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Editorial

The Biological Weapons Convention (BWC) and the Chemical Weapons Convention (CWC) have been active for decades. The BWC, the older of the two Conventions, will hold its Ninth Review Conference from 28 November to 16 December 2022. The member- countries are likely to discuss the Convention's achievements and challenges during this time-frame. Interestingly, the Conference of the State Parties of the CWC is also meeting from 28 November 2022 to 2 December 2, 2022. The Conference of State Parties meets annually, while the Review Conference of both the treaties takes place every five years.

However, organising the two conventions comes with its own challenges. While the Russia-Ukraine conflict has brought to the fore some of the persisting challenges of biological and chemical weapons, for many years, a few member-countries have been levelling allegations against others of violating and undermining the treaties.

Mrinmayee Bhushan, in her article, has underlined the controversy surrounding the COVID-19. She argues that the history of biological weapons has witnessed numerous such issues. Rajiv Nayan discusses the nature of the threat of chemical weapons in the Russia-Ukraine conflict. He finds that chemical weapons have not been of much use and have not gone beyond being a propaganda tool in the ongoing hybrid war. Anshu Joshi maintains that a comprehensive global defence against biological attacks is the need of the hour.

Siddhant Bajpai, in his article, points out that the current international order, which is in a state of flux because of the rise of China, an intense backlash against globalisation and institutionalism, and the COVID-19 pandemic, required an arrangement like BWC to ensure a rules-based order. Krutika Patil has focused on the convergence of biological and cyber warfare. She maintains that it is essential to envision the convergence points for biological and cyber warfare for a post-pandemic world order.

This issue of the *CBW Magazine* also comprises other features like Chemical-Biological News. With our readers' feedback, we wish to publish issues in the future that focuses on a subject of particular concern. Kindly address contributions and feedback to: cbwmagazineeditor@gmail.com.

Plausible Deniability and Proliferation of Bio-Weapons: The Elephant in the Room

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Summary

The mysterious origin of Covid-19 has given rise to many debates, allegations, denials and controversies. However, the entire history of biological threats and bio-weapons is full of such denials and allegations. Though classified as weapons of mass destruction along with nuclear and chemical weapons, the global arms race for biological weapons remained relatively inconspicuous. As evidenced by many historical examples certain features of Plausible deniability of bioweapons such as the covert nature, blurred boundaries of defensive and offensive research and ambiguity about the required set of equipment, resources, expertise and infrastructure make them distinctly different.

Plausible deniability of bioweapons is a critical feature and needs to be a central theme while designing policies for credible deterrence and bio-defence.

Introduction

Every feature of the biological weapons (BWs) arms race is intriguing; whether the very complex nature of all the biological agents, the challenges of weaponization, parameters of deployment, complexities of biological crimes, terrorism, or warfare. While studying the documents related to Unit 731, the Khabarovsk trials, Biopreparat, Oregon attacks, Amerithrax, Korean War or the experimental testing at Porton Down or Fort Detrick, the more one dives deep into these documents, the barometer of intrigue rises further!

The history of biological warfare is simple and easy to understand. However, when one investigates deeper, the investigations throw up more complicated questions than simple answers. The ability to persist with these questions, however, allows one to appreciate the evolving grey abstract patterns leading to probable answers and is critical for the appreciation of the true potential of this deceptive threat.

When a nation is building its own preparedness against such surreptitious threats, there is a need to appreciate the antecedents of historical biological events, irrespective of current international political affiliations and the role of other nations involved in these events in the past. An unbiased and unclouded vision is necessary to appreciate the historical backdrop and inherent traits of the players.

The Invisible Bio-weapons Race

The origin of COVID-19 is unequivocally the most controversial and ferociously debated issue of this century. Without firing a single bullet, COVID-19 has caused deaths of about 6 million people, psycho-social disruptions,

ready-to-burst-at-the-seams social infrastructures, economic setbacks, misinformation campaigns and lots of controversies around it. It is almost a war-like situation! An average citizen, quite helplessly is asking simple questions, "But who started it all and why can't *authorities* find the culprit?"

The answers to these questions are as mysterious as they can get.

The very nature of biological agents is such that the perpetrator can get away in a shroud of mystery; *Plausible Deniability* of intentions just adds to this mystery! The most common excuses are of it being a natural infectious disease caused due to zoonotic crossover, evolution of virus or eating infected raw meat, etc.

As it was evident during COVID-19, biological agents causing infectious diseases in this globalized world spread like Trojan Horses across international borders. The origin of COVID-19 has polarized the entire world, including scientists, scientific publication houses, policy makers and average citizens. In the absence of any unbiased investigation, this eternal enigma that has already killed millions, will continue.

This article has three objectives. First, it will describe the historical context of the global arms race for bio-weapons. In particular, the article will make an effort to capture the *fierceness of this competition* for research, development and technological excellence, under the garb of the benefit for humanity, actually focused on development and weaponization of more and more lethal bio-weapons.

Second, it will elaborate on the truly *deceptive nature of biological weapons*. There is a long precedent of biological incidences in the human history– whether bio-crimes, bioterrorism or biological warfare. There are numerous examples of large- scale bio-weapon programmes of nations competing in arms races, unethical human experimentation of bioweapons, state-sponsored terrorist organizations, apocalyptic non-state terrorist groups, nations colluding in hiding heinous biological war-crimes in exchange of biological weapons technology.

Third, the effort is to elaborate on the *Plausible Deniability* of the biological incidences, which have helped cover the ugly underbelly of the biological arms race, which was unceremoniously brought into the open by COVID-19. Now, average educated citizens have started finding out for themselves via the worldwide web and asking questions about issues such as frequent life-threatening incidences of laboratory accidents, and controversies about Gain of Function Research (GoFR), information about which was earlier restricted and limited to scientific circles.

The plausible deniability of biological weapons is of such high order that even after a century of the first successful weaponization of modern bio-weapons, and in spite of a fierce bio-weapons race throughout the period, there is minimal willingness to call out the Elephant in the Room!

Backdrop of Chemical Warfare during the First World War

In 1915, the first large-scale chemical weapon attack in the form of chlorine gas by Germany, started an incredible arms race within all Western nations involved in the First World War. Tremendous technological developments during the War led to liberal deployments of chlorine, mustard gas, and phosgene by Germany, Britain, France, Russia, Italy, and the US; with British use of

mustard gas proving to the most significant one. The War ended with a trainload of humiliated and blinded German soldiers; including a twenty-nine-year-old Corporal promising himself to avenge this humiliating defeat, Adolf Hitler[1]. Deployment of 113,000 tons of chemicals during the War resulted in more than a million men wounded by the chemical weapons with an equal number of deaths. The peace efforts after the War did not dampen the chemical arms race. In fact, in 1919 the British Holland Committee recommended,

" *...that it is impossible to divorce the study of defence against gas from the study of the use of gas as an offensive weapon, as the efficiency of the defence depends entirely on an accurate knowledge as to what progress is being made in the offensive use of this weapon.*[2]"

This principle is at the centre of the *Plausible Deniability* of the bio-weapons, irrespective of what the British or any other nation's public renunciation of chemical warfare achieved.

The technological advances in Chemistry and Bacteriology during and after the First World War further fuelled the chemical and bio-weapons arms race in these developed nations. The accusations by Allies of infecting horses with Glanders by Germany and the suspected use of Anthrax in Stalingrad by the Soviets during the War, are known examples of the use of the biological agents. But Winston Churchill's statement in 1925 actually gives an insight into the nature of the fierce ongoing biological weapons arms race during that period.

> 'Pestilences methodically prepared and deliberately launched upon man and beast .. . Blight to destroy crops, Anthrax to slay horses and cattle, Plague to poison not armies only but whole districts – such are the lines along which military science is remorselessly advancing.'[3]

At Porton Down, originally known for its chemical weapons development, the British were also developing, experimenting and weaponizing biological agents like Anthrax spores. Though a bulk of the documents related to development of bio-weapons remain classified and closed to inspection, some of documents that were leaked out, have now shown that it was the British who manufactured on a large-scale the West's or probably the world's first bio-weapons.[1]The British categorically stated and reiterated that 'the UK never possessed and has not acquired microbial or other biological agents and toxins in quantities which could be employed for weapon purposes'. However, the historical documents give evidence to the contrary.[2]

Geneva Protocol and Germ Warfare

Fifty years of bacteriological research before the First World War led to allegations of Germans utilizing glanders, anthrax and plague during the War. The search for a new generation of weapons by the war scientists in Europe inevitably edged towards bacteriological weapons race immediately after the First World War ended. This is one of the finest examples of *Plausible deniability of Bio-weapons*. Even though none of the nations had either declared research findings or possession of bio-weapons, or a single laboratory doing research on developing some, still by 1925, the need to incorporate 'the prohibition of bacteriological methods of warfare' within the scope of the Geneva Protocol. The year 1925 saw the Geneva Protocol signed by all major powers and a very telling statement from Churchill the same year.

Unit 731

The paradoxical effect of the Geneva Protocol of banning Bio-weapons was also evident at the beginning of the Japanese biological weapons development programme by Shiro Ishii. His logic was flawless about the effectiveness of biological weapons,

" *...otherwise statesmen at Geneva would not have gone to the trouble of banning them.*"

Ishii built the world's first major documented biological warfare programme in 1937. The Japanese were working hard to develop an effective anthrax bomb for the next seven years. Ishii had erected a large manufacturing facility for each pathogenic bacterial strain growing in large aluminium containers at tailor-made specifications at Pingfan.[3] The pathogens included anthrax, brucellosis, typhoid, typhus, plague, cholera, smallpox, and gas gangrene tested on guinea pigs, horses, mice, sheep, and humans; further, delivery systems were developed in the form of aerosol sprays, shells, and sabotage devices. The human experimentation would include exposure to aerosols or biological bombs, followed by victims being killed by an overdose of morphine and dissection to study the progress of the disease or vivisection. In addition, Japan had carried on an actual biological war against the Chinese population by air-dropping large quantities of plague-infested fleas along with rice or wheat, resulting in a plague epidemic that killed thousands of people.

However, at the end of the Second World War, when captured by the Allies, Ishii denied all the charges including the war crimes of unethical human testing. He stated in 1946: "*Biological warfare is inhumane and advocating such a method of warfare would defile the virtue and benevolence of the Emperor.*"

The Khabarovsk Trial

Post- Second World War, several Japanese officers involved in Unit 731 war crimes were captured by the Allies and the USSR. The Soviet authorities made an attempt to conduct judicial trials of the Japanese officers for war crimes. The Khabarovsk War Crimes Trial brought out the horrific details of these war crimes. The evidence from the Khabarovsk Trial indeed showed that, though the criminal human experimentation was as horrific as those of the Nazis, the United States dispassionately provided immunity to Shiro Ishii and other Japanese officers, from war crime charges in exchange for scientific data on human experimentation[1]. Behind the smokescreen of the Khabarovsk trials, the Russians were doing the same as the Allies– utilizing Japanese data to build their own biological weapons capacity.

The potential utility of Japanese wartime knowledge to enrich the Allied biological warfare programmes, could far outweigh the demand for justice. The American biological weapons investigation in 1947 concluded:

> "*Evidence gathered in this has greatly supplemented and amplified previous aspects of this field. It represents data which have been acquired by Japanese scientists at the expenditure of many millions of dollars and many years of work. Information has accrued with respect to human susceptibility to these diseases as indicated by specific infectious doses of bacteria. Such information could not be obtained in our own laboratories because of scruples attached to human experimentation. These data were acquired with a total outlay of $250,000 to date, a mere pittance by comparison with the actual costs of the studies....It is hoped that individuals who voluntarily contributed this information will be spared embarrassment because of it, and that every effort be made to prevent this information falling into other hands.*"[1]

In an extraordinary American decision, which remained a secret for thirty years, General Ishii and his fellow officers were offered immunity from prosecution for the world's most horrific biological war crimes[4] against humanity. *Plausible Deniability* of a different kind!

Porton Down and Gruinard Anthrax Island

Just like the Japanese, the banning of biological warfare in the Geneva Protocol prompted the British to launch their own biological warfare programme in 1934. The world's first effective biological bomb using Anthrax spores, was developed, mass-manufactured and tested on sheep on Gruinard Island in Britain. Porton Down, the centre of the British chemical weapon programme, was now mastering the techniques of manufacturing anthrax spores, weaponizing and testing them at Gruinard Island. An accidental outbreak of anthrax in the Scottish mainland was reported due to a dead sheep, which floated across from Gruinard. But it was trivialized, and was labelled a natural outbreak.

Alarmed by the Chinese allegations about the scale of Japanese biological warfare, the Anglo-American biological warfare programme started competing with Manhattan Project for priority. The collaborative development efforts of the US, Britain and Canada also included sharing of self-inoculating syringes against probable biological attacks from the Germans. During the Second World War, the US invested US$ 40 million in manufacturing plants and equipment. These collaborative biological weapon developments included studies at Camp Detrick on anthrax, glanders, typhus, yellow fever, fowl pests, rinderpest, various viruses, anti-crop agents as well as development of vaccines, laboratory trials, large-scale field trials all across the universities in the US.

Botulinum toxin or BTX, one of the most toxic substances known, was another favourite biological agent with a mortality rate of 60 per cent. Though the British did not officially confirm this, but by 1941, BTX was successfully weaponized and code named as 'X'. One notable biological assassination by British Secret Service during the Second World War was *Operation Anthropoid*– the assassination of Reinhard Heydrich, Hitler's personal choice to be his successor, by Botulinum-laced-grenades in Prague (1942).

Though the Germans had conducted horrific human experimentations on inmates of concentration camps, the development of their biological warfare programme was far behind that of the Allied forces, literally by years!

And, Britain categorically denied of having any biological weapons programme ever! The true picture of British biological warfare is difficult to portray because of the extreme secrecy regarding defence matters, even to this date.

Another small detail that often gets lost is that, even though BTX was successfully weaponized 50 years prior (and regularly used as a bioweapon for years after that), to the Chemical Weapons Convention (CWC), BTX was never listed in any of the three Schedules of the CWC.

Weaponization of Biological Agents and Experimentations

Since 1950, for the next two decades, the United States spent over $700 million for the development of biological weapons and many more millions in research and testing in the US, Britain and Canada. During this period, the US, Britain and Canada secretly conducted numerous testing experiments using pathogenic as well as some apparently harmless indicator micro-organisms, the targets being animals, humans, citizens of

other countries, their own citizens and entire cities to simulate germ attacks. For example, the entire 117 square miles of San Francisco were covered under the bacterial cloud, contaminating almost everyone on the 800,000 citizens. The civic officials were misled into believing that it was part of defence exercises of creating an invisible smokescreen to protect the city from radar detection. Similar experiments were conducted in Winnipeg, New York subways, the Bahamas, and Scotland.

Human experimentation using volunteers was not very uncommon in the 1960s. The British experimentation on terminally ill cancer patients using Langat Virus and Kyasanur Forest Disease in Porton Down, American testing of airborne Tularaemia on their own Seventh Day Adventist soldiers during the Vietnam War, are some examples. During this period, anti-crop agents and entomological agents: plague-infected flea, tularaemia ticks, yellow fever mosquitoes were also developed and tested as weapons.

During the Korean War in 1952, North Korea and China alleged that a captured American Air Force officer confessed to dropping Germ Bombs on North Korea. The China led 'International Scientific Commission'[5] composed of Soviet, Italian, French, Swedish, Brazilian and British scientists, in a 700-page report concluded that, "*the people of Korea and China did actually serve as targets for bacteriological weapons"* which included fountain pens with infected ink, anthrax-laden feathers, and fleas, lice and mosquitoes carrying plague and yellow fever. The United States, of course denied the allegations! '*An unverifiable report and its unverifiable denial*'[1]!

The pneumonic plague in Surat in 1994 too was suspected to be coming out of US experimentation of a potent strain in India. The controversy divided scientific communities, doctors, politicians and what was left was an unanswered enigma[6–8]. The US of course denied it.

Biopreparat

With woefully inadequate Western intelligence on the Soviet biological warfare programme, the only clues gathered were those from scientific publications, academic achievements and obvious gaps in a series of publications by Soviet scientists. However, in the 1940s, a Russian defector, Von Apen, revealed the secrets of Russian biological weapons' human experimentation in Mongolia to the Western world.

Many Wehrmacht files of German Intelligence accessed by the Allies after the Second World War, revealed that the Soviet biological defence programme had started in 1930s.

An anthrax accident at a military facility in Sverdlovsk was reported by Germany in 1979, which killed thousands of people and animals in the vicinity. The epidemiological data revealed that most of the victims lived in a narrow zone from the military facility extending towards the southern city limits, indicating an accidental release of aerosol[9]. The accident was caused by a missing air filter during a shift change in a manufacturing facility, running three shifts to manufacture a highly virulent strain of anthrax for inhalation. The Soviets of course, denied it completely, blaming the contaminated meat instead!

Another Soviet defector, microbiologist Vladimir Pasechnik, who defected to Britain in 1989, during his de-briefing described not just the scale but also the ambition of the Soviet biological warfare programme, of developing genetically engineered antibiotic resistant strains of Black Death. The American and the British agreed to keep

Pasechnik's defection and the knowledge of the Soviet biological warfare programme secret from the world, in exchange for full disclosure and cooperation for a diplomatic initiative.

However, the true nature of the Soviet bio-warfare programme, Biopreparat saw the light of day only through an insider, Kanatjan Alibekov (Ken Alibek) who headed Biopreparat and defected after the dissolution of the USSR. Alibek's defection to the US and his explosive book *Biohazard,*[10] stunned the world with its sheer magnitude, range and the ambitions of the Soviet Biopreparat programme. The most virulent strains of almost all known biological agents against humans, plants, animals, antibiotic-resistant and genetically engineered toxin-pathogen combination strains, mood-altering peptides, numerous delivery mechanisms from aerosol sprays, grenades to intercontinental ballistic missiles (ICBMs) loaded with pathogen bomblets, constantly running huge manufacturing facilities! This account simply mesmerized anyone who cared to listen. The Soviets never disclosed the details of their enormous biological warfare programme!

At the end of the Second World War, the Russians got hold of thousands of tons of German nerve agent stockpiles such as Tabun, Sarin, Soman and state-of-the-art manufacturing facilities to churn out these nerve agents in large quantities.[11] These manufacturing units were shifted to the USSR. The overall power balance prevailed due to the presence of most senior German chemists as precious POWs and consolation to the Allies. However, the biological weapons programmes of the Allies were justified to be continued as an excuse that the post-Hiroshima nuclear imbalance would prompt non-nuclear USSR to pursue aggressive biological weapons programmes.

The Domino Effect of the Global Arms Race

The domino effect of the biological arms race within the elite club was bound to spill over to all spheres of the world. Similar state-sponsored biological warfare programmes of many countries like France, Iraq, Iran, Italy, China, South Africa[12] are well-known. However, the value of biological agents was not lost on non-state actors for bioterrorism purposes.

Oregon

In 1984, devotees of Bhagwan Shree Rajneesh sprayed Salmonella cultures on salad bars infecting 721 people (12 per cent of the community) in order to control local election results in Oregon. The Salmonella cultures were acquired from an American company. However, no one suspected it to be a bioterror attack until after the commune collapsed due to infighting amongst the devotees. Here again, only an insider could establish the biological agent connection[13].

Aum Shinrikyo

An apocalyptic group in Japan led by Shoko Asahara, conducted number of chemical and biological attacks against the Japanese population using sarin, and Botulinum toxin sprays[14]. Though unsuccessful in achieving results, this group had weaponized botulinum, using sprays fitted on top of cars and air-sprayed it across Tokyo.

Amerithrax

Post-9/11, the United States was shaken with Anthrax letters sent to several media houses and senators, supposedly by Bruce Ivins, a scientist working on specific potent strains in US defence labs at Fort Detrick. Five people were killed and 17 injured due

these mailers containing military-grade Anthrax spores. While Ivins was detained as a prime suspect, he committed suicide.

Laboratory accidents and Gain of Function Research

Handling highly infectious and toxic biological agents, irrespective of defensive or offensive purposes, requires very high safety labs with elaborate infrastructure, strict SOPs, elaborate reporting and redressal mechanisms for accidental spillage or thefts, highly skilled manpower and protocols for their safety. In spite of meticulous planning and execution of bio-safety regulations, there is a long history of such accidental releases of Potentially Pandemic Pathogens (PPPs) at regular intervals throughout the world and the history of denials of these laboratory accidents.[15]

Another facet of the *Plausible Deniability* is intentions. The debate on Gain of Function research and associated risks has been prevalent since 2012. The boundaries between the noble intentions of developing vaccines against anticipated potential pandemic pathogens (PPP), and developing highly potent biological weapons with ill intent, are almost non-existent. The research laboratories, equipment, manpower and manufacturing facilities used for both may look indistinguishable. How can one determine the intentions behind such actions?

Plausible Deniability of Bio-weapons and Global Arms Race

Biological weapons are classified as potent weapons of mass destruction (WMD) along with chemical, radiological and nuclear weapons (CBRN) due to their ability to cause large-scale mortality and morbidity. However, biological agents have distinctly different abilities due to their stealth. And, the entire history is full of denials! Unlike nuclear or chemical weapons, the biological weapons race was never part of public geopolitical debates.

The unique feature of infectious biological weapons is that even a small vial containing a potent viral or bacterial culture can debilitate the target stealthily. The front-running countries of this arms race have conducted bio-defence exercises during the Cold War, to assess surveillance, early detection, warning systems and public health reinforcements. This feature of the impossible challenge of saving millions of citizens in case of a bio-attack, is attractive to many military scientists to further develop more potent bio-weapons against the enemy.

The military strategists and bio-weapon scientists have been designing biological weapons for assassinations, contaminating water resources, PPP-loaded scud-like missiles and ICBMs, bomblets for airdropping, targeted not only against the opposing armed forces, but also as anti-personnel weapons against entire cities. The technological advancement in biological sciences such as CRISPR and synthetic biology and its interdisciplinary spread across other technological verticals like Cybersecurity, Artificial Intelligence and Big data analytics, has added fuel to ambitions.

History is also full of examples of the way narratives are built according to self-interest and convenience. Though Unit 731 and Khabarovsk war crime trials revealed the gruesome nature of war crimes against innocent citizens, which was very similar to Hitler's war crimes, the Khabarovsk trial was quietly pushed under the carpet! Similarly, assassination of Reinhard Heydrich with Botulinum toxin (BTX)- laced bombs, (and long history of BTX weaponization and use in wars) was quietly blurred behind the

assassination of a Bulgarian writer Markov by Ricin. Ricin is a relatively far less toxic agent with questionable WMD potential, but it ended in Schedule 1 of CWC instead of BTX. Narratives!

To create a credible bio-defence, one of the most important things is to learn lessons from history. Without being clouded by the *Plausible Deniability* aspect of it all, it is imperative to appreciate that there is a full-fledged biological arms race raging since the days of the First World War. The nation should step up efforts of threat assessment, awareness and creation of a *Web of Prevention for Biosecurity and Bio-defence.*

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Chemical Weapons and the Russia-Ukraine Conflict

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Summary

The actors of in the Ukraine-Russia conflict theater use Weapons of Mass Destruction (WMD), including chemical weapons basically for either mobilizing global public opinion or extracting early concessions. So far, for them, WMD, including chemical weapons have served not beyond the tool of propaganda in the ongoing hybrid warfare. The global institutional framework, for chemical weapons is active but because of its limited mandate, does not appear playing a major role. The international community is yet to see a decisive intervention from it. Fortunately, the principal state actors resume their responsibilities by allaying apprehensions after resorting to the saber rattling. They should realise the danger of the casual game they play.

In the Ukrainian conflict theater, news relating to nuclear weapons along with other Weapons of Mass Destruction, including chemical weapons is appearing quite frequently. A section of the media filed an unverified report that Russia had used 'an unknown chemical agent' in Mariupol (now under the Russian control). An American official too claimed availability of 'credible information' of possible Russian use of 'a variety of riot control agents, including teargas mixed with chemical agents, that would cause stronger symptoms in order to weaken and incapacitate entrenched Ukrainian fighters and civilians as part of its aggressive campaign to take Mariupol.'[1]

Thereafter, Western officials and media kept reiterating and reporting the use of chemical weapons or the likelihood of the Russians using them, quite regularly. In general, Western media has also been highlighting or articulating the Western thinking that Russia is in possession of Novichok and Sarin agents because of a loophole existing in the chemical disarmament treaty.

The US government alerted the Ukrainian government about this possibility. However, the country did not confirm the validity of the report. At times, the difficult situation in the war was said to be the reason of not verifying the use of chemical weapons in Ukraine. However, the American officials confirmed that Russia had been warned of the consequences of using chemical weapons in the conflict zone in Ukraine.[2]

Notwithstanding the accusations and counter-accusations of verifiable use of chemical weapons, the very idea of the use of chemical weapons is giving rise to several issues concerning global security and politics.

Will the global response be a factor in Putin's calculation? The article intends to examine the complexity, the cost and the possibility of Russia's potential use of chemical weapons.

Russia is an original signatory of the Chemical Weapons Convention (CWC), which ratified the Convention on 13 January 1993. Prior to that, Russia and its predecessor State, the Soviet Union, had actively participated in the negotiations for the CWC that were finally concluded in 1992. On 5 November 1997, the Russian Federation had also ratified the CWC, which finally entered into force and became operational on 5 December 1997. Russia has also been serving on the Executive Council of the Organization for the Prohibition of Chemical Weapons (OPCW), designed to ensure compliance and implementation of different provisions of the CWC.

As a member of the CWC, Russia is obliged not to use or even get involved in planning for the use of nuclear weapons. Nor is it supposed to develop, produce, acquire, stockpile, retain, transfer chemical weapons. It is also not to accomplish any act whereby any other member country is assisted in acquiring a nuclear weapon. Russia is also a member of the 1925 Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, which bans the use of chemical weapons in a war.

However, Russia is continuously accused of using chemical weapons against the enemy state or Putin's personal political enemies . In 2021, the Director-General of the Twenty-Sixth Session of the Conference of the States Parties observed in his opening statement: "The use of chemical weapons on the territory of the Russian Federation also poses a serious threat to the Convention."[33]

The Organisation for the Prohibition of Chemical Weapons, "Opening Statement by the Director-General", Conference of the States Parties, Twenty-Sixth Session, November 29, 2021

Russia denies violation of the CWC. It has also been denying any plan to use chemical weapons in the Ukrainian theater.

The International Atomic Energy Agency (IAEA) is very active in the conflict vis-a-vis the nuclear threat. In fact, the Director-General of the IAEA led a delegation to the conflict theater. A couple of IAEA inspectors stayed back to monitor the situation at the Zaporizhzhya Nuclear Power Plant. Is OPCW taking the same pro-active measures related to chemical weapons? Quite significantly, the presence of the OPCW may not be as visible as that of the IAEA. The reason is quite simple: the nuclear power plants have been under threat ever since the conflict started.

On the other hand, as the conflict began, the accusation of Russian use of chemical weapons was quite recurrent. Of late, the accusation has not completely died down, but its intensity has certainly come down. Nuclear weapons seem to have overshadowed chemical weapons. Among chemical weapons, tactical weapons are projected as Russia's WMD choice in the battlefield.

Yet as mentioned, the EC of the OPCW has taken note of the developments in the Ukraine-Russia conflict theater. Even in the case of IAEA's team visit or within the regular IAEA update, the Director-General reminds the world of the organization's limitations in undertaking some activities. The OPCW, too, has to operate within a framework under limitations.

During the current Ukrainian conflict, the issue of the clandestine operation of Soviet era weapons facilities keeps recurring. Western media also highlighted the fact that by exploiting the loophole in the CWC or the exemptions meant for undertaking activities for research and defensive purposes, Russia is developing a new generation of chemical weapons in its labs. Apprehensions have been expressed about the use of new chemical agents in Ukraine.

However, outside the OPCW, the countries and other bodies have been responding to the threat of chemical weapons. This has great resemblance to what these countries and bodies are doing vis-à-vis nuclear threat. The West talked about deterrence against the Russian chemical attack. The understanding is based on the idea that Russia has been using chemical weapons internally as well as outside against enemies of the State, and has been working in collaboration with Syria, which possesses and reportedly even uses chemical weapons. The Russian legacy seems to strengthen the Western faith about Russia crossing the chemical redline.

The NATO **Secretary General Jens Stoltenberg stated that, "**any use of chemical weapons would fundamentally change the nature of the conflict."[4] He further explained: "There is a risk always for contamination, for that chemical agents are spread over bigger areas. So this will be a catastrophe for the people of Ukraine, but of course there is also a risk that we can see the spread of chemical agents also into NATO territory. I will not speculate beyond the fact that NATO is always ready to defend, to protect and to react to any type of attack on a NATO [a]llied country."[5] In fact, NATO and its members kept reminding Russia to refrain from crossing the redline.

Will NATO really take the military course if chemical agents reach NATO countries? On this question, even the statement of the NATO Secretary-General is very guarded. Theoretically, it could be an option but in practice, NATO may also deliberate carefully before crossing the redline. The US has already declared imposition of additional sanctions in case Russia is found using chemical weapons.[6]

NATO promised to provide protection equipment to Ukraine to shield itself from the chemical attack. It also urged its members to strengthen its own defences to guard against the use of chemical weapons by Russia. NATO emphasized that it had never planned to equip Ukraine with chemical or biological weapons.[7]

The 'False Flag' phenomenon, repeatedly highlighted for the dirty bomb and nuclear weapons, has been witnessed in the case of chemical weapons as well. NATO accused Russia for showing the 'False Flag' to attack Ukraine while Russia too suspected a 'staged incident under a false flag'[8]. NATO maintains that Russia talks about the possibility of NATO or the Ukraine using chemical weapons, as an excuse to introduce chemical weapons in the Ukraine conflict.[9]

On the contrary, Russia painted three false flag scenarios. In one scenario, it sees actual use of chemical weapons, resulting in the death of Ukrainian civilians or sabotage of Ukrainian facilities, and the blame would be on Russia. In the second, it visualized clandestine use of a small volume 'for neutralizing the will power and the capacity to resist within the fulfilment of a particular operational task.'[10] Russia's third scenario was overt use of chemical weapons in the battlefield. It considers the last scenario least probable and the first most probable.

Interestingly, Russia accuses Ukraine and its Western supporters of weaponising chemical plants in Donetsk and other areas. It also accuses Ukraine for using chemical weapons against the pro-Russian population in Eastern Ukraine. It has regularly been submitting notes to the OPCW drawing attention to Ukrainian action of weaponising chemical agents.

In one of the submissions to the OPCW, Russia informed its technical secretariat: "Artillery units of the 110th separate mechanized brigade of the Armed Forces of Ukraine fired from the town of Avdiivka at the site of a brewery located in the city of Donetsk, where hazardous chemicals were used in the production process."[11] Ukraine denied allegations in a separate letter submitted to the OPCW.[12] It maintained that it was Russia which had been shelling Ukrainian chemical facilities because of which hazardous chemicals had killed a few and affected many.

Will either side plan to use any chemical agent as an instrument of warfare? Like the use of nuclear weapons, the use of chemical weapons has its own cost, for which, any party intending or thinking of using it, may have to pay a heavy price. Low technology-intensive chemical agents are easily available but open use of chemical weapons incurs a high cost for a CWC member country. Clandestine use may not give a user strategic advantage. The accusations and counter-accusations appear to be part of a propaganda used by parties in a conflict. This is considered an important component of hybrid warfare.

However, the situation in a conflict, at times, spirals out of control. Soldiers, while shelling, may not realize the consequences of hitting an unknown but sensitive installation. Many a times, even if they or their commanders are aware that the installation is a chemical unit, they may not know the precise damage the attack may cause to the enemy ranks and population or to the treaty's obligations. In the Ukraine-Russia conflict, the silver lining is that all the parties are normatively committed to prevent use of chemical agents. However, they need to exercise more restraint about shelling chemical installations and to remain alert against some elements in their armed forces, planning the use of chemical agents.

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Ninth Review Meeting of Biological and Toxin Weapons Convention: Expectations and Challenges

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Summary

The ninth BWC review conference would get an opportunity to relook at the Convention in terms of its success and challenges ahead. The world is witnessing Russia-Ukraine war and China-Taiwan conflict in the shadow of Covid 19. A holistic global defence against biological attacks is much needed. It includes a stringent normative framework, innovative technologies, broad-spectrum vaccines, a strong public and community health system, and general awareness. Developing a global mechanism to communicate with the relevant stakeholders at the earliest also is a critical objective. Retrospecting the present scenario and developing a futuristic roadmap accordingly can make BWC pertinent, powerful and prevailing.

It is speculated that the threat of biological weapons has seen the dusk of the day, after the world ushered in the era of globalization, highly advanced technologies and a neo-liberal wave, promoting collaborative economic progress among countries. After all, who would be interested in waging wars against each other in a world of complex interdependence and multilateralism? And even if needed, who would be using deadly biological weapons that can create mayhem for the host as well. But COVID-19 changed all such thoughts and the world, forever. Despite a debate whether it was a planned biological weapons attack, or an accidental leak, or a natural attack, one thing is clear, biological agents have the capabilities to initiate drastic and dramatic change forever.

Based on their usage in history, the biological agents hold the potential to completely alter political, social and economic systems of the countries. Since they cannot be controlled once deployed, the scale of destruction cannot be predicted or calculated. Their covert use and long-time impact also add to their devastation power. Biological weapons have always been considered as 'unethical' weapons used by rogue nations or organizations, and have always been discarded at international platforms for their potential to create havoc. Considering these aspects, an international normative framework to prepare a robust defence against the production, stockpiling, usage and transfer of biological weapons was devised. For the last 47 years, the Biological Weapons Convention (BWC) has been trying to provide a comprehensive defence against biological weapons; however, there have been challenges and possibilities that should be discussed and addressed proficiently. The

upcoming ninth Review Conference of the BWC most likely would open the window of hope and positive developments, for the world to ensure holistic security against lethal biological weapons.

The BWC has been questioned by many experts for loopholes in the Convention, related to the dual-use dilemma and verification protocols. However, undeniably, it still provides a platform to countries to reject biological weapons. The United Nations (UN) has always regarded the BWC as a competent normative framework to contain usage of biological weapons. "The BWC effectively prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons. It was the first multilateral disarmament treaty banning an entire category of weapons of mass destruction (WMD). It is a key element in the international community's efforts to address WMD proliferation and it has established a strong norm against biological weapons. The Convention has reached almost universal membership with 184 States Parties and four Signatory States." [1]

This seems to be apt, considering the effectiveness of the BWC in making member countries at least understand the significance of abiding by the set norms against development, production or usage of biological weapons. With ten key articles, the BWC imposes a complete ban on any kind of development, production, stockpiling, usage and transfer of biological weapons. It also asks the member countries to "consult bilaterally and multilaterally and cooperate in solving any problems which may arise in relation to the objective, or in the application, of the BWC; and to request the United Nations Security Council to investigate alleged breaches of the BWC, and undertaking to cooperate in carrying out any investigation initiated by the Security Council." [2]

The BWC (the earlier BTWC that entered into force on 26 March 1975), can be quoted as the developed form, or the next step of the Geneva Protocol that only prohibited the usage of chemical and biological weapons. Since there were no provisions to ban research and development, production, stockpiling and transfer of chemical and biological agents for hostile purposes, the Protocol could not provide a potential normative defence against biological weapons. Later, these provisions were added in the BTWC.

The BWC also made sure that the member countries meet once every five years to review the progress of the BWC, the upcoming challenges in the light of the new global and technological developments, and ways to address the same. With the same objective, the ninth Review Conference is scheduled to be held from 28 November to 16 December 2022 in Geneva, Switzerland. [3]

The Review Conferences in the past have faced a few basic hindrances related to the nature and usage of biological weapons. First, there is the issue of dual-use dilemma associated with biological weapons. The same agents that are used to produce medicines or cosmetics can be used as biological weapons. Botulinum toxin is a classic example here, usually used as 'Botox' for cosmetic treatments. However, it is one of the deadliest poisons in the world, and can create unbelievable destruction if used. [4] This provides a safe escape to the country that wants to develop biological weapons from the Convention, as it is almost impossible for the Convention to make a distinction whether a particular country is developing medicines or biological weapons.

Due to this dual-use dilemma, the BWC faces a big lacuna in terms of verifying the purpose of research and development of any such

biological agent by any member country. Then, the Convention covering 184 countries, however cannot include countries supporting any terrorist organizations into its normative framework. Terrorism has expanded across the globe in the past few years, with organized terrorist groups possessing sophisticated technologies, a well-managed organizational structure and sufficient funds. Next-generation technological advancements have also added to apprehensions about usage of biological agents by terrorist organisations. They are cheaper, deadlier and can be covertly used. Despite being aware of these challenges, member countries could not address them competently in the past review meetings of the CWC.

It has to be understood that apart from norms or any normative framework, technologies and civil defence can also contribute effectively in building a comprehensive defence against biological weapons. But at the same time, the fact that the norms provide a multilateral platform to the member countries to collaborate and work together in achieving the set objectives while developing and using technologies and strengthening civil defence, cannot be neglected. Considering the same, the ninth Review Conference provides a significant opportunity to the member countries to work on the challenges and take the BWC to the next level.

So far, Review Conferences of the past have achieved varied outcomes. The First Review Conference in 1980, came up with a general outcome that, "the States Parties to the Convention reaffirmed their strong determination for the sales of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons. They reaffirm their strong support for the Convention, their continued dedication to its principles and objective and their commitment to implement effectively its provisions." [5]

The Second Review Conference, held in 1986, called upon member states that had not ratified or acceded to the Convention, to do so. As mentioned in the final document, "the [C]onference calls upon the [member] states which have not yet ratified [or] acceded to the Convention to do without delay and upon those states who have not signed the [C]onvention to join the State Parties thereto thus contributing to the achievement of the universal adherence to the Convention." [6]

"The Third Review Conference in 1991 decided to establish an Ad Hoc Group of Governmental Experts to identify and examine potential verification measures from a scientific and technical standpoint. The Ad Hoc Group of Governmental Experts held four sessions in 1992 and 1993. At its last session, the report of the Group (VEREX Report) was adopted by consensus and later circulated to all States Parties for their consideration."[7]

The Fourth Review Conference, held in 1996, came up with the understanding under Article IV that extended national measures are required to exclude use of biological and toxin weapons in terrorist or criminal activity. After the use of biological weapons by Aum Shinrikyo in Japan, the member states of the BWC realised that they need to discussthe usage of biological weapons by terrorist organizations. [8]

The Fifth Review Conference was held in 2002, and it was decided to hold annual meetings of state parties to discuss and promote common understanding and effective action plans to ensure comprehensive biodefence. The subsequent

Review Conferences repeatedly discussed similar objectives, and related issues. The ninth Review Conference was planned for 2020 during the Eighth Review Conference, held in in 2016. However, the Conference had to be postponed due to the outbreak of the COVID-19 pandemic. [9]

The ninth Review Conference, scheduled in November-December 2022, would get an opportunity to relook at the Convention in terms of its success, as well as the challenges ahead. The Russia-Ukraine war does not seem to be ending any time soon. Apart from the nuclear threat, both sides have also accused each other of developing bio-weapons capabilities. On the other hand, China seems to be very aggressive, especially in the context of Taiwan. Although it has been using its core military capabilities so far in threatening Taiwan and the countries that are offering it any kind of aid, it cannot be denied that it has bio-weapons capabilities. The whole world has been facing the brunt of a virus that is said to have leaked from a laboratory in Wuhan, China; and nobody knows if it was accidental or deliberate.

The Convention is at a juncture where the world seems to be facing multiple crises and challenges. COVID-19 has shown the world that even the most developed countries like the US and Italy are incapable of managing a biological attack on a mass scale. The pandemic made it very clear that a holistic global defence against biological attacks is the need of the hour. It includes stringent a normative framework, development of innovative technologies, research, development and production of broad-spectrum vaccines, strengthening public and community health systems, and creating general awareness so that people can respond effectively to such attacks at an early stage. Developing a global mechanism to communicate with the relevant stakeholders at the earliest in case of such emergencies, also seems to be a critical objective. Large-scale funding and mutual trust are required for such preparedness. The upcoming Review Conference of the Convention must discuss all this, in order to make the Convention relevant and comprehensive. Retrospection of the present scenario and development of a futuristic roadmap accordingly, can make the Convention pertinent and all-encompassing.

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Incoming Turbulence for the Biological Weapons Convention

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Summary

The current liberal international order is in a state of flux. Some factors contributing to the crisis are the rise of China, an intense backlash against globalisation and institutionalism, and the COVID-19 pandemic. As the Biological Weapons Convention (BWC) is an integral part of this rules-based order, it will also face strong headwinds. This article highlights the three significant challenges that the Convention and the wider pro-disarmament civil society will face. These are, weakening institutions, re-emergence of border politics, and increased risk of proliferation of bioweapons.

Introduction

The Russia-Ukraine war has reignited the debate around the risks of nuclear proliferation.[1] Though some disagree, the dominant discourse is that the war will incentivise new states to seek nuclear weapons.[2] Since nuclear weapons are considered a superior class of weapons, a public debate over these, tends to side-line the issues and the risks associated with other weapons.[3] A testimony to this, is how biosafety concerns have gone into a lull since the start of the war. It is despite these concerns having assumed new importance since the pandemic, especially those related to storage, handling, and transportation of bioagents. However, as the disruptions in the liberal international order grow, the biological weapons regime will face further challenges.

Weakening of global governance institutions

The global governance institutions are the first casualty in times of sustained crisis in the international order. Institutions are a set of rules that specify how States should cooperate and compete with each other.[4] They prescribe acceptable forms of State behaviour and proscribe unacceptable behaviour. States negotiate these rules, which are "standards of behaviour defined in terms of rights and obligations.[5] Hence, institutions are a mechanism for "decentralised cooperation of individual sovereign [S]tates, without any effective mechanism of command".[6] Any crisis negatively affects their functions of agenda setting, coordinating the ensuing debates, and rulemaking and enforcement.

The shift from unipolarity to bipolarity will exacerbate the challenges for the BWC. The smooth functioning of a rule-based order requires clarity on global distribution of power.[7] A willing unipolar hegemon is best suited to ensure a sustainable international order.[8] With the rise of China as a peer competitor of the US, developing possible strategies and evolving a consensus on strengthening the BWC regime will become difficult and conflict-ridden. As seen in the past, China's lack of transparency on the origins of COVID-19 and the US's lack of willingness to enforce order within the World Health Organization (WHO) resulted in an inadequate and incoherent global response to the pandemic.[9]

As the backlash against globalisation and the global pandemic are key constituents of the current crisis, the WTO and the WHO have increasingly found it difficult to perform their respective roles. Similarly, the progress on developing an institutional architecture like the Organisation for the Prohibition of Chemical Weapons (OPCW) to monitor and ensure compliance with the BWC will also face new roadblocks.

Re-emergence of border politics

Another phenomenon that positively reinforces institutional weakening is the acute rise in border politics since the pandemic. The idea of an interdependent and interconnected world having shared responsibility, has taken a hit. Border politics and pandemics have been linked very closely for centuries. Border restrictions on immigrants and travellers from outside have been the dominant way States have responded to global health crises. These externalisation policies are driven not by scientific rationale and consensus. Instead, they are influenced by popular opinion, stereotypes, and pre-existing orientations towards State control. Such a response to the pandemic reflects growing anxieties about border security in the modern international system.[10]

Here, one cannot ignore the rise of populism across the globe. As an ideology, populism seeks to bifurcate society into two homogenous but antagonistic camps: a virtuous and homogeneous 'people' and a set of 'elites'. These elites are characterised as 'dangerous' and "depicted as depriving (or attempting to deprive) the sovereign people of their rights, values, prosperity, identity, and voice".[11] Largely, fears relating to border security have become current in domestic politics as against designing and implementing effective national policies on biosafety.

Populist leaders see and project the liberal international order as unfair and unjust.[12] They label international institutions as elite chambers established to benefit a few. Whether from the public or leaders' point of view, these sentiments pose barriers to cooperation. Populists aggressively resist nudges towards cooperation by international institutions and civil society. They are reluctant to delegate national sovereignty and suspect that it would result in a loss of popular support from the electorate.[13] Hence, States will continue to strongly resist any such demands by international institutions for implementing global biosafety norms.

Increased risk of bioweapons proliferation

Thirdly, the risk of bioweapons proliferation emanates both from non-state and state actors.[14] Since the pandemic, extremist and terrorist groups have recognised the immense potential of bio-agents as weapons for mass disruptions.[15] Security agencies have traced the activities of radicalised individuals and groups like Al-Qaeda and Islamic State

pursuing bioweapons.[16] Regarding the inter-State system, the Russia-Ukraine war has brought attention back to traditional anxieties and insecurities. The doubts about national survival can make States look at bioweapons as insurance against existential threats. States having disputes with a stronger adversary or fearing regime change through foreign intervention will look at pathogens and biotechnologies as an asymmetric means to balance against such threats.

Various factors make bioweapons a cost-effective instrument of terror, intimidation, and asymmetric warfare. First, they offer plausible deniability to the user. In contrast to nuclear or chemical weapons, locating them and tracing their supply chain is tough. Second, because of the dual-use nature of biotechnologies, pathogens are cheap and easy to access and can be manipulated for destructive purposes with moderate efforts. Third, bioweapons are easy to deliver and have high potency.[17]

Conclusion

It is not clear if COVID-19 was a potential bioweapon accidentally let loose. However, the pandemic has brought the risks associated with bioagents and biotechnologies out in the open. The dangers posed by these as potential weapons are too great to be ignored or dealt with half-heartedly. States cannot depend just on the normative consensus of bioweapons being immoral and unacceptable, to reduce the risks. Given the multitude challenges, assuming so will put the world population at risk. It is to be seen whether the dangers of not having an effective global biosafety regime can bring the States together on the issue. However, the current crisis of the liberal international order hints at an uncertain future.

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The Convergence of Biological and Cyber Warfare

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Summary

Concerns about cyber threats have grown as a result of the COVID-19 pandemic-ravaged global order. Our biological and digital systems have been severely damaged by the proliferation of different virus varieties. It is crucial to envisage convergence points for biological and cyber warfare for a post-pandemic world order since the COVID-19 pandemic resembles a form of biological warfare combined with persistent cyberattacks. There are two points where biological and cyberwarfare converge. Firstly, integrating cyber and biological weapons might have disastrous results resembling a new form of warfare. Second, the development of international norms for cyberwarfare might learn a lot from the enormously successful development of norms for biological weapons, which are prohibited by international law, given the similarity in their threat characteristics.

Introduction

In the 1990s, cyber warfare was merely a theoretical concept. The situation is visibly different in the 2020s as showcased by the Russia-Ukraine conflict where both sides have employed offensive cyber capabilities.[1] The pandemic-ridden global order has only exacerbated cyber threats-related concerns. The escalation of virus variants has wreaked havoc in our biological and digital systems. Dangers in post-pandemic cyber space pertain to surge in cyberattacks on critical infrastructure, spyware threat, pandemic espionage, disinformation campaigns, rising cybercrimes, and ransomware proliferation due to an inescapable compulsion to digitise.[2]

Therefore, since the COVID-19 pandemic resembles a form of biological warfare coupled with relentless cyberattacks, it is imperative to conceptualise convergence points for biological and cyber warfare for a post-pandemic world order. The intersection of biological and cyber warfare appears at two points. Firstly, the consequences of combining cyber and biological weapons could be catastrophic. While biological warfare has traditionally been viewed as a threat requiring the presence of a specific biological agent, the rise of cyber warfare campaigns has led to the emergence of a fifth phase of bio warfare with a "cyber-bio" framing.[3] Secondly, due to their similarities in threat characteristics, the international norm setting for cyber warfare could gain tremendously from the hugely successful international norm building for biological weapons that are prohibited under international laws. The analysis of these convergence points is essential for tackling new biological and cyber warfare threats and to find possibilities of international restrictive

norm-setting strategies for a post-pandemic offensive cyber capability of countries.

Combined use of Biological and Cyber Weapons

Biological warfare, or the use of pathogenic bacteria and viruses, or toxic biological substances to kill, sicken, or confuse an enemy, has been practised for thousands of years.[4] Biological warfare has traditionally been viewed as a threat that emerged from four distinct eras: pre-germ theory, applied microbiology, industrial microbiology, and molecular biology and biotechnology.[5] Comparably, in cyber warfare, computer networks are used to disrupt, deny, degrade, or destroy information on enemy computers and networks, or even the computers and networks themselves.[6] When cyber and biological weapons are used together, the results can be disastrous. A country that possesses both weapons may be tempted to use both at the same time in order to multiply the damage. For instance, a nation may launch a cyberattack to gain access to sensitive data on the enemy's bioweapon capabilities, including protective equipment and vaccination stocks.[7] Therefore, by weaponizing or virtually amplifying natural epidemics, bio-warfare in the fifth era seeks to weaken socio-political systems rather than directly causing mortality and morbidity in populations through the use of dangerous biological agents.[8] The combinational use of cyber and biological weapons through IoMT (Internet of Medical Things) cyberattacks, critical medical infrastructure breaches, disinformation and misinformation campaigns, and pandemic espionage, can intensify the deleterious effects of biological warfare.

Internet of Medical Things (IoMT) Cyberattacks

To enhance medical treatment and research, the pharmaceutical and healthcare sectors are progressively integrating new technology into their systems. The IoMT refers to devices that are linked to healthcare IT systems via network connections, and is rapidly expanding, with hospitals, patients, and medical professionals using connected devices for various medical functions.[9] A part of the IoMT are the Implantable Medical Devices (IMDs), that include implantable cardiac defibrillators, cochlear implants, insulin pumps, pacemakers, and neuro-stimulators. There are increasing concerns of the security integrity of these devices as they are susceptible to hacking.[10] In June 2020, researchers identified a group of 19 vulnerabilities in a TCP/IP software library, called Ripple20. These flaws affect a number of medical devices and could be exploited for a range of nefarious purposes, such as reducing or obstructing device functioning. Devices used to deliver low-voltage electrical stimulation to the brain to manage chronic pain are vulnerable to attack and can be hacked to change voltage settings.[11] From the standpoint of cyberspace security, this is undoubtedly a brand-new form of biological warfare.

Critical Medical Infrastructure Breaches

A biological attack combined with a cyberattack can shut down hospital information technology systems that may result in widespread casualties. Threat actors can execute a biological attack while also interfering with hospital operations using malware. In fact, health-related cyber networks are not subject to the same strict cybersecurity regulations as other sectors, such as energy or financial services, despite demonstrable attacks showing that the healthcare industry is a key target among critical national infrastructure sectors. For example, the 2017 WannaCry ransomware attack paralyzed the National Health Service

(NHS) of the United Kingdom, disrupting one-third of hospital trusts, damaging 1 per cent of NHS computers, costing £92 million, and cancelling 19,000 patient appointments. These breaches may also be lethal. In the midst of the COVID-19 pandemic in October 2020, US government agencies issued a warning about an upsurge in ransomware attacks against hospitals by threat actors with ties to Russia employing Trickbot and Ryuk malware to destroy critical US healthcare infrastructure.[12]

Disinformation and Misinformation Campaigns

Disinformation campaigns that target public health institutions and policies have increased tremendously, giving rise to widespread anti-vaccination movements and undermining domestic and global responses to outbreaks and pandemics. The rise of measles cases following disinformation campaigns related to the US 2016 presidential elections, the rise of disinformation during the COVID-19 pandemic, and the impact of misinformation on public health interventions during the Ebola outbreaks in 2014-2016 in West Africa and those in 2019-2020 in the Democratic Republic of the Congo are a few examples to explain this phenomenon. High levels of scientific reporting and official advice are juxtaposed with large-scale media reporting, conflicting statistical interpretations, rumours, and hypotheses using disinformation and misinformation. These active disinformation tactics, combined with misinformation disseminated via social media, are likely to exacerbate the outbreak by increasing public distrust of official reporting and rejection of scientific data.[13] The impact of disinformation on pandemics can be compared to a bio-cyber phase, a new stage in biological warfare in which an outbreak is essentially weaponized to have effects similar to biological warfare but without having to deploy an actual virus, avoiding international repercussions.[14]

Pandemic Cyber Espionage

Cyberattacks aimed at stealing COVID-19-related information have become widespread. North Korean hackers, for example, attempted to breach the systems of Pfizer, a pharmaceutical company that manufactures COVID-19 vaccines. Meanwhile, some Portuguese-speaking cyber criminals gained access to the computers of Oxford University researchers involved in COVID-19 vaccine research. Russian and Chinese intelligence agencies have been accused of attempting to steal data on COVID-19 medicines and vaccines from the European Medicines Agency in 2020. Interestingly, the Lithuanian government claimed that Russian hackers were using the country's IT infrastructure to conduct cyber espionage against organisations dealing with the COVID-19 vaccine.[15] Therefore, the cyber espionage related to the pandemic facilitates and sets the groundwork for biological warfare.

Similarities between Cyber and Biological Warfare

Cyber and biological weapons have been adequately compared to nuclear weapons. For instance, according to Joseph S. Nye Jr., despite significant distinctions between cyberattacks and nuclear weapons, governments and private players can apply nuclear lessons to understand and handle cyberspace[16] and bioweapons being referred as the 'poor man's atomic bomb', as a deterrence strategy for nations that cannot afford to develop nuclear weapons.[17] However, while it may seem that dangers

posed by biological and cyber weapons have nothing in common, they actually have a number of similarities that have a significant impact on global security. These weapons have been described as 'non-explosive' weapons in the category of 'non-obvious' warfare, because both the identification of the opposing force and the nature of war are entirely unknown.[18] Gregory Koblentz and Brian Mazanec have classified the similarities between cyber and biological warfare into seven commonalities: 1) the difficulty of attribution; 2) attractiveness as an asymmetric weapon to weaker powers and non-state actors; 3) unclear deterrence value; 4) dual-use nature of affiliated technologies; 5) force multiplier capabilities in the battlefield; 6) penchant for significant collateral damage; and 7) adoption of clandestine programmes to develop these weapons.[19]

The **challenge of attribution** with these weapons is due to their ability to be deployed covertly from unidentifiable or proxy locations and the defender's lack of access to tools to reliably track down the perpetrator of the attack. These weapons are ideal for carrying out clandestine operations and often the victims aren't even aware that an attack has taken place due to the weapon's delayed effects. Just like in biological warfare, it is difficult to differentiate between natural and man-made outbreaks, in cyber warfare, it is a laborious task to identify if a breach was intentional or a technical glitch. It is technically difficult to link a pathogen or computer virus to a specific laboratory or geographic region. For example, The 2001 anthrax letter attacks, in which dried spores of the bacterium Bacillus anthracis, which causes anthrax, killed five people and cost the United States $6 billion, illustrated the difficulty of identifying the source of a biological attack.[20] Further, even after two years since the COVID-19 pandemic, that killed 5 million people and affected 300 million people globally, the exact location and data on how the initial outbreak took place in China, still remains a mystery.[21] The question of attribution is even more contentious in cyberspace. This invisibility cloak due to lack of a mechanism for attribution helps perpetrators to wreak havoc without any accountability.

Historically, the discussions on taming these weapons have been challenging because of their **dual-use applications** and their much-desired ability to act as force multipliers in the battlefield. Commercial, off-the-shelf technology can be used to develop both biological and cyber weapons, which have numerous peaceful and lethal applications along with civil and military ones. Further, due to its multi-use potential, anonymity, widespread effects and relatively low costs, these asymmetric weapons are extremely **attractive for the non-state actors and weaker powers.** For biological warfare, dangerous organisms or toxins can be obtained from natural sources or under the guise of a peaceful application, such as academic research. Similarly, in cyber warfare, the regulation on cyber weapons due to the ubiquity in dual-use application is even more challenging. Botulinum toxin, for example, is one of the most lethal substances on the planet and can be a highly effective biological warfare agent. It is, however, widely used in an extremely diluted form to treat muscle spasms and wrinkles via cosmetic botox treatments.[22]

The capacity to employ these asymmetric weapons as a **force multiplier in conventional military operations** is a significant similarity between biological and cyber warfare. Cyber weapons are particularly suited for employment at the operational, or theatre, level of warfare to cause operational paralysis, decreasing the

enemy's capacity to deploy and coordinate forces in the theatre, as seen in the most recent conflict between Russia and Ukraine.[23] Similarly, the prolonged period of illness caused by some biological agents, such as Brucella spp., may counterbalance the delayed time of onset. The advantage of incapacitating agents is that they would force the defence to deal with many wounded soldiers, who normally use up more resources than dead soldiers do.[24] Further, another common feature is the **unpredictability** associated with the use of biological and cyber weapons, as well as the **potential for collateral damage** as a lack of operational experience with these weapons makes understanding and optimising their effectiveness difficult.

In addition, the capacity to act as a **strategic deterrent is significantly reduced** due to the unpredictable consequences of biological and cyber weapons, the accessibility of defences against them, and the necessity of secrecy and surprise for these weapons to be effective. Finally, another feature that is shared by biological and cyber weapons is the **use of covert programmes** to develop them. Both of these weapons are sensitive enough and their development is rarely acknowledged. The concealed nature with which States develop cyber and biological warfare programmes makes it more difficult to detect and understand them. For instance, the Soviet Union possessed the largest biological weapons programme in history and for decades its magnitude, scope, and sophistication was kept a secret.[25] Similarly, the effects of the Edward Snowden episode, that leaked the extent of the United States government's surveillance programme, is only indicative of how in order for the usage of these weapons to be successful, their development needs to be secretive.[26]

Mutual Norm Setting Lessons for Biological and Cyber Weapons

While biological and cyber warfare share various similar threat characteristics, there are also significant differences. The main dissimilarity being the direct impact of biological weapons on human beings, which is indirect in cyber weapons. Therefore, for cyber weapons to have direct physical implications, they need to anchor a vector, which is not the case with biological warfare. Moreover, there is a long history associated with poisons, which provides a context for thinking about biological weapons that cyber weapons lack due to their relatively new origins that operate in a new and man-made domain, and lack a similar historical, normative framework.[27] However, the development of biological weapons is prohibited by international treaties and nations run the risk of invoking retaliatory measures like economic sanctions. Therefore, due to a number of similarities, as well as the knowledge and rich history of dealing with biological weapons, tactics to counter cyber weapons could advance faster, by learning from the experience of biological warfare, such as the potential for developing restrictive international norms.

Norm Setting for Biological Weapons

Despite being categorised as weapons of mass destruction after nuclear weapons, biological weapons are much older than nuclear weapons and have been in use since ancient times. The Biological Weapons Convention (BWC) now prohibits the development, production, and stockpiling of biological weapons. This event, which prompted the creation of numerous strategies for addressing the threat presented by biological weapons, including international treaties, deterrent threats, export controls, and physical and medicinal countermeasures, has an important historical context. For

example, Germany launched the first State-sponsored biological warfare programme during the First World War in an attempt to weaken the Allied war effort. Both the Allies and the Axis powers developed biological weapons during the Second World War, and Japan employed them against Chinese soldiers and civilians. Furthermore, several countries, including the United States, the Soviet Union, the United Kingdom, France, Iraq, and South Africa, continued to pursue offensive biological warfare programmes during the Cold War.[28]

Numerous countries took unilateral steps to eliminate their stockpile of biological weapons during the 1960s and 1970s. In 1969, the United States stopped using biological weapons, destroyed its stockpile, and ended its 27 years old offensive biological weapons programme.[29] Britain and France too abandoned their biological weapons programmes after becoming nuclear weapons states. Following unilateral disarmament efforts by various States, the BWC was negotiated and opened for signature in 1972, becoming the first treaty to prohibit an entire class of weapons, which came into effect in 1975. Despite the absence of verification procedures in the treaty, the BWC's main objective was to stigmatise and delegitimise biological weapons by enforcing international norms against their creation, ownership, and use. This was demonstrated by the Soviet Union's secret expansion of its biological weapons programme for over a decade even after it had signed the BWC and publicly renounced bioweapons.[30] In addition, because verification procedures for the BWC could not be agreed upon when the treaty was signed due to increased hostility between the United States and the Soviet Union during the Cold War, the treaty's significance is purely declarative.

Nonetheless, unlike the Non-Proliferation treaty, the BWC was an impartial treaty with the same binding rules for all stakeholders. The BWC currently has 183 states-parties, including Palestine, and four signatories (Egypt, Haiti, Somalia, and Syria). Ten states have neither signed nor ratified the BWC.[31] Since its initiation, the BWC has been enhanced by the addition of measures that foster confidence, such as notification of plague outbreaks, notification of bioterrorism incidents, and the development of security labs. The success of BWC and unilateral abandonments of these weapons suggest that these weapons were not considered to be absolutely useful. This may also be seen in the fact that terrorists have not used biological weapons since they are less effective and efficient than easily accessible conventional methods.[32] However, norms setting may still be one of the most effective methods for mitigating cyber danger, despite the failure of norms and international agreements to restrain some biological weapons programmes.

Norm Setting for Cyber Weapons

When it comes to norm setting for restrictive use of cyber weapons, States particularly struggle with agreeing on common objectives. The disparity emerges because Russia and China emphasise on the value of sovereign control while other democracies support a more open internet protocol. International norms setting for cyber weapons began in 1998 when Russia proposed a United Nations (UN) treaty to ban 'electronics and information weapons'. This proposal was supported by China and other Shanghai Cooperation Organisation members (India was not a member when SCO was established in 2001). The US, however, blocked this effort due to its strategic superiority in these technologies. Nonetheless, in 2004, the US and 13 other States agreed to the Russian proposal after which the UN Secretary General appointed a group of governmental experts (UNGGE)

to discuss the issue of cyber threats. Since then, five GGEs met in response to the United Nations First Committee Resolution on 'Developments in the Field of Information and Telecommunications in the Context of International Security.' The lethargy in cyber-related norm setting has been due to the difficulty in accepting common nomenclature; for example, the Russians prefer the term 'information warfare', whereas the US prefers 'cyber operations'. However, the GGE issued reports in 2010, 2013, and 2015 that helped to shape the cybersecurity negotiating agenda significantly. However, the 2017 GGE meeting was a failure and the members could not agree on a common agenda.[33] The UN General Assembly also established an Open-Ended Working Group (OEWG) in 2019 as a parallel working group with GGE on ICTs in the context of international security.[34] Therefore, clearly in comparison to norms setting for biological weapons, work on cyber weapons has a long way to go for encouraging restrictions and bans.

The vast expertise with biological warfare stands in stark contrast to the very little experience with the increasing danger of cyber warfare. The most important lesson from the BWC for a cyber-weapon convention is whether or not effective verification is possible, meaning if stakeholders can pinpoint on necessary conditions to sign and even ratify an arms control treaty. As evident in the BWC, even though bioweapons are banned, the mechanism to verify if States have or are developing bioweapons is absent. Therefore, if inherent verification barriers are taken into account, cyber weapons appear to be one of the worst candidates for an arms control treaty. Cyber weapons pose far more difficult verification challenges than biological weapons due to their attribution challenges, dual-use nature, and development in covert programmes. Further, the success of ban on bioweapons has been due to limited tactical and strategic utility of these weapons.[35] It is unclear on how States can be convinced of tactical and strategic limitation of cyber weapons in the long run, as they are now effectively employed by various militaries as force-multipliers. This can perhaps be possible through the stigmatisation of cyber warfare and its weapons similar to the strategy employed for norm setting for biological weapons. In addition, to successfully implement a dissuasion strategy against cyber weapons, nations and societies must agree that information technology advancements should only be used for peaceful purposes and that using cyber weapons to attack civilian targets and vital infrastructure is unacceptable. The Quad's approach to strengthen cyber resilience through its various initiatives is one example of norm setting strategy that must be expanded beyond the Indo-Pacific.[36]

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Chemical and Biological News

UN still sees no sign of biological weapons in Ukraine

27 October 2022

This marked the third time since the 24 February invasion that the Council has formally met at Russia's request to address its ongoing allegations. The UN's High Representative for Disarmament Affairs, Izumu Nakamitsu, had previously informed ambassadors – first in March, and then again in May – that the UN had seen no evidence of biological weapons use in Ukraine.

"This remains the case today," her Deputy, Adedeji Ebo, told the Council. "I would also like to note that the United Nations currently has neither the mandate nor the technical or operational capacity to investigate this information," he added. Both Russia and Ukraine are parties to the 1972 Biological Weapons Convention (BWC), which prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons.

Mr. Ebo reported on the proceedings of a formal consultative meeting in Geneva, requested by Russia, under Article V of the Convention and the Final Declarations of its Second and Third Review Conferences. "The Meeting heard the presentation by the Russian Federation of its Article V consultation request regarding respective outstanding questions by the Russian Federation to the United States and to Ukraine, concerning the fulfilment of their respective obligations under the Convention in the context of the operation of biological laboratories in Ukraine," he said.

Both Ukraine and the US responded in the meeting, which ended without consensus. This week, Russia lodged a formal complaint to the Security Council under Article VI of the Convention, stating that Ukraine and the US had not provided "necessary explanations". Article VI allows States Party to request the Council to investigate breaches of the Convention. Countries would have to cooperate in any Council investigation.

Mr. Ebo reported that since the BWC entered into force, provisions of Article VI have never been invoked. "The Convention does not provide any guidance on the type of investigation that the Council may initiate. States Parties have also not developed any specific guidance or procedures concerning the modalities to be employed for the purposes of an Article VI investigation," he said. The top official underlined the UNODA's readiness to support any investigation initiated by the Council.

https://news.un.org/en/story/2022/10/1129952

Moscow urges UN probe into Ukrainian biolabs

25 Oct, 2022

Russia is calling on the UN Security Council to establish a commission to investigate alleged violations of the convention prohibiting the production or use of biological weapons by Ukraine and the United States.

"We requested a meeting in two days in line with Article VI of the Biological Weapons Convention," the Russian mission to the United Nations said. Moscow's ambassador, Vassily Nebenzia, circulated a draft resolution ahead of a meeting set for Thursday, along with *"a variety of documents and evidence that shed light on the true nature of military biological*

activities of the US and Ukraine on the Ukrainian territory."

Russia was forced to invoke Article VI of the convention to raise the issues with the Security Council after its repeated inquiries were largely ignored by Washington and Kiev, who *"have not provided necessary explanations, nor have they taken immediate measures to remedy the situation,"* Nebenzia explained.

Moscow has alleged that the two countries conducted secretive, joint biological research on Ukrainian soil, claiming it had obtained incriminating evidence of those activities during the ongoing military operation. The Russian Defense Ministry has gradually released said materials to the public in batches since March. *"The data analysis gives evidence of non-compliance by the American and Ukrainian sides with the provisions"* of the BWC, Nebenzia said.

https://www.rt.com/news/565341-russia-un-ukraine-biological-laboratories/

High Representative's briefing to the Security Council on the implementation of Security Council resolution 2118 (2013) on the elimination of the chemical weapons programme of the Syrian Arab Republic

25 October 2022

Since the last consideration of this matter by the Council and consistent with established practice, the Office for Disarmament Affairs has been in regular contact with its counterparts at the Organisation for the Prohibition of Chemical Weapons (OPCW) on its activities related to this matter. On 24 October 2022, I held a monthly call with the OPCW Director-General to receive an update on developments and ascertain his views.

Efforts by the OPCW Declaration Assessment Team (DAT) to clarify all the outstanding issues regarding the initial declaration and subsequent declarations of the Syrian Arab Republic have not progressed since the Council last met on this issue. Unfortunately, all efforts by the OPCW Technical Secretariat to organise the twenty-fifth round of consultations between the DAT and the Syrian National Authority continue to be unsuccessful.

As Council members were previously informed, the OPCW Technical Secretariat has provided the Syrian Arab Republic with the list of pending declarations and other documents requested by the DAT since 2019, with the aim of assisting the Syrian Arab Republic in resolving the 20 outstanding issues.

As has been stressed on a monthly basis for many years now, due to the identified gaps, inconsistencies and discrepancies that remain unresolved, the Technical Secretariat continues to assess that, at this stage, the declaration submitted by the Syrian Arab Republic cannot be considered accurate and complete in accordance with the Chemical Weapons Convention. 2 The OPCW Technical Secretariat remains fully committed to ensuring the complete implementation by the Syrian Arab Republic of all its declaration requirements and to assisting Syria in fulfilling its obligations under the Convention, OPCW policy-making organs' decisions, and Security Council resolution 2118. I take this opportunity to reiterate my support for the integrity, professionalism, impartiality, objectivity, and independence of the work of the OPCW.

https://front.un-arm.org/wp-content/uploads/2022/10/High-Representatives-briefing-to-the-Security-Council-on-the-implementation-of-Security-Council-resolution-2118-2013-on-the-elimination-

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FACT SHEET: Biden-Harris Administration Releases Strategy to Strengthen Health Security and Prepare for Biothreats

OCTOBER 18, 2022

President Joe Biden will sign National Security Memorandum-15 (NSM-15) and launched the *National Biodefense Strategy and Implementation Plan for Countering Biological Threats, Enhancing Pandemic Preparedness, and Achieving Global Health Security* (the Strategy).

As the President has said, there are no walls high enough or oceans wide enough to keep out biothreats and protect our communities. The Strategy reflects the Biden-Harris Administration's comprehensive plan to protect our nation from future pandemics and biological threats. It outlines a set of bold goals to transform the nation's biodefenses and health security by launching a whole-of-government effort across 20 Federal Agencies to detect, prevent, prepare for, respond to, and recover from biological incidents, in partnership with our international, state, local, tribal, territorial, and private sector partners. NSM-15 supports execution of the strategy by strengthening the coordination of biodefense efforts across government.

Infectious diseases that cross borders and disrupt societies are a threat to our national security and global stability. COVID-19 is the latest example of how biological threats can devastate communities across America and around the world, resulting in millions of deaths and trillions of dollars of economic losses globally. In addition to COVID-19, the global community is concurrently fighting outbreaks of monkeypox, polio, Ebola, highly pathogenic avian influenza, and other diseases, stretching thin global resources and demonstrating gaps in our current preparedness. And, the risks of weaponization of biological agents are expanding.

The United States must be prepared for outbreaks from any source – whether naturally occurring, accidental, or deliberate in origin. Urbanization, climate change, and habitat encroachment increase the risk of an outbreak emerging from animal reservoirs. Global interconnectedness accelerates the speed at which infectious diseases spread across the world, especially when coupled with overwhelmed health systems. Furthermore, the norm against the development and use of biological weapons has been challenged by state and non-state actors over the past several decades.

https://www.whitehouse.gov/briefing-room/statements-releases/2022/10/18/fact-sheet-biden-harris-administration-releases-strategy-to-strengthen-health-security-and-prepare-for-biothreats/

Remarks at the Global Partnership against the Spread of Weapons and Materials of Mass Destruction

October 5, 2022

We also urge all GP members to condemn and call out Russia's deplorable disinformation campaigns, to include the blatant lies that falsely allege the use of CBRN weapons by the Ukrainians and biological weapons activities by the United States and other GP [Global Partnership] members. These claims are patently false and seek to undermine international cooperation and assistance under the BWC's Article X provision. We are grateful to those GP members who spoke up during the recent BWC Article V formal meeting to support the

United States, Ukraine, and our peaceful partnership.

It goes without saying that the United States views biological safety and security as a major priority and is grateful to Germany for its leadership on this topic. We are very proud of this year's deliverables and of the work of the Africa Signature Initiative. We similarly support the role the GP plays in strengthening and reinforcing the BWC, particularly through the BWC Implementation Support Unit's project under the Signature Initiative. Finally, we call upon members to endorse measures at the BWC's Ninth Review Conference to enhance compliance, increase transparency, promote confidence, and strengthen the operationalization of the BWC, and to support an experts' working group to study these issues and identify concrete steps to strengthen implementation.

Responding to Russia's unprovoked war and increasing biosafety and biosecurity capabilities worldwide are priorities for the United States, but they are not the only issues confronting us, or the GP. We must also advance security priories related to chemical and missile threats, especially those emanating from North Korea, the deteriorating security situation in Afghanistan, as well as export controls and other measures to address the rapid evolution of sensitive dual-use technologies. These are but some of the challenges confronting this group, but none of us can do it alone. We have a strong collective record to build upon and the United States is strongly, unequivocally, and passionately committed to doing our part.

https://www.state.gov/remarks-at-the-global-partnership-against-the-spread-of-weapons-and-materials-of-mass-destruction/

Russia floats bioweapons proposal

Sep 19, 2022

Russia has urged amendments to the Biological Weapons Convention (BWC), floating three ideas to reinforce the landmark international agreement and make it more legally binding for its parties. The proposals were announced on Monday by Igor Kirillov, who heads Russia's Nuclear Biological and Chemical Defense Troops.

The proposals were designed after a meeting of BCW member states in Geneva that were held earlier this month, Kirillov told a media briefing. The meeting was convened by Russia, which has accused the US and Ukraine of violating the agreement. Moscow has raised allegations against the two counties of conducting secretive biological research on Ukrainian soil, claiming it had obtained incriminating evidence during the ongoing military operation. The Russian military has repeatedly released said materials to the public in batches since March.

"The participants of the meeting were provided copies of real documents previously publicized by the Russian Defense Ministry, as well as with material evidence confirming the implementation of military biological programs on the territory of Ukraine," Kirillov said. "None of the delegations had any doubts about the authenticity of the submitted documents, including in terms of the accumulation of pathogenic materials in Ukrainian laboratories," he added.

https://www.rt.com/russia/563119-moscow-bioweapons-convention-proposal/

Russian soldiers in Ukraine hospitalized with severe chemical poisoning – Moscow

Aug 20, 2022

Several Russian soldiers involved in the military operation in Ukraine have been hospitalized with severe chemical poisoning, the Russian Defense Ministry said on Saturday. Traces of Botulinum toxin Type B, which is an *"organic poison of artificial origin,"* have been discovered in samples taken from the servicemen, the ministry said, accusing Kiev of *"chemical terrorism."*

The Russian troops were *"hospitalized with signs of severe poisoning"* after being stationed near the village of Vasilyevka in Zaporozhye Region on July 31, the statement said. *"The Zelensky regime has authorized terrorist attacks with the use of toxic substances against Russian personnel and civilians"* following a string of military defeats in Donbass and other areas, the ministry insisted.

Moscow plans to send laboratory tests from the soldiers to the Organization for the Prohibition of Chemical Weapons (OPCW). Botulinum toxin, often called the *"miracle poison,"* is one of the most toxic biological substances known to science. Produced by the Clostridium botulinum bacteria, it blocks the release of the acetylcholine neurotransmitter, causing muscle paralysis.

Botulinum toxin Type A has been used in medicine in small doses in recent decades, especially to treat disorders characterized by overactive muscle movement. It's also well known in cosmetology under its shortened name, Botox.

https://www.rt.com/russia/561214-ukraine-chemical-poisoning-moscow/

Detailed information of Japanese army's notorious chemical warfare unit made public in China for first time on 77th anniversary of Japan's WWII surrender

Aug 15, 2022

The complete name list and personal information of all the 414 members of the Japanese army's Kwantung Army Chemical Department, also known as Unit 516, which researched and developed lethal chemical weapons during World War II (WWII), were made public in China for the first time on Monday, serving as important new historical evidence for the study on Japan's chemical warfare history.

Monday marks the 77th anniversary of Japan's defeat and unconditional surrender in WWII. The Exhibition Hall of Evidences of Crime Committed by Unit 731 of the Japanese Imperial Army located in Harbin, Northeast China's Heilongjiang Province, disclosed the registered information of all the 414 members of Unit 516 which the Japanese army first set up in Qiqihar, Heilongjiang, on May 11, 1939.

Unit 516 mainly focused on the research and development of a series of toxic substances, including the strong erosive mustard gas, the quick erosive lewisite, asphyxiating chloric acid gas and the application of these toxic chemical in actual combats.

According to Jin Chengmin, curator of the exhibition hall, the registration book was completed around 1945. A total of 237 pages were compiled containing 414 members' names, birthdates, household registrations, types of services, arm of the services, as well as their relatives' residences and their relationships, which can reveal the basic historical facts including the entire scale of the Unit 516 and the composition of the

personnel and their ranks. "Like the biological warfare, chemical warfare by Japan was a top-down, premeditated, well-organized and a systematic national crime which violated international morality and human conscience," Jin told media.

According to Jin, the total number of the members of Unit 516 is not 250 as was originally claimed but was as many as 414 that is so far reachable. Its core members were high-rank officers and its professionals came from medical schools and army hospitals. While the notorious Unit 731 killed and harmed Chinese civilians with biological weapons, Unit 516 adopted chemical weapons and they were referred to as a pair of "devil brothers," Gao Xiaoyan, a research fellow with Heilongjiang Provincial Academy of Social Sciences, told media.

https://www.globaltimes.cn/page/202208/1273071.shtml

ISIS planned chemical attacks in Europe, new details on weapons program reveal

Joby Warrick, July 11, 2022

In the summer of 2014, as his followers were ravaging the cities of northern Iraq, Islamic State leader Abu Bakr al-Baghdadi convened a secret meeting with a weapons expert whose unusual skills the terrorist chief was anxious to acquire.

His guest was a small man, barely above 5 feet tall, and he had only recently been freed from a years-long stint in U.S. and Iraqi prisons. But before that, Salih al-Sabawi had been an Iraqi official of some renown: a Russian-trained engineer who had once helped President Saddam Hussein build his extensive arsenal of chemical weapons.

Baghdadi had summoned Sabawi, 52, to offer him a job. If supplied with the right equipment and resources, could he produce the same weapons for the Islamic State? Sabawi's reply, according to a later intelligence report about the meeting, was yes. He could do that and more.

Thus began what U.S. and Iraqi Kurdish officials describe as a crash effort aimed at building the biggest arsenal of chemical and, potentially, biological weapons ever assembled by a terrorist group. Within six months, under Sabawi's direction, the Islamic State would manufacture mustard gas, a chemical weapon from the World War I era, as well as bombs and rockets filled with chlorine.

But Sabawi's ambitions, and by extension Baghdadi's, were much broader, according to newly disclosed details on the Islamic State weapons program. Iraqi Kurdish intelligence reports, seen by The Washington Post, shed new light on the role played by Sabawi, a mysterious figure known within the terrorist group as Abu Malik, and the ambitious plan by Islamic State leaders to develop and use weapons of mass destruction in Iraq and abroad.

New insights also are emerging from a U.N. investigation that is combing through millions of pages of Islamic State records as it seeks evidence of the group's war crimes. In addition, several current and former U.S. officials in interviews with The Post spoke for the first time in detail about an urgently planned military operation, conducted in 2015 by U.S. Special Operations forces with assistance from Kurdish Peshmerga operatives, to kill Sabawi and crush the weapons program before it reached maturity.

https://www.washingtonpost.com/national-security/2022/07/11/isis-chemical-biological-weapons/

US bio-labs overseas: Time to open the doors

By Xin Ping, Apr 29, 2022

The Yongsan US military base in Seoul, the ROK, was surrounded by ROK citizens shouting "Shut down the bio-labs!" It was not the first time that such protests took place in a country in which US troops are based. But the date of this campaign made it different. It was April 10, 2022, the 50th anniversary of the opening for signature of the Biological Weapons Convention (BWC).

From the GG-21 Program in Georgia to the JUPITR Biochemical Experimentation Program in the ROK, biochemical experimental programs controlled by Washington have been exposed one after another. But that is only the tip of the iceberg. The US, a self-proclaimed "beacon of democracy," stands out in conducting dangerous biological experiments and expanding its bio-military empire to the whole world. Recently, a total of 5,629 contracts about US overseas biological laboratories were revealed. And the documents have so much to disclose.

The discrepancy in the number of overseas bio-labs would be an interesting start to a journey of discovery . The US openly admitted that it runs 336 biological laboratories in 30 countries around the world, including 26 in Ukraine. However, the contracts suggest that the US has signed contracts with 49 countries, way more than it had admitted. According to Igor Kirillov, Chief of Russia's radiation, chemical and biological protection force, the US has formed a network of more than 30 biological laboratories in Ukraine, which is also more than the US version of the tally.

In one instance of contract with Ukraine, there is a paragraph that goes, "preventing the proliferation of technology, pathogens and expertise that are located at facilities in Ukraine and that could be used in the development of biological weapons." The wording sounds neutral indeed. But considering the shadowy lab operations and curious coincidences, this admonishment is more like an admission of a standard laboratory practice. It is particularly so when the media outlets all over the world have covered crises in places where US bio-labs are located. The Time of Israel reported that the secret human body experiments in Georgia's Lugar Research Center had caused a number of deaths. In BBC's report, the US troops in the ROK conducted tests on a variety of highly toxic substances, including live anthrax, without informing the ROK government and local citizens. Reuters reported that, on the day the Russian-Ukrainian conflict broke out, the US-controlled biological laboratory in Ukraine urgently destroyed deadly pathogens, including anthrax and rat plague.

https://www.globaltimes.cn/page/202204/1260665.shtml

A legacy of 'secrecy and deception': Why Russia clings to an outlawed chemical arsenal

By Joby Warrick, March 19, 2022

On July 12, 2018, British scientists gathered at a restricted military base for a first look at the weapon used in a bizarre murder attempt a few weeks before. The device was a perfume bottle, tossed away by the assailants as they fled the country, and containing less than a tablespoon of a liquid so deadly that it could only be handled with heavy rubber gloves and hazmat gear.

Investigators already suspected that the weapon was of Russian origin — the intended victim was a Russian ex-spy living in

England, and the attackers were identified as military intelligence operatives from Moscow. The surprise, as the examination unfolded, was the sheer potency of the oily fluid inside the vial. It was enough poison, the scientists calculated, to wipe out a small town: the equivalent of thousands of lethal doses.

This was Novichok, a powerful nerve agent invented by Russia. Just a year earlier, in 2017, Russian President Vladimir Putin had declared to the world that his country no longer possessed such chemical weapons. U.S. and British intelligence officials believed at the time that Putin was lying, and here, in a laboratory in southern England, was tangible proof. Russia had secretly preserved at least some of its arsenal of poisons, and it clearly was willing to use them — including on foreign soil.

Four years later, insights from the probe into the attempted assassination of defector Sergei Skripal in Salisbury, England, are helping to fuel worries that Russian chemical weapons could soon turn up in yet another country, with far graver consequences. The Biden administration has repeatedly warned that Russia, frustrated with the faltering progress of its 3-week-old invasion of Ukraine, may be preparing to use chemical weapons against Ukrainian troops, political leaders or even ordinary civilians in an effort to regain momentum and seize control of key cities.

While the nature of those preparations is not publicly known, current and former U.S. and NATO officials say Russia has long possessed an array of chemical weapons, which it retains in defiance of international treaties and despite years of Russian promises and pronouncements. Moreover, senior Russian leaders appear to regard chemical weapons as a legitimate tool for achieving a variety of goals, from eliminating political foes to subduing armed opponents, officials and weapons experts say. Russia denies possessing chemical weapons, and the Kremlin has accused Kyiv and Washington of plotting to use chemical or biological weapons in Ukraine.

https://www.washingtonpost.com/national-security/2022/03/19/russia-chemical-weapons-ukraine/

China backs Russian allegations about US biological weapons

Beijing's official news agency repeats claims America is trying to spread pathogens through animals

William Langley in Hong Kong and Edward White in Seoul

March 14, 2022

Chinese diplomats and prominent state media have repeated Russian disinformation reports about US-run biological laboratories in Ukraine, deepening tensions between Washington and Beijing ahead of a critical security meeting in Europe. Yang Jiechi, China's top foreign policy official, and Jake Sullivan, US national security adviser, met in Rome, the first face-to-face meeting between senior China and US officials since Russian president Vladimir Putin ordered troops into Ukraine. The talks come against a backdrop of rising frustration in the west over China's relationship with Russia and Beijing's refusal to condemn the invasion. The Financial Times reported on Monday that Russia has asked China for military equipment to support its invasion of Ukraine, sparking concern in the White House that Beijing could undermine western efforts to help Ukrainian forces defend their country.

However, China's official rhetoric on the Ukraine conflict over the weekend

concentrated on allegations that the US was using Ukraine to research dangerous pathogens and biological weapons. Xinhua, the official state news agency, on Sunday published a "satellite investigation", posting satellite images of supposed US labs identified by Russia. Xinhua repeated Russian claims that the US was seeking to learn how to spread pathogens through animals. The Global Times, a nationalist tabloid, ran a story based on an article published in Russian daily newspaper Izvestia, in which an unnamed former Ukrainian official claimed that Ukraine had a network of military research facilities under the supervision of its security services and modernised by the US.

The reports appeared after Zhang Jun, China's permanent envoy to the UN, on Friday dismissed the US assertion that the biological laboratories allegations were "groundless". He said the "concerns raised by Russia should be properly addressed". "The US always says they advocate transparency. If they believe the relevant information is fake, they can just provide us with relevant data for clarification, so that the international community can draw a conclusion by itself," Zhang said. The Chinese foreign ministry has also backed the claims, with spokesperson Zhao Lijian telling reporters in Beijing that US "biological military activities" in Ukraine are "merely the tip of the iceberg".

https://www.ft.com/content/3f9b8164-e9d6-4dfd-880a-f4fa96966439

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