# Chemical and Biological Weapons in Egypt and Libya

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Summary

Egypt has for long possessed chemical weapons (CW) and biological weapons (BW), and was unable to make much progress in the nuclear weapons (NW) domain, at least as yet, Qaddafi's Libya on the other hand produced CW, developed BW, neared nuclear capacity as well, eventually, but shifted to total deproliferation in due course.

Apart from South Africa, Egypt and Libya appear to be the most important countries in the African continent, in terms of Weapon of Mass Destruction (WMD) proliferation and deproliferation processes. While Egypt has for long possessed chemical weapons (CW) and biological weapons (BW), and was unable to make much progress in the nuclear weapons (NW) domain, at least as yet, Qaddafi's Libya on the other hand produced CW, developed BW, neared nuclear capacity as well, eventually, but shifted to total deproliferation in due course. This article is intended to outline the significant characteristics and milestones marking the two countries in those respects.

## Egypt

In historical perspective, Egypt was the first Arab country to equip itself with CW and BW. It was also the first to utilize CW (in Yemen in the 1960s). Egypt did not join the CW Convention (CWC) and the Biological Weapons Convention (BWC), and continues to maintain its chemical and biological capabilities. While frequently accentuating the essentiality of the Middle East being free of whatever WMD, Egyptian spokesmen often emphasized that the acquisition of CW and BW is necessary and completely justified, as opposed to Israel's nuclear and sub-nuclear WMD capabilities.[1]

That stance is as well valid presently. It traces back to the preparation for the international convention for the prohibition of CW (January 1993), and especially to its wake. The consolidation of a pan-Arabic approach was obvious - with Egypt in the lead - calling for withholding signatures from the chemical convention - and implicitly supporting the maintenance of an offensive chemical and biological capability, as is the

practice in Egypt itself - as long as a comprehensive ban on chemical, biological and nuclear weapons in the Middle East is not implemented. That posture is fairly understandable, in principle. Egypt's then Foreign Minister Amr Moussa, even stressed that this issue constitutes a main topic in the reorganization of the regional alignment in the Middle East. In January 1993, when the chemical convention was signed, President Mubarak was in Damascus, and together with Assad, called upon the Arabs to refrain from joining the convention.

Egypt cooperated with Iraq as well, foremost technologically, within that context. Until 1990, collaboration between Egypt and Iraq flourished, with respect to ballistic armament, CW and BW; shortly before the Iraqi invasion of Kuwait, Egypt's foreign and defense ministers rallied to the defense of Iraq's acquisition of CW and BW, apparently in anticipation of joint Iraqi-Egyptian benefit. The Iraqi invasion of Kuwait brought about an enormous geopolitical vortex, nevertheless.

On the basis of Egypt's vast expenditures, as far as its military buildup is concerned - in addition to its geo-strategic key position and persisting decision not to join the accords preventing the proliferation of CW and BW - it would seem reasonable to assume that this buildup does include CW and BW, particularly that NW are out of reach for Egypt, thus far.[2]

## Chemical weapons

The Egyptian acquisition of CW began in the early 1960s, and only barely preceded its implementation by the Egyptian Air Force in the Yemen war from 1963-1967. The primary facility is located in Abu-Za`abal (supported by neighboring insecticide and pharmaceutical plants), and secondary facilities are located in Abu-Rawash (the assembly point for filling aerosol cans) and adjacent to Beni-Suaif (an Air Force base). A primary research and development facility is located in the National Research Center in Cairo, and a supportive production line functions within the framework of the Egyptian company for Dyestuffs and Chemicals.[3]

Egypt first produced mustard (blistering gas) and phosgen (asphyxiation gas), which were also employed in Yemen. Subsequently, Egypt moved to producing psychotomimetic incapacitating agents, sarin nerve gas and later VX nerve gas. All these were manufactured in industrial quantities and were loaded onto land mines, artillery shells, aerial bombs, rockets (including cluster-tipped rockets) and finally onto missile warheads. After the Egyptian-Iraqi-Argentinian “Condor” missile programme was frozen, which was designed for chemical and biological armament from the Egyptian and Iraqi perspectives, Egypt turned to arming alternative missiles, and that armament effort has most likely been accomplished.[4]

Egypt conducted a national trial challenge inspection exercise on a chemical plant in its own country and reported on it to the Conference of Disarmament, without exposing the plant. The Egyptian representative noted in his report that “Egypt does not possess or produce CW”, although “the inspected plant is definitely capable of producing CW of all types” - a purposeful claim designed to create uncertainty and obfuscate the distinction between production capacity and actual manufacturing. In contrast, and at about the same time (1991), Egypt claimed that “in the past it possessed a large supply of CW, but at present its CW production is limited to that which is necessary to ensure defensive and deterrence capabilities”; in other words,

indirect Egyptian admission of the existence of CW in its possession and its production.[5]

### Biological weapons

In the early 1960s, Egypt embarked on an integrated CW and BW project which was code-named "Izlis". It was implemented in a military-civilian consortium located in Abu-Za`abal which includes a military installation numbered as 801, a civilian installation called "The Abu-Za`abal Company for Chemicals and Insecticides", and an additional civilian installation called "The El-Nasser Company for Pharmaceutical Chemicals and Antibiotics". The latter plant provides, in conjunction with its large-scale real civilian pharmaceutical and biotechnological activities, a cover for military activity in the field of BW.[6]

Egypt signed the BWC in 1972, but did not ratify the treaty afterwards. Incidentally, Egyptian president Anwar Sadat first announced the existence of BW in Egyptian possession in 1970, when he was still vice-president, and once again in 1972 when he was already president; “We have the instruments of biological warfare in the refrigerators”.[7] It seems that in the early 1970s, a decade after the BW project's inception, and after the massive stockpiling of operational CW and their implementation in Yemen, Egypt stockpiled biological warfare agents in operational quantities alongside the means to deliver them. While, the existence of CW in Egypt's possession was already a public knowledge, Sadat's statement acknowledged the regime's perspective on BW as an effectual means of deterrence.

Later on, Sadat[8] and his Chief of Staff[9] declared that Egypt possesses a genuine mass destruction capability which includes sufficient biological and CW, though not nuclear weapons. Indeed, throughout the 1970s, Egypt significantly intensified its activity in the field of BW, and during the 1980s, worked in close cooperation with Iraq in the development of biological warfare agents.[10]

A variety of biological warfare agents have indeed been researched by Egypt, including the germs causing plague, anthrax, brucellosis, and Q fever, encephalitis viruses, Rift Valley virus, botulinum toxin, mycotoxins and other pathogens and toxins; some of those pathogens and toxins were developed to the level of operational BW.[11] The biotechnological and biomedical infrastructures found in Egypt attest such accomplishment. A further dimension was added in the form of the highly pathogenic H5N1 avian influenza virus that became, uniquely to Africa, endemic in Egypt during the recent decade. Although entirely legitimate, the intensive and extensive coping with this virus, scientifically and practically, inevitably makes it a pathogen of military potential.[12]

Egyptian strategists, who have dealt with the issues relating to the Israeli-Arab balance of power, have repeatedly emphasized the importance of both biological and CW as vital components of Arab and Egyptian armament efforts. This understanding on the utility of these weapons still persists, concomitant with the lasting and relatively stable peace between Egypt and Israel.

## Libya

In comparison to Egypt, the case of Libya is much different. Libya represents the first case of a deproliferation process, which it voluntarily undertook, in December 2003. Indeed, there is are variety of factors - geostrategic, political and personal - that together propelled and fueled this

outstanding move conducted by Qaddafi, who for many years was one of the most radical anti-Western leaders who also sought WMD and supported terrorist activities of various hues. As a matter of fact, since the early 1980s, he persistently - though not very effectively - pursued WMD, chemical, biological and nuclear strategies, all at the same time.[13]

It so happened that this enduring course shaped by Qaddafi continuously brought about an opposing American-British endeavor aimed at hindering any Libyan progress in the WMD domain. Tirelessly and variedly being conducted, that endeavor eventually brought about the desired outcome, and Libya became fully committed to not just inspections and control but rather to a totally unlimited deproliferation process, pertaining to any item included or in support of its WMD programmes, in whatever place and sense.

At first, Libya let the US and British experts, and later on UN inspectors, explore any facility they wanted to. It declared, showed and handed over whatever it was requested to; equipment, material, munitions and documents. It fully cooperated so as to destruct stockpiles, components and other items. Moreover, it disclosed much information about its WMD-related technological interfaces with Iraq, Iran, Syria and Pakistan. Invaluable intelligence assets have thus been achieved.

Libya exhibited, at any rate, a degree of daring within that context. Increasing, indirect pressure was imposed upon Qaddafi during 2003, while his son and head of intelligence were having intensifying contacts with the US and Britain. Yet eventually, Qaddafi could equally choose to carry on with WMD procurement, and to disclose the WMD-oriented interfaces with Libya's Muslim sisters. His elderly soberness, however, apparently turned dominant, especially since he witnessed the fate of Iraq and Saddam Hussein.

Otherwise, Libya would very slowly - but consistently - make progress towards acquisition of biological and nuclear weapons, in addition to CW. Such development could have not been tolerated, and hence the preemptive efforts made by the US and Britain. If abortive, those efforts would leave Libya essentially unharmed, approaching its primary goal, one way or another. Earlier, Qaddafi had indeed emphasized many times that Libya had every right to equip itself with non-conventional weapons.[14] Notably, before having its own CW, in 1987, Libya employed CW supplied to her by Iran, against Chad.[15]

## Chemical weapons

*The Libyan inventory*

On January 6, 2004, less than three weeks after Qaddafi's 19 December statement on deproliferation, Libya deposited its instrument of accession to the CWC with the UN in New York. Thirty days later, on February 5, 2004, Libya officially became a state party to the CWC and was required to submit a complete initial declaration of its CW programme within thirty days.

The items declared and uncovered included;

- CW stockpile consisting of approximately 23 metric tons of mustard gas (reportedly produced a decade ago),
- Some 2000 artillery shells and 1500 aerial bombs to be filled with this chemical warfare agent on short notice (much more bombs were later revealed - detailed below),
- Two CW storage facilities,

- 1,300 metric tons of precursor chemicals needed to produce nerve gases,[16]

- 14 filing boxes filled with documents - some in Arabic, some in English. Two of the boxes carried a reference to the German-built ostensibly pharmaceutical facility at Rabta ,[17]

- One inactivated CW production facility; namely, a dual-use capacity to produce mustard gas and nerve agents, in terms of equipment in storage that could outfit a backup CW production line to reinforce or replace the Rabta facility. Beyond mustard manufacturing, Libya is thought to have carried out research to produce two nerve agents, meaning sarin and soman.[18]

Notably, the sole delivery system that Libya domestically devised for its stockpile of mustard gas was a 254-kilogram aerial bomb that was shaped to be carried on the external wing racks of a fighter-bomber. Each bomb had an explosive buster tube running down its central axis, surrounded by a hexagonal array of six cylinders. The cylinders were resized so that eight 1-liter plastic canisters filled with mustard agent could fit snugly inside. Thus, a single bomb held a total of 48 liters of mustard. When the bomb hit the ground, an impact fuse in the nose would cause the central burster-tube to explode, dispersing the mustard agent as a cloud of droplets and vapor. In peacetime, however, Libya stored the empty bomb casings separately from the stockpile of mustard agent, intending to fill the weapons prior to use. In addition to the 1500 declared aerial bombs, more than 2000 bombs were disclosed by the Libyans in actuality.[19]

*Facilities*

The Rabta complex was founded as a "Technology Center" by an Iraqi specialist, Dr. Ihsan Barbouty, an architect by profession, possessing huge European-based companies, already serving the Iraqi CW programme. It 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. Besides, a CW munitions factory was built at the Rabta compound, separate from the chemical warfare agent plant. For its construction, assistance was afforded by certain Japanese firms. 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 agents. In 1994, another underground wing was constructed in the Rabta compound, intended to develop and produce CW. This time, the main constructor drafted for the project was a German mechanical engineer, Roland Franz Berger, who had been living in Libya for a long time. Tens of tons of mustard were assessed to have been produced in that facility before it was converted, ostensibly, for civilian purposes. Many more details about the Rabta facility are available elsewhere.[20] Later, two additional facilities, located in Sebha and Tarhuna, were constructed, regarded to contain further installations for the Libyan CW programme. The site of Sebha was picked because it already housed strategic installations for development and production of ballistic missiles. The Tarhuna facility aroused an intensive political confrontation with Tripoli, while the latter was totally denying any link to CW. That cardinal discrepancy has not been fully deciphered.[21] Curiously, on April 6, 1996, Egypt announced that its consulate in Benghazi, Libya, had been attacked by unidentified gunmen, but declined to say whether the incident was linked to a controversy over Libya's alleged

construction of a CW complex in Tarhuna. "What happened was published in today's papers," Egypt's Foreign Minister Amr Moussa told journalists, referring to reports that two Libyan guards and one of the assailants had been killed in the attack; he declined to further elaborate. Most Egyptian newspapers said that the assault was the work of Muslim extremists who had begun to challenge Libyan Colonel Moamer Qaddafi's government. But the opposition Cairo Daily al Ahrar quoted observers linking this "blatant terrorist attack" with accusations against Libya made in Egypt earlier in the week by the US Defence Secretary William Perry. Perry said that he had briefed Egypt's President Hosny Mubarak on evidence that in Tarhuna Libya was building a huge underground CW plant that could be a threat to Egypt's national security. Perry also said that he could not confirm or rule out the possibility of military action to knock out the facility before its scheduled completion in about a year's time. However, he said that the US would exhaust peaceful means before resorting to any use of force. Mussa, who was reported to have undertaken an unannounced trip to Libya after Perry's visit, said that Egypt advocated "quiet diplomacy to reach a settlement and solve these problems". He added that Egypt "does not have any proof of the seriousness of the American accusation against Libya" nor "evidence to indicate the existence" of a CW plant. Libya says the underground works at Tarhuna are part of its "Great Manmade River" subterranean water exploitation scheme. However, about the same time, Qaddafi also stated that the Arabs have a right to acquire CW because of Israel's reputed possession of nuclear weapons.[22]

All in all, the Rabta chemical facility has been described as the "inactivated chemical warfare agent plant", while the two uncovered "CW storage facilities" are probably located in two of the three compounds mentioned. The mustard stock still being found in Libya had been 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 utilized for mustard production) were housed in the identified storage sites. Some incompatibilities seemingly exist regarding the production of sarin, tabun and lewisite. However, glass-lined vessels designed to contain corrosive chemical reactions, and ancillaries - mainly for synthesis of nerve agents - were found.

**Biological weapons**

Following the decision made by Qaddafi to undergo deproliferation, 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. The US and UK specialists invited to Libya found no concrete evidence of an ongoing BW 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 a BW programme had ever existed in an operational state.[23]

Earlier reports indicated that during the 1980s and 1990s an attempt to establish a BW infrastructure took place in Libya, in the form of some masked projects, the main location being apparently at Taminhint (a small town northwest of Sebha in south central Libya).[24] Those masked projects included the General Health Laboratories, Health Research Center, and Microbiological Research Center. Supportive facilities

included the High Institute of Technology in Brack, the Biotechnology Research Center in Tajura, and the Tripoli and al Fattah universities.[25]

Also, during the 1990s, a secret project, code named "Ibn Hayan", aimed to produce bombs and warheads filled with anthrax germs and botulinum toxin. It was led by top Iraqi BW experts who left Iraq due to the UN inspections, and were allowed by Saddam to assist Libya. The project was directly linked to the Libyan presidency bureau. A number of organizations, 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 producing biological warfare agents through maintaining constant sterile environment, as well as ancillaries were purchased primarily from China and Serbia.

Meaningful assistance had been extended by Cuba. US officials noted Libya (aside from Syria and Iran) was especially interested in advancing its BW programmes. Carl Ford, Assistant Secretary of State for Intelligence and Research (2001-2003), said there was evidence of Cuban exports of dual-use BW technology to Libya, and other Muslim countries in the Middle East. Also, Pakistani specialists apparently helped the Libyan biological effort to achieve some advance.

On the whole, it is clear that an endeavor for practically implementing a BW programme took place, and for certain periods of time, was highly prioritized. Seemingly, it was not productive; distinctively, yet, there is a lack of published information on that subject, particularly on the Ibn Hayan project, which most probably dealt with anthrax.[26]

## A lingering process of CW disarmament

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 had provided a destruction plan for these weapons and production facilities. The complete destruction of Libya's CW and the capacity to produce them was originally intended to be completed by April 29, 2007.

In July 2006, the Libyan government asked the OPCW to extend the intermediate and final deadlines for the destruction of its mustard agent stockpile. The organization's top decision-making body, the Conference of the States Parties, granted this request in December 2006, changing Libya's final destruction deadline from April 29, 2007 to December 31, 2010. In July 2007, Libya submitted to the OPCW detailed facility information for the Rabta Toxic Chemical Destruction Facility, which will destroy the mustard agent and remaining precursors that Libya has declared.[27]

However, things were different in practice. Destroying Libya's CW stockpile has been a lot trickier than emptying the shells and bombs. By the end of 2009, Libya had not destroyed any of its Category 1 CW (agent and precursors) and only 39% (551 tonnes) of its Category 2 CW. In March 2012, Libya still had many tonnes of mustard and an awful lot of G-agent precursor chemicals (the Category 2 materials, mostly phosphorous compounds) still kicking around.[28]

WikiLeaks controversy helped clarify the Libya situation to some extent; A WikiLeakes June 2009 State Department cable noted

that Qaddafi played "cat and mouse" with the international community, "deliberately slow-rolling implementation of its WMD commitments."[29]

Interestingly, further WikiLeaks items have provided some corroboration of the problems Libya is experiencing with its CW programme. According to another WikiLeaks released secret cable, the head of Libya's CW destruction programme, Dr. Ahmed Hesnawy (who is also the former head of its CW production programme), told the US Embassy in Tripoli in late 2009 that a "grassroots environmental campaign" and "civil defence concerns about possible leaks" had caused "all hell to break loose" with the programme. The embassy's comments on these explanations were skeptical about the environmental movement, but gave credence to the concern about leaks. It said, "Given tight Libyan Government controls over national security facilities and programmes, we find it hard to believe that a grassroots movement could affect Libyan policy or action on a sensitive programme such as the Rabta facility" and that "The UK DCM, who visited the storage facility earlier this year, told P/E Chief that the containers currently housing the material were in fact leaking when he observed them".[30]

Supervising the destruction of Libya's CW caches through February 2011, the OPCW was forced to suspend its operations due to the uprising against Qaddafi and the resulting deterioration of the country's stability. In early September 2011, OPCW Director-General Ahmet Uzumcu said reports he had received indicated that the remaining weapons were secure and had not fallen into the hands of militant groups.[31] A stockpile of mustard gas, which the OPCW reported the regime may have attempted to hide from inspectors overseeing the CW programme's dismantlement, was reportedly found in the Jufra District by anti-Qaddafi fighters less than two weeks later.[32]

Once again, Libya did not fully meet the final extended deadline of 29 April 2012 for the destruction of its CW stockpiles. In accordance with the 'Detailed Plan for the Destruction of CW Remaining After the Final Extended Deadline of 29 April 2012' submitted by these States Parties, Libya plans the destruction of the remaining Category 1 CW by December, 2013, Category 2 CW by December, 2016 and Category 3 CW by May, 2013. Libya's National Transitional Council is cooperating with the OCPW regarding the destruction of all legacy CW in the country.[33]

However, as of May 2013 Libya had destroyed 85 percent of its Category 1 CW. Destruction operations are now scheduled for completion in December 2016. Nevertheless, as of September 2013, destruction of CW stockpiles has not resumed. The international community cannot yet rule out the possibility of additional undeclared and undiscovered CW assets, and should they exist, cannot assess their security. The chronology of events in Libya provides a new case study on the difficulty of CWC compliance verification, even when on-site inspections are in place.[34]

And the 10-years accumulating lessons from the Libyan CW disarmament file are fairly clear, apparently, in relation to the fresh, ongoing Syrian case. In some senses, though not entirely, the two are strikingly similar.

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