Chemicals, U.S. became a supplier to the Iranian Atomic Research Organization. Also, the Iranian Mines Company served as a front for ordering some 100 tons of sodium cyanide—an important precursor for manufacturing tabun and cyanide gas—from the German firm Rotexchemi, but the cargo was intercepted in Turkey in October 1990. Production of those two war gasses persisted, however, appreciably relying on laboratory synthesis studies conducted at Shiraz University. A plant for producing organophosphate insecticides (mainly DDVP; 220 kg a batch, as declared by Iran) supported the manufacture of a nerve agent, being based on three-methyl-phosphide (plus chloral and benzene). Glass-coated chemical reaction vessels and pipes, needed for synthesizing mainly di-chloro, a vital nerve gas precursor, were sought in Europe and the Far East.[107] Then, in 1992, additional essential technologies were acquired from the Hungarian firm, Lampart,[108] while raw materials for advanced nerve agents were eventually procured from Pesticides India Ltd for the Qazvin factory in 1993,[109] as well as for the Arak factory, located within the National Petrochemical Complex.[110] In addition, the latter facility was expanded into a plant for synthesizing ethylene oxide, from which thiodiglycol is readily manufactured. Iran's full mastering of that process, in terms of annual capacity of 200 tons, was later exhibited in the CD.

Iran obtained much necessary and relevant information from an Israeli businessman, Nahum Manbar, who was arrested, tried, and convicted in Israel for deliberately cooperating with the Iranians. His tainted interface

with Tehran was monitored and fully verified by the Israeli intelligence community. During 1992–1993, he furnished a plan for the synthesis of thionyl-chloride, a project involving, as well, the Indian firm, Exomet. From 1990 to 1993, Manbar provided, in addition, various raw materials for the manufacturing of mustard and nerve gasses. He also granted Iranian requests for know-how, plus equipment, for producing tabun, sarin, and soman nerve agents, as well as for constructing a plant to produce binary chemical artillery shells.[111]

Another significant contribution came out of Libya. In 1990, the Thai firm, Tiambonkit, obtained the full layout and details of Libya's CW facility at Rabta and forwarded them to the Iranian Military Industries Organization. And, the construction plans for Libya's Tarhuna factory, described as the largest CW plant in the world, were obtained by German intelligence from German and Austrian contractors. (The great concern is that those plans have reached Syria as well as Iran.) That factory was designed to produce mustard gas, plus sarin and soman. Whether and where those grand Libyan industrial layouts are being completely copied by Iran remains uncertain. Notably, many facilities that may significantly contribute to running a CW program are found in Iran, and some of them are being used for that purpose.

MAKING SIGNIFICANT PROGRESS

All in all, Tehran's CBW efforts from the end of its war with Iraq in 1988, up to 1993, were remarkably extensive and intensive. Consequently, by 1993, at the latest, Iran was synthesizing tabun on a fully industrial scale, in addition to mustard, lewisite, cyanide, and phosgene. Serial weaponization—including 155mm artillery shells, rockets, aerial bombs, and ballistic missile warheads—took place chiefly at the Isfahan Munition Works, a complex significantly modernized by the Swedish company Bofors.[112] (This facility is in addition to the one at Damghan.) Also, segments of the Defense Organization Industries at Isfahan and Shiraz deal with the development of chemical warheads for ballistic missiles.

The next phase began around 1994. Evidence indicates that Iran has since then increased its endeavors with respect to nerve agents.[113] Detailed information, regarded to be sound and reflective, of Iran's activities during that phase has been presented by Anthony Cordesnam [114] and others.

Suppliers from the Orient

Iran may have acquired the capability to produce the nerve gasses sarin and VX during the mid-1990s. Initially, the construction of a facility for the production of phosphorous-pentasulfide (a vital precursor for the synthesis of VX nerve agent) by John-Brown Engineering and Krebs had been

foiled.[115] The pretext was of a plant for producing amiton, a very potent pesticide. Iran also sought to obtain impregnated alumina, which is used to make phosphorous-oxychloride, a major component of VX and sarin, from the United States. But India and China instead became its cardinal suppliers, reflecting a distinct, though certainly not absolute, Iranian shift toward the Far East, plus Russia. Thus, in 1995, a report by the German intelligence agency, BND, indicated that Iran had made great efforts to acquire the equipment necessary to produce sarin, using the same cover of purchasing equipment for pesticide plants that its rival Iraq had used in the past. For that purpose, three Indian companies—Tata Consulting Engineering, Transpek, and Rallis India—had approached German pharmaceutical and engineering concerns for such equipment and technology under conditions that allowed German intelligence to trace the end user to Iran.[116] The factory in question succeeded in getting the equipment and technology and, to be more precise, had the concrete intention—rather than merely the technical capacity for—producing sarin, as had the Iraqi factory, a decade earlier. Indian entities have also assisted in the construction of a major new plant at Qazvin to manufacture phosphorous-pentasulfide, the main precursor for VX nerve gas.[117] The Indian chapter, in all probability, has not yet been terminated.

China is of particular importance, even though Iran had placed several significant supply orders with China that were not delivered. In the mid-1990s, Razak Industries in Tehran and Chemical and Pharmaceutical Industries in Tabriz ordered 49 tons of alkyl dimethylamine, a chemical of dual-use, serving to make detergents and tabun, and 17 tons of sodium sulfide, another dual-use chemical, suitable in making mustard gas. Although orders were never delivered, Iran's International Movalled Industries Corporation (IMICO) and China's North Chemical Industries Co. (NOCINCO) had brokered them. Both firms have been linked to other transactions affecting Iran's CW program since early 1995, and NOCINCO has supplied Iran with industrial quantities of raw materials. In late 1996, CIA sources indicated that China might have supplied Iran with up to 400 tons of chemicals for the production of nerve gas.

In May 1997, the United States imposed sanctions on seven Chinese firms for selling precursors for nerve gas and equipment for making nerve gas, although Washington made it clear that it had "no evidence that the Chinese government was involved."[118] Among the Chinese firms were the Nanjing Chemical Industries Group and Jiangsu Yongli Chemical Engineering and Import-Export Corporation. Cheong Yee Ltd., a Hong Kong firm, was also involved. The chemical precursors included thionyl chloride, dimethylamine, and ethylene chlorohydril. The equipment included special glass-lined vessels supplied by Q. Chen,[119] while Nanjing Chemical and Industrial Group completed construction in April 1997 of a

production plant to manufacture such vessels in Iran. The plant was fronted by Meli Agrochemicals, and the program negotiated by Dr. Mejid Tehrani Abbaspour, a chief security advisor to President Rafsanjani.

In April 1998, the Iranian Defense Industry Organization took delivery from a Chinese corporation, the Tianjin branch of SinoChem, of 500 tons of phosphorus pentasulphide, a cardinal dual-use precursor for synthesizing VX nerve gas.[120] Apparently, Iran then possessed, for the first time, the principal precursor for synthesizing the most advanced nerve agent, VX, in a full industrial quantity. Serial production commenced by 1999. Still, Iran's intensive switch to nerve agents did not impair its affinity for the old phosgene and other war gasses. In March 2000, Iran contracted with a German company, Salzgitter Anlagenbau, to build a 1,450 kilograms-per-hour phosgene generator.

The issue of production rates is rather complex. Iran was apparently beginning to scale up production of mustard and nerve gas by the time of its August 1988 ceasefire with Iraq. The increase took place gradually, yet consideration might be given to a refraining from making abrupt moves that could readily be monitored by adversaries. By 1996, Iran was estimated to be producing around 1,000 tons of chemical warfare agents annually.[121] The estimates actually ranged from "several hundred tons of blister, blood, and choking agents," to the U.S. Defense Department's estimate that cumulative production of chemical agents had reached at least 2,000 tons, possibly including a nerve agent. More authoritatively, perhaps, General Anthony Zinni maintained that Iran "may have produced several thousand tons of chemical agents."[122] The low-end 1,000-ton annual figure is doubtful, since the proliferation of technology and indigenous improvements made it likely that Iran's annual production of CW was far greater.[123] Indeed, those figures may possibly be regarded as underestimations. Quite clearly, the magnitude of Iran's CW arsenal is still scaling up, and the manufacturing of binary CW, rather than final chemical warfare agents, is plausible.

Correctly describing the Iranian CW program as "the most active" one in the developing world,[124] Michael Eisenstadt contrasted that program's essence and rate with the elegance of its conduct and camouflage.

Biological Weapons

In the realm of biological weaponry, as well, Iran is working ceaselessly. It is fully aware of the colossal strategic significance of the BW bear, and acts accordingly. Tehran undoubtedly aspires to ultimately developing biological warheads for any long-range missiles it owns, processing, or developing. Iran's initial BW program began in 1984. In 1990, when the program was remarkably upgraded, a member of the Iranian Parliament's Defense Committee stated that the country "possesses the equipment and

raw materials needed for the manufacturing of BW."[125] Those two milestones, marking the first phase of Iran's BW program, illustrate the gradual, constant, and effectual progress made in that area since then.

Scientific and technological infrastructures, which are potentially supportive of a BW program, are quite common in Iran, and in part are active essentially for that purpose. Also, the general worldwide concern is that an operative BW production capability may be concealed within the country's civilian industrial facilities. In comparison with other developing countries, at Tehran's disposal are vast and quite advanced biotechnological capacities, along with a skilled work force. Therefore, it is only partially in need of outside assistance, and its BW program should be fully operational in a fairly short time.

Surprisingly or not, Iran's biological warfare agents basically dovetail with those included within Syria's BW program: botulinum toxin, ricin toxin, and anthrax. Mycotoxins, as well as the virus causing smallpox are also reckoned to be included in Iran's program of biological warfare agents.[126] Mention should be made of cholera, typhoid, dysentery, various toxins, foot and mouth disease, and cattle plague, as well as crop pathogens, such as the fungus attacking rice. Given Iran's ties to Russian expertise, Tehran might adopt agents developed by the former Soviet program, such as Marburg, plague, and tularemia.[127] Cooperation with Syria was first expressed in 1984 in Damascus—coinciding with the outset of Iran's BW program. During the "Syrian Scientific Week" Dr. Baladi Ramzada from Tabriz University presented his study about aerobiological characterization of atmospheric pollens,[128] while another senior Iranian scientist, Dr. Bahram Yakhmai, presented mechanisms regulating protein synthesis.[129] This biological collaboration with Syria, Iran's grand Moslem ally, proceeded from that point, though it was mostly undisclosed.[130] Besides, academic scientific collaboration of potential applicability was taking place with laboratories in India, the USSR, France, Germany, and Sweden. Not by chance, in 1985 an international conference on biotechnology took place for the first time in Iran. And, in 1992, a salient agreement signed by Iran and Cuba—an acknowledged BW-oriented state—paved the way for expert exchange in the fields of biotechnology and genetic engineering, thus appreciably enhancing Iran's BW potential.

Iran accused Iraq of employing BW against it on several occasions.[130] In 1984, Khamenei stated that Iraq used "microbe bombs."[131] More concretely, in 1986 Iraq was implicated in using mycotoxins; this was later apparently confirmed scientifically.[132] At any rate, it served as one propelling factor for an Iranian BW program. Its inception was rather peculiar, however, conglomerating scientists from the IRGC's CBR Division and the Institute for Biochemistry and Biophysics (IBB) to study the utility of many bacterial strains isolated from the Iran–Iraq battle

zones for field degradation of mustard and nerve gasses—an outstanding way of decontamination. More basic, though no less applicable, was Iran's UN-supported project aimed at the production of a bacterial insecticide; the project implementer being the IROST biotechnology department. The usefulness of such practices for a BW program is considerable, in terms of both simulation and camouflage. Human pathogens were dealt with, as well.

According to a report by the U.S. Arms Control and Disarmament Agency, the Iranian BW program has been embedded within that country's extensive biotechnology and pharmaceutical industries, so as to obscure its activities. The Iranian military has used medical, educational, and scientific research organizations for many aspects of BW agent procurement, research, and production.[133] In general BW R&D activities mostly take place within governmental and university laboratories,[134] while pilot and serial production are apparently carried out in facilities located at Kharge and Bander-Abbas.[135] Damghan reportedly is also a major production facility.[136]

In the mid-1990s, Iran had begun to stockpile anthrax and botulinum in an aerosol form in a facility near Tabriz, having by then the capacity to mass-manufacture such agents.[137] Actually, that stage was the culmination of the Iranian anthrax plus botulinum track. The anthrax pathogen had long before been isolated by Tehran University, and had since become readily available. In the first half of the 1980s, experimental infection by anthrax was conducted in Razi Institute, perhaps the most advanced biotechnological facility in Iran. At Razi, anthrax is mass produced in Iran for veterinary vaccine. That institute masters, as well, the biotechnology needed for large-scale manufacturing of botulinum toxin (around 600 liters a batch). The Razi Institute is also the most capable in producing and preserving viruses in Iran. Not surprisingly, Iran participated in 1992 in an international group of experts who convened in Geneva in order to examine various issues related to the implementation of the BWC. Represented by one of its best virologists, Hosam Rostai from Razi, Iran and Iraq were the only Middle Eastern countries to take part in that important event. Remarkably, 2.7 billion doses of livestock vaccines, sera, and antigens are produced annually at the Razi facility.

In the domain of bacteriology, noticeable scientific activities could be tracked since the late 1970s. Many strains of the germ-causing plague were isolated from a natural source in Iran by a team from the Tehran-based Pasteur Institute (1981). Brucella strains were isolated from sickened people in Tehran University and Shiraz University for Medical Sciences (1982–1984); tularemia was detected in animal sera in natural focus in Iran (1978, Pasteur Institute); food-borne botulinum toxin was studied as well (1998, Pasteur Institute).

Most able to develop alimentary pathogenic bacteria (particularly causing typhoid, cholera, and dysentery) for sabotage purposes is the Pasteur

Institute. Prominently guarded by the IRGC and the Ministry of Information, the Pasteur Institute has been described by local residents as a facility engaged in BW R&D, parallel to its civilian activities.[138] Other important facilities are the Institute for Biochemistry and Biophysics (IBB) at Tehran University, the Institute for Biochemical and Bio-environmental Research at the Sharif University of Technology, and the National Center for Genetic Engineering and Biotechnology (NCGEB), all connected with the IRGC.

Toxic Substances

The next phase consisted of toxins. Although Iraqi employment of mycotoxins against Iranian troops has not been fully verified, Baghdad likely possessed that type of biological weapon.[139] Moreover, the Iranians themselves certainly showed interest in that specific category of bio-weaponry. In December 1988, the IRGC's Poisons Unit at the Imam Reza Medical Center, Mashhad, asked a Canadian scientist for some dozen mycotoxin-producing fungal strains, but the delivery was halted by Canadian authorities. The same happened following a similar request to the Netherlands Central Bureau for Fungal Cultures, forwarded, that time, by IROST.[140] Dutch authorities blocked the supply, but were ineffective in preventing the delivery to Iran from the firm Contact of an advanced fermentation vessel, ostensibly for the production of vaccines. Also, German sources indicated that Iran had successfully purchased such fungal cultures.[141] This was corroborated by studies conducted on T-2 toxin plus other potent mycotoxins at Mashhad University Medical Sciences, Shaheed Beheshti University of Medical Sciences, Tehran, and the Islamic Azad University, Tehran.

In 1991, spiral equipment for biological production was supplied to Iran by the Swiss firm MBR, a procurement that led to another Swiss biotechnology supplier, Bio-Engineering Co. Three industrial fermentation vessels had been ordered, this time by an unidentified research institute, formally affiliated with the Iranian Ministry of Agriculture. Although the three vessels were deliberately and severely damaged, another three were delivered safely to Iran in 1992. Another procurement of such vessels by Iran—from the Swiss firm Chemap—was foiled, but the Iranians had already attained the desirable biotechnology for producing large quantities of fungal toxins, bacterial toxins, and pathogenic germs.

Whether the purchased fermentation vessels were then used to mass produce fungal mycotoxins and/or other biological warfare agents is not clear. Yet, extending its large-scale CW-related production into large-scale BW-related production in 1993, Iran turned to widely manufacturing another powerful plant toxin—ricin. Not needing fermentation technology, but rather the ability to chemically purify a toxic protein (ricin), the Iranian national firm for medicines, Daru-Pakhsh, bought an

extraordinary amount of 120 tons of castor beans. That enormous mass is much more than any reasonable quantity required for castor oil, though appropriate for the production of ricin toxin. Other significant toxins knowledgeably investigated in various Iranian facilities include clostridial, staphylococcal, cholera, snake, and tetrado-toxins. Food-borne botulinum toxin was studied as well at the Pasteur Institute. But the IBB is regarded as possessing the most advanced knowhow in Iran for studying and developing toxins as biological warfare agents.

An important move took place in 1994, aimed at upgrading Iran's overall biotechnology system, and particularly its absorbing capacity. The Biotechnology Studies Center was established by the Technology Cooperation Office. The intent was to help both the government and private sector policy approaches in setting priorities for biotechnology development. The duties of the center have been extended to include:[142]

- Comprehensive and comparative survey of biotechnology development in the world and Iran;
- Updating Iranian scientists and policy makers on biotech development in the world;
- Information gathering about biotech activists in Iran;
- Facilitating international communication for Iranian biotechnologists;
- Orientation of the private sector for investing in the biotech industry.

The milestones set to accomplish those objectives are:

- Scientific management and biotechnology development;
- Biotechnology and national development;
- Government roles in biotech developments;
- Biotech and the "Iran 1400" plan;
- International cooperations;
- Application of Russian biotech.

Significantly, the only foreign resource mentioned therein is Russia. The Iranian–Russian biotechnological interface includes strong, continuing ties among scientists of both nations, stemming, apparently, from regular academic cooperation. One conspicuous framework of that evolving interface is the annual Iranian-Russian Conference on Agriculture and Natural Resources. The remarkably wide scientific scope covered by this framework includes typically applicable topics. Clostridium botulinum (the isolation of types A, B, E, in the north of Iran) and the related toxinogenic bacterium, Clostridium chauvoei (large-scale cultivation) were two of the topics presented.[143]

The importance of dual-use biotechnology has been emphasized by U.S. Assistant Secretary of State Carl Ford, with regard to the Iranian–Cuban interface. He noted that "there is evidence of Cuban exports of dual-use

BW technology to Iran" (plus Syria and Libya). "While I'm concerned about what Cuba and its biotechnological capability may be providing other countries like Iran," Ford told a Senate Foreign Relations subcommittee, "I'm also concerned about their associations with countries that also have a biological warfare capacity and there can be an exchange of ideas and capabilities."[144] Likewise, China has sold Iran dual-use equipment and vaccines with both civilian medical applications and BW applications.[145]

Unsurprisingly, the formal academic frameworks connected with the Iranian Biotechnology Studies Center are being overseen by the IRGC, including:

- Tehran University—general biotechnology;
- Azad University—chemical engineering biotechnology;
- Sharif University of Technology—protein and gene engineering biotechnology;
- Pasteur Institute of Iran—biotechnological products;
- NRCGEB—cellular and molecular genetics biotechnology.

Thus, since 1994, the NRCGEB has been saliently upgraded, as exemplified through some of its workshops and current research. Notable workshops include:[146]

- New Recombinant DNA Technology (1994);
- Computer Application in Genetic Engineering (1994);
- PCR techniques (1995);
- In Vitro Gene Transcription, mRNA Translation and Protein Synthesis (1996);
- Large-Scale Protein Purification and Application in the Production of Therapeutic Products (1996);
- Gene Cloning and Its Statement (1997);
- Gene Expression in Eukaryotic Cells, Molecular Analysis of Gene Products (1997).

The trend that began in 1994 found expression in an increased export of Iranian trainees abroad. One example, Alizera Zomorodipour, gained superb knowledge at the University of Uppsala, Sweden, on the genomic and virulence mechanisms of the rickettsial pathogen causing epidemic typhus.[147] A notable reflection of the Iranian earnestness concerning BW-related essentials is the *Iranian Bio-safety Guidelines and Database*, issued by the Iranian National Bio-safety Committee.[148] This meticulously prepared document is significantly applicable to biological warfare agents.

Parallel to those biotechnological infrastructures, Iran's BW program has been upgraded, receiving assistance from European companies, as well as from formerly Soviet BW-related professional elements, in addition to those from Cuba, North Korea, China, and Pakistan. Thus, in 1994, Iran procured bio-containment equipment and technology from Germany. In 1995, the IRGC tried to purchase suitable production equipment for BW,

and, consequently, Iran may have begun small-scale weaponization by 1996.[149] Eventually, Italian and Spanish companies, in addition to Swiss, Dutch, and German firms, provided Iran with components since incorporated into its BW program. Moreover, its overall collaboration with Russia enabled Iran, in the mid 1990s, to enhance its biological capabilities to such an extent that their operational effect, if used, would have been similar to that of nuclear weapons.[150]

Tehran's endeavor to obtain crucial segments of the former Soviet Union's incredibly extensive BW-related knowhow actually began some time ago. Closer geographically to Russia, certain Moslem states are of paramount importance in that effort. Armenia and Kazakhstan serve as Iran's main bridges and sources to Russia. Uzbekistan and Azerbaijan may also be helpful. In Kazakhstan—a very potent state in terms of hitherto Soviet-originated BW capacities—are advanced facilities for BW R&D (in Aksu), production (Stepnogorsk), and field testing (Aralsk); in Azerbaijan, a BW R&D facility in Tbilisy, and in Uzbekistan, a field-testing facility on Vozrozhdeniya Island. These potentially contributive civilian institutions are the Almaty Anti-Plague Research Institute and Otar State Research Agricultural Institute (Kazakhstan); the Center for Prophylaxis and Quarantine of Most Hazardous Infections; the Arbovirus Facility of Virus Museum in the Research Institute of Virology, and the Samarkand Institute of Veterinary Science (Uzbekistan).

Despite a vigorous American attempt to foil the move, the equipment of an Armenian biological key-plan was sold in its entirety to Iran through a firm officially affiliated with the United Arab Emirates.[151] Indications are that Russian plants stood behind such "Armenian leaks"; the Russians would transfer to the Armenians and to other partners superfluous production and information potentially necessary to Iran, or the Russians would ignore (but not, of course, without a payoff) the question of how Armenian businessmen disposed of the property belonging to them.[152]

Iran also sought to mobilize highly ranked experts in Russia and Kazakhstan, and some of its attempts were successful.[153] Tehran's particular keenness to recruit such talent intensified during 1997, and has not let up in recent years.[154] Those experts master, for instance, the essentials that allow for the resistance of a missile warhead returning to the atmosphere so that biological agents installed in it will not be damaged by extreme heat or drastic momentum fluctuations.[155]

By 1998, according to Israeli sources, Iran could already deliver BW elements via Scud missiles and Sukhoi attack aircraft.[156] At about the same time, the CIA publicly reported that Tehran might possess weaponized biological agents that could be dispersed by aerial bombs and artillery, and was pursuing the development of biological warheads for ballistic missiles. In 1999, Israel's Deputy Defense Minister commented

that Iran had completed the development of a biological warhead for the long-range Shihab-3 missile.[157] That report was compatible with a nearly contemporary analysis, observing that the wide inaccuracy of the Shihab-3 indicated its adequacy as a biological warhead-carrying missile.[158] Also, the Shihab-4 was thought to be able to carry a bacteriological warhead.[159] Coincidentally, Iran may have since then acquired the production technology to make dry, storable, and aerosolized or encapsulated biological warfare agents. This would permit it to develop suitable missile warheads and bombs, as well as covert devices filled with those agents.[160] At about that time (1999), parts of Iran's biological inventory had probably taken operational shape.[161] Subsequently, significant progress was made so that, at the present, serial weaponization of biological warfare agents is being carried out. The Iranians are nearing complete independence regarding the technologies related to BW.

Eventually, Iran probably deployed BW, which it could deliver via terrorist saboteurs, aerosol tanks mounted on aircraft or ships, or via missiles.[162] Thus, taking heed of the entire BW spectrum, Tehran did not ignore their importance in the context of terrorist actions; it equipped itself with micro-warfare means destined to employ biological agents by on-spot spraying and by contaminating water systems. Given that Iran possesses various BW—including specific instrumentation designed for guerilla operations—former CIA director R. James Woolsey described the Hezbollah as a potential tool for biological terrorism. That threat has been heightened, and is particularly realistic, because the Hezbollah is directly supported and encouraged by Iran.

Quite recently, the Iranian opposition group, Mujaheddin-e-Khalq—the first to expose the country's massive secret nuclear facility, built near the town of Natanz to make weapon-grade uranium—cited informants inside the Iranian government, and broadly referred to Tehran's BW program. Asserting that an endeavor to triple the magnitude of that program commenced clandestinely in 2001, it pointed out that stockpiled anthrax-filled weapons constitute the first fruits, while at least five additional pathogens—including smallpox, plague, typhoid, cholera, and aflamycotoxin—are actively being worked with toward serial weaponization. An extremely extensive, diffused, camouflaged system carrying out the overall Iranian BW program was described.[163] The information included continues to be regarded as basically valid. The group's report largely corroborates the information provided herein, and its contents have been mostly supported by acknowledged intelligence observers.

DEALING WITH THE THREAT

The last twenty years have been fairly dynamic regarding Iran and CBW. The significant period began in 1982 with Iraq's undisturbed infliction of CW

upon a vast number of unprotected Iranian military forces—plus civilians, later—during the Iran–Iraq War. At that time, Iran was virgin, in terms of CBW programs. Many analysts have suggested that this was the factor that hampered Iran's military superiority, at large, and led to the end of that war. At any rate, Iran quite naturally turned to exploring the configuration and utility of CW, starting with the aborted Iraqi chemical munitions it had captured.

The impact of Iraq's continued employment of CW, definitely a milestone, certainly brought about the initiation of an Iranian counter-program in the mid-1980s. Sporadic Iranian use of captured Iraqi chemical munitions against Iraqi forces preceded the start of Tehran's own program, and was instrumental in comprehending the physical structure, chemical content, and operational mechanisms of those munitions, particularly in their conversion by Iran from abortive into workable ones. Also, thousands of Iranians were bearing various chemical agent lesions, about which much was then learned profoundly, in terms of symptomatology, pathogenesis, lethality, treatment, recovery, and long term effects of chemical warfare agents. Those agents included the blistering mustard war gas, as well as the nerve-agents, tabun and sarin, recurrently employed by Iraq. A vast amount of valuable knowledge was thus gathered and accumulated by Iran. Ironically, that chapter of the work was, then, a very effective lesson for, and birth pangs of, the forthcoming Iranian CW program. Moreover, that chapter was and still is a key factor—a rather traumatic one, in a sense—within the strategic platform underlying Iran's ongoing CW program. Almost legitimately, at that stage, Iran's widening acquaintance with the CW that hit its people led to its initial adoption of the simplest WMD—chemical armament. Relying on basic chemical processing, Iran then acquired its first self-made CW—phosgene, cyanide, and the more complex compound of sulfuric mustard. Mainly duplicating the captured Iraqi chemical munitions, Iran's pioneering CW experts weaponized simple toxic materials into unsophisticated artillery shells and aerial bombs. On a small scale—incomparable with Iraq's massive employment of CW—those Iranian-made chemical munitions found their way to the Iranian-Iraqi battlefield.

So far, so reasonable; yet, two Iranian moves reflected seeds of impropriety. One was the announcement by President Rafsanjani that CW is incompatible with the principles of Islam, and is therefore categorically not to be used—especially by Muslims against Muslims—while those weapons were simultaneously used by Iran against Iraq. Another contradictory move was granting a Libyan request for CW for use in Chad. In retrospect, those specific moves signified the birth of a gap between image and reality, and of a cryptic menace. They would certainly have been forgotten by now, if not for Iran's increasing perseverance.

Presently, they have culminated in Iran's denial of any quest whatever for WMD, and its possible supplying of chemically loaded ballistic missiles to Libya. A sharply reflecting course was the overwhelming propaganda conducted by Iran against the companies—especially German ones—that massively contributed to the Iraqi CBW program, while at the same time exploring ways for utilizing those very same companies in favor of the rising Iranian CBW program.

Syria has been mobilized for that mission as well, with well-established experience in camouflaging technology procurement from extraneous—chiefly German—sources, in addition to laboratory and industrial-scale production capacities, weaponization, field-testing and storage. Existing Syrian connections with foreign private technology suppliers, mainly West European, have thus been extended, so as to meet Iran's evolving needs. The same principle could likely have been applied with respect to institutionalized or semi-institutionalized assistance afforded to Syria and Iran by Soviet (and later Russian), Chinese, and North Korean sources. At that stage, the second half of the 1980s, Iran was considerably dependent on Syria's cooperation, and indeed gained it. The two Moslem countries—though differing largely from each other—gradually reached common, profound understanding as to their desired strategic augmentation, both ballistic and unconventional. Their Eastern orientation, together with their perception of Iraq (at that time, at least) plus Israel as rivals, and Lebanon as a platform, fueled the process. Though distantly situated, Libya enthusiastically joined, to an appreciable degree, the Iranian–Syrian connection. Beyond the boundaries of the Middle East, yet still within the Moslem block, Iran wove strong ties with Pakistan, a distinct regional power, mastering advanced WMD and ballistic technologies.

The Threatening Axis

President George W. Bush's "axis of evil" includes Iran, along with Iraq and North Korea. Though not cooperating as a solid triangle, Iran, Syria, and Libya are interacting, particularly in the realm of WMD and ballistics, as well as terrorism. More than any other conglomerate in the Middle East, this alliance is marked—subtly, yet soundly—by far-reaching understandings with regard to those strategic arms.

Assuming or calculating that Syria may facilitate and amplify a future Iranian nuclear threat—primarily, though not solely against Israel—while an Iranian nuclear umbrella is furnished to Syria, Tehran has apparently adopted such a secondary consideration to fuel its nuclear quest. At any rate, the realization of that quest would lower, the threshold of CBW deployment and employment by Iran, Syria, and other Arab countries.[164] Moreover, Iran is likely to reckon Syria as its most appropriate strategic ally among the states bordering Israel. Thus, during any future

confrontation with Israel, Syria—along with the Hezbollah, under Damascus's encouragement—would allow direct contact with Israel; be an agency for regional and international terrorism; and serve as a fortifying factor, in terms of deterrence, threat, platform, attacking force, and actual frontline. Accordingly, Iran consistently fosters its bonds with Syria in both senses: strengthening Syria's chemical and biological, in conjunction with ballistic, capabilities, and supporting the Hezbollah. That support may include CBW.[165] One ostensibly marginal expression of the Iranian–Syrian–Hezbollah conglomerate has long been the aggressive narco-terrorism conducted against Israel and other states by the Hezbollah, sponsored by the Iran-Syria nexus.

Absorbing cardinal lessons concerning its neighbor, i.e., Iraq's military suppression and inspection by the UN, Iran appears to have crystallized a particularly subtle strategy with regard to WMD. One aspect comprises its determined pursuit of WMD; the other is its unwillingness to disclose the programs aimed at realizing this pursuit. In order to follow that paradoxical strategic equation, Iran carefully adheres to three basic and delicate measures:

(a) Implementing programs (chemical, biological, and nuclear) through modes unrevealing of anything that might give rise to a vulnerability with respect to the identity of involved individuals, institutions, facilities, installations, components, ingredients, and technology suppliers.
(b) Cultivating a vivid image of a nonproliferating state through diversified, multilayer diplomatic activities, while simultaneously trying to shape agreed formulations that would enable it to guilefully get around conventions and still benefit through being a party to those very conventions.
(c) Bringing out its evolving ballistic capabilities, calculating that the capacity to deliver chemical and biological warheads is, at any rate, a well-known attribute of the derived strategic power, and manifesting the existence of its anticipated nuclear weaponry only in due time.

Iran's notably increased diplomatic activities during the years 1989–1992 toward the final crystallization of the CWC are compatible with those approaches. Moreover, Iran's diligence in that sector reflects a basic principle: preciseness is vital, indeed, so as to be perfectly aware of what is forbidden and, equally, of what is permitted. By demanding unambiguous formulations with reference to prohibited entities, Iran may readily refine those inverse entities that are not disallowed.

As to CW, Tehran realized that an effort to deny running an offensive, evolving program during the second half of the 1980s would be entirely abortive, resulting in a significant, mostly undesirable, international discrediting of its image. Therefore, it challenged its trackers to disprove its declaration of having totally destroyed its CW arsenal and terminating its CW program, assuming that such a task might not be achievable. Yet,

the unexplainable inconsistency marking Iran's overall activities and declarations regarding its own CW program until acceding to the CWC unavoidably leads to an extrapolation that Tehran still adheres to that approach. Such a conclusion relies on evidence pertaining to the period of Iran's participation in the CWC.

In general, a nation acceding to a convention which prohibits the possession of an unconventional weapon, while, in actuality, having this weapon, may act according to one of the following alternatives:

- Start (or continue) at once to eliminate the inventory of the concerned weapon (as did the U.S.);
- Retain the existing inventory (until a program for eliminating it is worked out and begun, as did Russia);
- Proceed with proliferation, or retain offensive capabilities, covertly.

Iran joined the Biological Weapons Convention (BWC) in 1972 and ratified it in 1973, not having, at the time, any BW program. That move was fairly straightforward, though later, during the 1980s, Iran undertook a BW program of its own. Yet, joining and ratifying the Chemical Weapons Convention (CWC) was rather complicated. The chronology—signing in 1993 and ratifying in 1997—was, presumably, not casually determined. Iran is likely to be meticulously considering its options during the ten years it is allowed to retain CW, while perhaps seeking an extension at the end of the period. (It would probably not be the only nation doing so.)

The fact that most Muslim nations are full members of the CWC and BWC is misleading, because more than half the Islamic states plainly do not have, and do not intend to have, CBW. And most possessors are not full members. Iran, a major possessor, is a full member, but its status is distinctly a case of well-orchestrated camouflage. Meanwhile, a non-possessor, Lebanon, has intentionally refrained from membership, so as to allow the deployment of CBW by Iranian or Syrian forces in Lebanon, if and whenever needed.

Cheating as a Foundation

Nonetheless, in July 2001, during a briefing at the White House, a senior Bush administration official remarked, "Iran has an offensive BW program. Iran would not be signing a document that prevents her from cheating."[166] Though put forward bluntly, that statement might quite soberly reflect, in effect, the entire story of Iran's WMD paradigm.

A salient characteristic of Iran's strategic philosophy is that its pursuit of full indigenous technological capacities—namely total independent production—is of virtually the same intensity as its quest for CBW. That

is a sober approach, indeed, particularly for a partially condemned developing country like Iran, which is not at all inclined to give up its CBW programs.

Iran is doing very well, then, in getting its most significant assistance from countries mastering key technologies. Lately, an increase has been evident in the importance of the aid to Iran's chemical-biological efforts which it receives from China, Russia, North Korea, Pakistan, and South Africa. The partnership between Iran and Syria, along with North Korea, sets forth a very powerful strategic linkage indeed, especially in the area of unconventional weapons. At the same time, extensive help is still coming from German firms, mainly the same firms that previously helped Iraq. Thus, Tehran's general geostrategic orientation, and its WMD technologies in particular, rests on three principal aspects:

- Timing a partial shift from Western technology suppliers to Eastern ones;
- Balancing and integration of technologies procured mainly from Russia, North Korea, China, and Pakistan;
- Maintaining fertile interfaces with other Middle Eastern Moslem anti-western states and enemies to Israel, namely Syria and Libya.

The crucial link in coping with both intelligence monitoring by Iran's adversaries and efforts by Tehran to attain strategic supremacy in the region is its technological ability to covertly couple its ballistic missiles with undetectedly-prepared warheads containing effective chemical and biological warfare agents. While such concealment is essential so as to minimize its political and physical vulnerability, it is nevertheless a liability in the event Iran chooses to disclose its quest (or even possession) of CBW-carrying missiles as a means of projecting a deterrence or power projection. Disclosure could thus become a means of enhancing its deterrence capability, letting potential adversaries know of its previously undeclared CBW components. Its current action in publicly acknowledging acquisition of ballistic missiles, ostensibly tipped with merely conventional warheads, is the initial step in moving along that line.

Iran might also employ CBW retaliatively, in the event its WMD or nuclear facilities are attacked, especially if such an assault might lead to leakage of hazardous pollutants. In August 2004, Iran's defense minister Vice Admiral Ali Shamkhani warned that his nation might resort to preemptive strikes to ward off any attack on its nuclear facilities. He told Al-Jazeera television: "We will not sit to wait for what others will do to us."[167] And General Mohammad Baqer Zolqadr, a commander of Iran's Revolutionary Guards, referring to Israel's 1981 attack on Iraq's nuclear facilities at Osirak, stated: "If Israel fires one missile at [the] Bushehr atomic power plant, it should permanently forget about the Dimona nuclear center, where it produces and keeps its nuclear weapons."[168]

IRAN'S PANORAMIC OUTLOOK

Strategically and geopolitically, Tehran's regime has featured, beneath the surface—and beyond a recent, partial nuclear inspection regime—a consistent, broad, coherent worldview since the onset of the Islamic Revolution. Its approach regarding WMD, though cardinal, is but a sensible corollary. So far, increased Western interference with Iran's nuclear program has not interrupted its CBW programs.

Tehran's perspectives, both regionally and globally, are perfectly compatible with the notion of a grand Islamic destiny, with the WMD component a vital derivative. As the head of Israel's military intelligence—the leading analysis agency in the Israeli intelligence community—recently stated: "Iran is determined to conduct a line of attrition-in-stages against Israel, aimed at wiping out the state of Israel. For implementing that goal, Iran is first and foremost developing unconventional weapons capabilities and surface-to-surface missiles."[169] That is the very essence of Iran's regional perception; other regional features are secondary.

The United States constitutes an equivalent element within Iran's global perception. Though apparently not a target for large-scale destruction, the U.S. mainland looms as the maximal range of the Iranian ballistic missiles under development. The middle-range toward NATO states has not been ignored. Not by chance, then, is Iran diligently developing a full spectrum of CBW, ranging from sabotage and guerilla warfare by toxic and infective materials, to intercontinental ballistic missiles tipped with CB warheads.

The prognosis of Iran's CBW programs is plain in its principles and complex in its texture. While the initiation of Iran's CBW programs is perfectly understandable, if not legitimate, stemming from the recurrent brutal infliction of chemical blows by Iraq, their continuation is concealed and tainted, particularly in view of Tehran's acceding to international control conventions.

The attempt to objectively gauge the essence of Iran's policies requires comprehension of the total sequence of events and developments since the very start of Iraq's employment of CW against the Iranians in the 1980s Iraq–Iran War.

Moreover, Iran is fully aware of the fact that the question of nuclear weapons is crucially meaningful with respect to CBW. Iran's procurement of offensive nuclear capabilities would remarkably lower the threshold for deploying and employing CBW by itself and Arab states, with little fear of nuclear retaliation. Iran, Syria, and Libya would thus feel free, relatively, to employ CBW, in the belief that they are protected from nuclear counterstrikes, while willing to absorb a chemical or a biological attack. Unlike Iraq's Saddam Hussein, who failed to launch missiles armed with

chemical or biological warheads after having sent conventional missiles against Israeli cities, Iran would not refrain from doing so. Were Iran to be equipped with nuclear weapons, striking a chemical-biological blow against Israeli or other targets would be considered even more of a primary goal more than it had been for Saddam Hussein. The consequences of the U.S.-led invasion and occupation of Iraq have likely intensified Tehran's CBW programs, rather than undermined them.

While Iran's ballistic developments are more or less transparent with respect to conventional warheads, WMD-oriented activities remain completely inaccessible. Concurrently, as of late 2004, its nuclear sphere was ostensibly controlled or at least monitored by the IAEA. Though certainly bothering the Iranian regime, both diplomatically and practically, the UN's control measures have been far from adequate, and the upshots discouraging. Even subsequent to the revelation of Iran's hidden nuclear enrichment facilities, and the uncovering of a widescale Iranian–Pakistani–Libyan nuclear nexus, Tehran's tainted maneuvering did not cease.[170] And, though presently somewhat less worrisome, but totally uncontrolled, its parallel CBW sphere remains perfectly concealed.

To this point, Iran is successfully, though not safely, paving the road toward its desired strategic horizon. The extent and depth of intelligence gathered about its operations exceed what Tehran had envisioned. But Iran's leadership intends to cope with those fractions of incriminating intelligence, and constantly try to refrain from relapsing mistakes or faults. But Iran can scarcely succeed alone, since its interfaces with foreign technology suppliers are monitored. That is a main reason for Iran's efforts to become completely independent of external assistance. For the time being, however, the subtle, fragile interplay of international exposure and Iranian camouflaging continues unabated. And Iran has taken a strong stance in trying to ward off a preemptive attack on its facilities.

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LIBYA: THE FIRST REAL CASE OF DEPROLIFERATION IN THE MIDDLE EAST?

Dany Shoham

Following its announced renunciation of its WMD programmes in December 2003, Libya has submitted complete initial declarations to the OPCW and IAEA, and the corresponding inspection regimes have now been applied. These confirmed what had generally been assumed, namely that Libya had managed to manufacture chemical weapons (CW) in industrial quantities but was not yet capable of producing nuclear weapons. They also answered questions about its biological weapons (BW) capabilities, about which much less had been previously known.

This study attempts to comprehend the essence of this exceptional shift in Libyan policy, and to compare the nature and level of the different WMD capabilities that Libya has now revealed with what the world thought it had. It also looks into the wider various implications of the Libyan action to the tangled Middle-Eastern arena of WMD de-proliferation.

Chemical Weapons

As uncovered and declared, the CW stockpile consists of approximately:

- 23 metric tons of mustard gas (reportedly produced a decade ago);
- some 3500 artillery shells and aerial bombs to be filled with this chemical warfare agent on short notice;
- 1300 metric tons of precursor chemicals needed to produce nerve gases;[1]
- two CW storage facilities;
- one inactivated CW production facility (located at Rabta) - namely, a dual-use capacity to produce mustard gas and nerve agents, along with equipment in storage that could outfit a back-up CW production line to reinforce or replace the Rabta facility;
- 14 filing boxes filled with documents, including a reference to the German-built ostensible pharmaceutical facility at Rabta.[2]

No filled munitions have been declared or found.

In March 2004, the OPCW inspectors verified through continuous on-site monitoring the complete destruction of Libya's entire declared stockpile of unfilled munitions. Libya has provided an outline for destruction of mustard and all production facilities with the final destruction to be completed by April 2007. Although Libya can seek expertise and financial support from other Chemical Weapon Convention (CWC) member states, it is expected to pay for the disposal itself. Which techniques are used to implement such disposal - incineration and/or neutralisation - will take into account levels of required expertise and environmental pollution.[3]

Libyan past preparedness to manufacture nerve agents was addressed by the Head of OPCW, Rogelio Pfirter, in March 2004: "I think they were pretty close to producing nerve gases. I'm not sure they were in a position to produce them, but we need to look more thoroughly into the declaration for that."

Closer scrutiny of the documents provided by Libya should also shed more light on the status of the country's CW production, but it is believed that the programme has been dormant for some time. Pfirter added that, "The actual production of chemical agents was inactivated sometime in the early 1990s. But in as much as there were CW, there were the bombs to deploy them. I would say the programme should be considered to be alive. But the bombs were destroyed in the last few days. So the immediate danger has in a way been diminished."[4]

Generally, the above detailed findings, declarations and remarks were rather unsurprising. It is fairly compatible with the following data known previously, namely:

Procured precursor chemicals (obtained mainly from West European and Far-Eastern firms):

- 60 tons of phosphorus-trichloride;
- 20 tons of dichlorethane;
- unspecified - yet industrial - quantities of: thionyl-chloride, thiodiglycol, ethylene oxide, dimethylamine, sodium sulfide, sodium-fluoride, and pynacolyl alcohol.

Those chemicals are used for the production of mustard and nerve gases. Pynacolyl alcohol is a straightforward precursor for synthesizing soman, a

notably advanced nerve agent. Iran reportedly provided Libya with extraneous CW supplies, which were possibly those used against Chad.

Equipment:

- Production line for mustard gas synthesis;
- Glass-lined vessels designed to contain corrosive chemical reactions, and ancillaries - mainly for synthesis of nerve agents.

Facilities:

The Rabta complex[5] was founded in the 1980s as a so-called 'Technology Center' by an Iraqi specialist, Dr. Ihsan Barbouty, an architect by profession, with large European-based companies, already serving the Iraqi CW programme. Rabta included a war gases production plant, camouflaged as a pharmaceutical project and built by Dr. Urgen Hipenstil Imhauzen, a German chemist owning the firm *Imhauzen Chemei*. In addition, a CW munitions factory was built at the Rabta compound, separate from the chemical warfare agent plant. Japanese firms assisted with its construction. US officials learned that Japan Steel Works was building Rabta's metalworking plant. The facility housed precision machines capable of turning out artillery shells plus aerial bombs, as well as corrosion-resistant containers for chemical warfare agents.

In 1994, another underground wing was constructed in the Rabta compound, intended to develop and manufacture CW. This time, the main project constructor was a German mechanical engineer, Roland Franz Berger, who had been living in Libya since 1973. It is believed that tens of tons of sulphur mustard were produced in that facility, before it was converted, ostensibly, for civilian purposes. In 1990, American and German intelligence sources claimed that Libya had synthesised approximately 30 tons of mustard gas at Rabta.[6]

Later, two additional facilities, located in Sebha and Tarhunah, were constructed, believed to contain further installations for the Libyan CW programme. The site of Sebha was picked because it already housed strategic installations for the development and production of ballistic missiles. The Tarhunah facility reportedly aroused an intensive political confrontation with Tripoli, though the reasons for this have not yet been fully deciphered.[7]

The Rabta chemical facility is now described as an "inactivated chemical warfare agent plant," while the two uncovered "CW storage facilities" are

probably located in or close to two of the three compounds mentioned. The mustard stock found in Libya was manufactured at the Rabta chemical factory, and the aerial bombs in the Rabta metalworking plant. The mustard, the bombs and the precursor chemicals (some of which were already utilised for mustard production) were housed in the identified storage sites.

There are some incompatibilities - possibly now insignificant - regarding other chemical warfare agents included within the Libyan CW programme (beyond mustard manufacturing). Libya was thought to have carried out research to produce two nerve agents, sarin and soman.[8] Another nerve gas, tabun, and another blistering agent, lewisite, have been mentioned elsewhere.[9] According to a Russian source, Libya has manufactured mustard gas, sarin, and phosgene.[10]

Biological Weapons

Libya declared the existence of a past research programme to develop and produce BW, and the procurement of dual-purpose biological essentials. Apparently, no specific BW facilities were explored following the declaration. Those British and American specialists who were invited to Libya found no concrete evidence of an ongoing BW-related effort. The team was given access to medical and pharmacological scientists and facilities, and Libyans were questioned about equipment and research that could be applied to biological warfare. But the Libyans denied that their BW programme had ever reached an operational state.[11]

Earlier reports had indicated that during the 1980s and 1990s Libya attempted to establish a BW infrastructure in the form of some masked projects, the main location apparently being at Taminhint (a small town northwest of Sebha in south central Libya).[12] Those masked biological projects included, chiefly: general health laboratories, a health research center; and a microbiological research center. Several supporting facilities have been involved: an institute of technology; Brack Biotechnology Research Centre, Tajoura; Tripoli and al-Fattah universities.

Also, during the 1990s, a secret project, code-named "Ibn-Hayan," aimed to produce bombs and warheads filled with anthrax and botulinum toxin. It was led by top Iraqi BW experts, who had left Iraq due to the UN inspections, and had been allowed by Saddam Hussein to assist Libya. The project was directly linked to the Libyan presidency bureau and a number of organisations, including universities and laboratories attached to the ministries of agriculture and health, were engaged in making ostensibly innocent purchases of dual-use diagnostic and laboratory materials.

Reportedly, mobile equipment designed to produce biological warfare agents through the maintenance of a constant sterile environment, were purchased, primarily from China, India and Serbia.

US officials have noted that Libya was especially interested in advancing its BW programmes. Assistant Secretary of State Carl Ford said there was evidence of Cuban exports of dual-use BW technology to Libya and other countries in the Middle East. Besides, several Indian and Pakistani specialists were apparently helping the Libyan biological effort to bring about some tangible advance. It is not known whether progress was achieved, but the US Undersecretary of State for Arms Control and International Security, John Bolton, accused Libya of operating a clandestine BW programme, and Russian intelligence indicated that Libya has been "engaged in initial testing in the area of BW."[14]

On the whole, it is fairly clear that concerted efforts were made to develop and implement a BW programme and that for certain periods this was a high priority. While it seems to have been less productive than expected, there is a lack of published information on that subject, in particular on the Ibn-Hayan project, so more revelations might still emerge.

Nuclear Weapons

In recent meetings with the IAEA, Libyan officials explained that Libya had imported natural uranium, centrifuges and conversion equipment, and constructed pilot-scale centrifuge facilities. According to the Libyan representative to the IAEA, these centrifuge facilities have since been dismantled. He stated that his country's enrichment programme "was at an early stage of development and no industrial scale facility has been built, nor any enriched uranium produced." However, upon inspection by several teams of UK and US intelligence officers, one officer noted, "They had centrifuges turning and were making enriched uranium... This was a serious programme, and one that was not bought off the shelf."[15] So, what underlies this intriguing discrepancy?

The most significant nuclear facility in Libya is Tajoura Nuclear Research Center (TNRC). Established in 1982 with the help of the USSR so as to "solve problems of economic significance to the country via peaceful application of atomic energy," its heart of activities is the Soviet-designed 10MW IRT pool-type research reactor, used for isotope production and nuclear research. In addition to this reactor, TNRC houses a "critical facility," which presumably includes a critical assembly, a neutron generator complex, and a TM4-A Tokamak fusion reactor. Other facilities at TNRC

include radiochemical laboratories, complete with equipment for the production of isotopes, and nuclear metallurgy laboratory.

Additional notable installations, though of secondary importance, include a Russian 50-to-100 kV electron microscope, a US Instron device for measuring material stress, a physical research facility, which is comprised of laboratories for nuclear physics, solid-state physics, neutron physics, material sciences and engineering, radiation biophysics, mass spectrometry, activation analysis, and physical research using the neutron generator.[16] Further to its research laboratories, TNRC is equipped with support facilities, such as electronic workshops, machine shops and test laboratories. Most installations are well maintained.

Beginning in the 1980s and lasting throughout the 1990s, Libya managed, very gradually, to build pilot-scale centrifuge facilities and to experiment with uranium enrichment technologies. A quantum leap occurred in 1997 when, following a meeting between Pakistan's top nuclear scientist, Abdul Qadeer Khan, and Libyan officials, partly processed uranium was shipped directly to Libya by means of a global nuclear trading network headed by Khan.[17]

Many deliveries of nuclear components to Libya followed. Middlemen and engineers in Turkey, Germany, Switzerland and Britain, as well as Kazakhstan, Dubai and Malaysia, were also closely involved in the clandestine effort. In 2001, for example, a shipment carried on a Pakistani airplane provided Libya's secret programme with an enriched uranium (hexafluoride) fuel stock, as well as the designs and equipment to make a nuclear bomb. A number of complete high-speed stainless steel centrifuges were also flown to Libya direct from Pakistan over the course of the next year. The centrifuges were possibly P-1 models, based on a design stolen by Khan from his former Anglo-Dutch employers, URENCO, in 1975.

A further major undertaking, called Project Machine Shop 1001, aimed to build a manufacturing plant in Libya capable of making centrifuge components that could not be obtained from outside the country. Peter Griffin, a British engineer who first began working with Khan in the early 1980s, provided the plan for Machine Shop 1001 and a lathe. Machines for the workshop came from companies in Spain and Italy. Griffin also arranged for seven or eight Libyan technicians to go to Spain for training in operating some of the machines. A Spanish company had supplied sophisticated tools that were needed for the repair and maintenance of nuclear centrifuges. A Turkish company supplied aluminium castings, and another electrical cabinets and voltage regulators.[18] In parallel, two tons of raw uranium

(hexafluoride), intended for enrichment in Libya and perhaps for use in a single nuclear warhead, were supplied by North Korea.[19]

Lately, the most critical components were shipped out of Tripoli to the US, including more then 4,000 advanced centrifuges and the drawings Khan sold. Thanks to this technology, though still far from a fully operational state, the Libyan nuclear programme was more advanced than previously thought. As late as 2003, in parallel to the Libyan-American-British discussions, Libya and Egypt exchanged nuclear (and missile) technologies.[20] Once again, this shows that the IAEA's basic safeguards regime required under Article III of the NPT was far from adequate.

Libya's Patterns of Proliferation

Technologically, in terms of genuine domestic capabilities, Libya is the most backward state in the Middle East. Yet, unlike any other Arab country, it had strong bonds and strategic cooperation with several WMD possessors in the Middle East and beyond - namely Iraq (until recently), Iran, Syria, Egypt, Sudan and Pakistan. As a result - and in conjunction with additional, chiefly European techno-scientific contributions – Libya's WMD programme may be read to have constituted a singular, unique melting pot of multiple CBW essentials. Without this, since Libya's own input was slight, it is unlikely that it could have developed any significant WMD programme.

Libya's patterns of proliferation are not of recent origin. Twenty years after gaining independence, Libya acceded to the 1925 Geneva Protocol in 1971, while its powerful neighbour, Egypt was engaged in a serious programme to develop CBW. Tripoli acceded to the BWC in 1982, even as it held open its BW options, though it did not appear at that time to have ambitions to acquire its own CBW. Its ratification of the BWC only took place in 2002, consequent on problems arising from the unsolved anthrax letters in the United States. When the CWC was concluded in 1992, Tripoli dragged its feet over joining - thereby retaining solidarity with Syria and Egypt against Israel and keeping its options open.[21]

Disregarding his treaty obligations, Gadafy decided to acquire WMD despite progress being slower than he wanted. Libya's high dependence on foreign technological support and other geopolitical drives and considerations made it possible for the West to constrain efforts to attain WMD capabilities. Nevertheless, thanks to the indifference displayed by a lot of Western European suppliers, as well as increasing help from Eastern and Muslim states, Libya was able to make significant progress.

Libya's change of policy appeared to have begun in 1990, when it forwarded a letter to the president of the Geneva Conference on Disarmament, calling for "the adoption of far-reaching measures for the elimination of chemical, biological and nuclear weapons and the destruction of the stockpiles of these weapons in order to protect mankind from their dangers and preclude any possibility of their use."[22] Yet, in reality, Libya's own WMD endeavours did not decrease at all. Moreover, since 2001, Libya made intensive use of its secret services to try to obtain advanced technical information on the development of WMD.[23]

The US and UK regarded Gadafy as unbalanced and a permanent adversary, against whom they adopted an informal WMD counter-proliferation regime (though the British Department for Trade and Industry (DTI) turned a blind eye as companies like Peter Griffin's Gulf Technical Industries (GTI) continued to supply proliferation-sensitive equipment and technologies). Other important technology suppliers like Germany, Italy, Japan and Thailand were rather reluctant to participate, preferring to ignore the ongoing interplay between their private companies and Libya. Libya's backwardness provided a good pretext for preserving that interplay, which the Libyans disguised through essential, gigantic civilian projects.

Libya, for its part, continued to demand the "dismantling of the WMD that the Israelis have... Otherwise, the Arabs will have the right to possess those weapons,"[24] while hypocritically denying that it was trying to obtain WMD. Libyan Foreign Ministry official Hasuna al-Shawish called on US Undersecretary of State John Bolton to provide evidence for his claim that Libya was seeking WMD.

The Libyan Shift: claims, justifications and reactions

The most recent shift - or drift - in Libyan policy began in October 2001, when Musa Kusa, director of Libya's external intelligence, arrived in London for talks with MI6, the British secret intelligence service, and members of the CIA.[26]

Surreptitious, high level diplomatic and intelligence interactions continued, leading to a series of exploratory visits to various Libyan installations supposedly involved in WMD acquisition. In August 2003, for the first time Gadafy publicly announced that he was willing to allow international biological and chemical inspectors to visit Libyan sites.[27] Visits commenced in October 2003, just a few weeks after US and British intelligence services discovered that a freighter bound for Libya was hauling thousands of parts

for specific centrifuges - a key component for producing nuclear weapons. Whether the interception of the cargo, worth tens of millions of dollars, was a consequence or a cardinal factor in Libya's decision to give up its deadliest weapons programmes, has yet to be determined.[28] There is some speculation that it was subsequent US threats, rather than the lengthy British and American diplomacy vaunted by Tony Blair, which really sparked Gadafy to abandon his WMD ambitions.[29]

Further visits to Libyan WMD-related facilities were undertaken in December 2003, lasting for four weeks. The head of Libyan intelligence and Gadafy's own son, Saif Aleslam, were the main Libyan figures engaging with MI6 and the CIA during this period. According to a US source, "The Libyans were quite open. They provided access to facilities. They provided substantial documentation about their programmes. And we were able to take samples, photographs and other evidence."[30]

This act of deproliferation attracted enormous attention worldwide. The motives and incentives for Gadafy's move were subject to a variety of interpretations, ranging from Libya's innate goodness to rumours that Gadafy had been diagnosed with throat cancer and had two years to live.[31]

The Libyan regime offered different explanations. Prime Minister Shokri Ghanem contended that deproliferation "is in the interests of the Libyan people and in the interest of the whole world community."[32] He later added: "WMD are very costly. It's better that we concentrate on our economic development."[33] Gadafy himself, in an exclusive interview with CNN, acknowledged that his country "had certain WMD programmes and machines," and yet that "we have not these weapons," adding that the programmes he is prepared to dismantle "would have been for peaceful purposes - but nevertheless we decided to get rid of them completely." It was also reported that the war in Iraq might have played a role in Gadafy's decision to dismantle his country's WMD programmes.[34]

Gadafy also called on other states to follow his dramatic example, by admitting involvement in banned weapons programmes, if they were to prevent "tragedy" from striking their nations.[35] A few days later, Libya's Foreign Minister, Abdel Rahman Shalgam, maintained at a news conference, "We didn't arrive to the point of weaponisation."[36] He then asserted that the Libyan step was a completely voluntary decision by the Libyan Popular Congress (parliament).[37]

Despite claiming Libya's deproliferation as a success, some in the US and Britain sounded notes of caution. Whilst promising, "As Libya takes

tangible steps to address our concerns the US will in turn take reciprocal tangible steps to recognise Libya's progress," President Bush added that the US had "serious concerns" about Libyan policies and actions, including its pursuit of WMD.[38] State Department deputy spokesman Adam Ereli said "It is a long process. We need to make sure that there is follow through on the Libyan commitments."[39]

In Britain, the Conservative Party's Foreign Affairs Spokesman, Michael Ancram, asked: "Do you really believe that with all the evidence of irrationality, dishonesty and totalitarianism, Gadafy can genuinely be trusted on this occasion?"[40] A senior Western diplomat said Libya still has to "show how serious it is. The real issue is whether the Libyans are prepared to have the kind of inspection regime that the US and Britain think is needed."[41]

Others were sceptical or looked for underlying motivations: "By pretending to eliminate WMD he does not possess, Gadafy has given a huge political bonus to Bush and Blair, a way for them to evade censure for shamelessly lying to their nations into the Iraq war."[42] Also: "By amazing coincidence, Gadafy's first message to Britain occurred just days before the invasion of Iraq. And his final capitulation to US-British terms occurred just five days after Saddam Hussein was fished out of a rat-hole."[43] Some even suggested that Libya's new disarmament overtures might be but a smokescreen for easier access to foreign technology.[44]

It is likely that a heterogeneous cluster of factors - political, diplomatic, strategic and personal - initiated and fuelled Libya's change of policy. Firstly, there was a desire to avoid another military confrontation with the US, which might now be sparked by Libya's pursuit of WMD as well as its support for terrorism. Gadafy had seen what happened to Saddam. Gadafy himself felt under threat from fundamentalist Islamic groups in Libya and wanted allies. Iran had come under increasing pressure over its nuclear programme and had agreed to sign the IAEA's Additional Protocol and undergo intrusive nuclear inspections. Libya's increasing need for economic recovery meant that US sanctions needed to be lifted. One may argue about the relative weight of each of those factors, yet all are likely to be contributory.

Conversely, the very multiplicity of causes may be indicative of incoherence and irrationality in the decisionmaking. Perhaps the answer boils down to Gadafy's personal realisation that Libya urgently needs substantial injections of technological equipment and know-how for its oil industry and oil-related economy. Having just celebrated his 34th anniversary in office, Gadafy perhaps wishes to revive some sense of political and economic

dynamism in order to reinvigorate his hold on power, particularly against domestic Islamist opposition. Only a friendly US can help him achieve these crucial goals.[45]

It looks as if Libya hid its change of approach even from its Middle Eastern allies, such as Syria and Iran. Likewise, the US and UK hid their contacts from NATO and Israel. Israel's head of military intelligence commented that "the contacts were extremely classified and in that case the US did not cooperate with us. To my best knowledge only five people in the US were involved."[46] As Prime Minister Sharon pointed at Libya's accelerated approach toward nuclear weapons, the US responded: "We handle this, and you should keep a low profile."[47] That attitude turned out to be expedient.

Libya's willingness to totally abandon its WMD programmes may make it a pioneer model in the Middle East. Conceivably, it may propel a Middle-Eastern chain-reaction of WMD deproliferation. Moreover, Libya announced it "will not deal in any military goods or services with states which Libya considers to be of serious weapons of mass destruction proliferation concern."[48]

One potential problematic question concerning the new situation - assuming that all the relevant WMD facilities and related assets have been uncovered - is whether their conversion is reversible and, if so, whether any future military-oriented reutilisation would be detectable? Although the Libyan move appears genuine those issues should still be addressed.

Conclusion

On the evening of September 11, 2001, Gadafy said, "Irrespective of the conflict with America, it is a human duty to show sympathy with the American people and be with them in these horrifying and awesome events which are bound to awaken human conscience... a heartfelt expression of sorrow, signalling that our two countries had reached a common recognition of the need to eliminate the dangers of international extremism and terrorism. While America's relations with most Arab nations teeter between tense and cautiously cooperative, Libya and the United States are coming closer together. Libya has moved steadily in recent years to eliminate the antagonism that has long divided us."[49]

As Western interest in the prospects for stability along the southern shore of the Mediterranean in general has increased, it has become fashionable among foreign and security policy elites and publics in Europe to refer to a new arc of crisis in the south.[50]

At the same time, Tripoli's African-oriented approach needs to be taken into account. Libya's recent accession to the CWC may undermine any efficacy the one-time Arab League policy opposing that treaty had retained. Gadafy has spent most of the last decade transforming his 'pariah state' into a political and economic leader in Africa, both above and below the Sahara. His desire to be a leader of the continent seems to have won out over any dedication to the remnants of Arab unity. The Pelindaba Treaty for an African Nuclear Weapon Free Zone was regarded as an important unifier in the wake of South Africa's renunciation of its nuclear weapon programme in the early 1990s. Two-thirds of African states have already joined the CWC. Although many African signatories have yet to ratify, there are only three non-signatory states besides Libya on the African continent (Angola, Somalia, and Sao Tome and Principe).[51] The desire to consolidate his African-oriented approach should not therefore be underestimated as a factor in Gadafy's political shift and renunciation of weapons of mass destruction.[52]

Many questions about Libya's WMD programmes persist. What was the nature of and progress made within the Libyan Ibn-Hayan BW project? What is the essence of the Libyan-Pakistani-Iranian nuclear triangular? And what was the fate of the Iraqi chemical-biological-nuclear assets, which in part endured mostly intact, until 2002? If Libya is really prepared to come clean about all aspects of its WMD programmes, answers to these questions should not be long in coming, and may provide further insights into the mechanisms and motivations of WMD proliferation.

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