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CHEMICAL AND BACTERIOLOGICAL (BIOLOGICAL) WEAPONS

Letter dated 20 May 1982 from the Permanent Representative of the
Union of Soviet Socialist Republics to the United Nations addressed
to the Secretary-General

I have the honour to transmit to you a critique, prepared by experts from the USSR Academy of Sciences, the USSR Ministry of Health and other competent Soviet organizations, of the report of the United States Department of State to the Congress of the United States entitled "Chemical Warfare in Southeast Asia and Afghanistan", which has been circulated at the United Nations (A/37/157, annex).

The document prepared by the Soviet experts demonstrates, on the basis of a careful analysis of all the points raised in the said report, that the "data and evidence" with which the United States Department of State seeks to support its assertions of Soviet involvement in some kind of "chemical warfare" supposedly being carried on in those regions, are totally without substance.

The over-all conclusion emerging from this critique is that the State Department report is nothing more than a malicious fabrication intended to divert attention from the real chemical warfare that the United States Army conducted over a period of many years against the peoples of Indo-China, to justify the United States decision to begin the large-scale production of new chemical weapons, and to conceal the United States Administration's reluctance to engage in serious negotiations on the prohibition of chemical weapons.

I would request you, Sir, to have this critique circulated as an official document of the General Assembly under item 54 of the preliminary list.

(Signed) O. TROYANOVSKY

* A/37/50/Rev.1.

ANNEX

CRITIQUE,

prepared by experts from the USSR Academy of Sciences, the USSR Ministry of Health and other competent Soviet organizations, of the report of the United States Department of State to the Congress of the United States entitled "Chemical Warfare in Southeast Asia and Afghanistan", which has been circulated at the United Nations

General observations

A study of the State Department report reveals that its assertions of Soviet involvement in the use of chemical weapons in South-East Asia and Afghanistan, like the arguments adduced in support of these assertions, bear no relation to the actual facts.

The report is built on unconfirmed hearsay, interviews with persons claiming to be eyewitnesses, and other circumstantial material of dubious origin. This "information" is in no way supported by independent sources, and the conclusions drawn from it not only are unconvincing but contradict objective medical and technical data. No wonder, then, that no physical evidence to support the accusations made in the report has yet been presented.

To give the disinformation contained in the State Department report an air of verisimilitude, its compilers use a variety of devices. The report has been given a deceptively factual appearance. It contains many geographical names and dates for the alleged instances of the use of chemical weapons. Although the reader has no way of checking the truth of the allegations, the long list of places and "victims" is evidently intended to make a strong impression on him. However, the report disregards the fact that not a single such victim has been produced for doctors to examine.

The report maintains a supposedly "objective" approach to the analysis of various accounts of the use of chemical weapons, including stories spread by the followers of Pol Pot. It is claimed that the authors, concerned lest those stories should prove to be propaganda, have carefully reviewed all the facts. As a result, the report states, only 28 of the 124 accounts of the use of chemical weapons in Kampuchea were confirmed. The authors used this logical device to make their readers believe at least a small proportion of the accounts to be genuine.

The report incorporates a factual description of some of the properties of chemical weapons, which, however, bears no relation to the actual situation on the scene. Thus, theoretical discussions of the toxins' failure to persist in the areas of their presumed use are evidently designed to account for the lack of physical evidence.

Reasons for engaging in the use of chemical weapons are ascribed to the Soviet Union with no substantiation whatever: "The Soviets consider chemical weapons an

effective and acceptable means of warfare in local conflicts ..."; "Southeast Asia has offered the Soviets an opportunity to test old agents that had been stockpiled for many years as well as more recently developed agents or combinations of agents." The authors of the report advance the following argument, which supposedly confirms that mycotoxins - toxic substances produced by microscopic fungi - have been used: mycotoxins are cheap, relatively safe and stable to store and transport, and available from Soviet stocks.

Predictably, announcements by United States authorities as to exactly which poisons have been used have been constantly changing. Originally, neuro-paralytic agents, skin vesicants and other "conventional" substances were said to have been used, although no evidence for this was advanced. During hearings in one of the sub-committees in the Congress of the United States in December 1979, Senator Pryor stated: "For now we have no facts. We have suppositions, we have unconfirmed accusations, we have insinuations, we have a few articles, we have absolutely useless hearings in Senate committees and the Senate itself".

Then, beginning in September 1981, there came a version according to which mycotoxins were being used in South-East Asia and Afghanistan. At a press conference in West Berlin on 13 September 1981, United States Secretary of State Alexander Haig announced: "We now have physical evidence from South-East Asia which has been analysed and found to contain abnormally high levels of three potent mycotoxins - poisonous substances not indigenous to the region". Following this statement, the Permanent Representative of the United States to the United Nations sent a note verbale to the Secretary-General (A/36/509 of 15 September 1981) retracting the story that "traditional" chemical-warfare agents had been used in Laos, Kampuchea and Afghanistan and acknowledging that "no known traditional chemical warfare agent alone or in combination with others could produce all of the symptoms described or cause death to occur as rapidly as had been reported". The note stated that United States agents had sent from the area of an alleged chemical attack on Kampuchea a leaf and stem sample which, under analysis, had revealed abnormally high levels of three potent mycotoxins of the trichothecene group: nivalenol, dioxynivalenol and T-2 toxin. It asserted that the degree of mycotoxin contamination discovered in the leaves and stems was impossible under natural conditions and that trichothecenes "do not occur naturally in warm climates". Having shown that mycotoxins can easily be produced in large quantities with the proper technological capability (mycotoxins are produced, sold and even sent through the post in the United States), the Department of State came to the conclusion that the party producing mycotoxins and using them for military ends in South-East Asia and Afghanistan must be none other than the Soviet Union.

Now the Department of State is making another U-turn: in its report to Congress of 22 March 1982 it retreats from its earlier conclusion that conventional toxins were not used in the region and lumps together all the old and new "evidence" of chemical warfare in South-East Asia and Afghanistan.

The collection and presentation of samples of "Soviet chemical weapons"

Modern chemical weapons and their properties in combat are well known to military specialists in many countries. The effect of chemical warfare agents on

humans, animals and plants is described in some detail not only in the scientific literature but also in army manuals. The latter contain general information about the use of chemical weapons in the First World War and the results of subsequent tests using new chemical weapons on animals and plants and, in the United States, on volunteer human subjects as well. Underlying the superficial picture of the use of chemical weapons and displays of their toxic properties there are objective patterns, scientifically described processes, and well-researched mechanisms by which they act upon various biosystems and organs. Therefore, regardless of where and by whom the use of chemical weapons might be observed, accounts of such use cannot be taken seriously if they contradict known scientific facts.

The lack of physical evidence of USSR involvement in chemical warfare in South-East Asia and Afghanistan is understandably causing concern to the writers of the report. The fact remains that up to now the United States authorities have not submitted any physical evidence to indicate that any known toxic substance has been used. One cannot say that no attempts have been made to find such evidence: the report states that 50 different samples were collected. As early as 1979 the United States Army's Chemical Systems Laboratory (Edgewood Arsenal) received various samples, including a yellow powder and fragments of tiles from the roof of one of the huts. However, the results of analyses using the most up-to-date highly sensitive methods and modern analytic techniques were negative in every case - as well they might be, for toxic substances have not been used since the chemical warfare carried on by the United States Army in that region.

The writers of the report devote much attention to the question why it is difficult and even impossible to obtain samples of poisonous substances from the areas where chemical weapons were allegedly used. They cite abstract arguments about the non-persistence of such substances on the scene owing to the effect of weather conditions, including precipitation, temperature and wind velocity, and to the characteristics of the soil and the over-all environment.

The report states that trichothecene mycotoxins are "fortunately" very persistent substances out of doors, and it was possible to collect specimens from the areas of alleged "chemical attacks" in Kampuchea.

Results obtained in the analysis of the samples

The results of analyses of samples of plant leaves and stems, stated in the report raise many questions. First of all, why do different parts (fragments) of the same leaf contain different quantities of mycotoxins? When contamination occurs artificially, there cannot be such a great variation (by a factor of more than 10) in the contamination levels. Unequal contamination levels for different parts of the leaves are encountered only when contamination occurs naturally because the fungus population is unevenly distributed over the leaf surface.

Furthermore, the analysis results do not indicate contamination levels in the stems. Everything seems to suggest that no mycotoxins were found there. When contamination occurs artificially, as when mycotoxins are actually sprayed by aerosol, the stem cannot remain uncontaminated if the surface of the leaves is

contaminated. With certain levels of aerosol dispersal, the stem may be contaminated to an even greater degree than the leaves.

The report does not indicate the number of leaves analysed. It therefore remains unclear whether the figures given are contamination levels averaged over all the leaves or whether they relate only to the single most contaminated leaf. It may be assumed that on certain leaves no mycotoxins were found, but that fact is not mentioned, since it would contradict the assertions that the leaves were artificially contaminated.

The writers of the report regard the level of leaf contamination (161.25 parts per million) as unusually high. Considering the low toxicity of mycotoxins of the tricothecene group compared to modern toxic substances, M. Meselson, professor of biochemistry at Harvard University, has correctly noted that "the delivery of ethal doses would appear to require the laying down of gigantic quantities of 'yellow rain' per unit area, which would be orders of magnitude greater than that required for conventional warfare agents" ("Yellow rain': unanswered questions", Indochina Issues, No. 23, Center for International Policy, Washington, January 1982).

The State Department report and other American statements have asserted that in the same area of Kampuchea where the leaf and stem samples were collected, a specimen of water from a still pond was collected and analysed. The water was found to contain 66 ppm of deoxynivalenol, as well as "trace amounts" of diacetoxyscirpenol. No nivalenol or T-2 toxin was found in the sample, thus refuting the claim that the area was artificially contaminated with mycotoxins. Why was no nivalenol found in the water, while on the leaves it was found in greater quantities than other mycotoxins? Such a phenomenon can be observed only where contamination occurs naturally, and never when mycotoxins are sprayed from airplanes, by rockets or by artillery.

From the data given in the report it follows that no more than 59.1 milligrams of deoxynivalenol settled on each square metre of surface area of the leaves (assuming that 1 m² of leaves weighs 1 kilogram). At the same time, according to the data given, more than 66 grams of mycotoxin settled on each square metre of the water surface in the above-mentioned still pond, that is, 1,000 times as much as on the leaves. Accordingly, this mycotoxin settled on the surface of the pool at a rate of 660 kg per hectare. Even if we assume that the number of aerosol particles settling on the leaves was less by a factor of several tens than the number settling on the water surface (and there are no grounds for such an assumption), the contradiction in the analysis results remains. Everything falls into place if we work from the assumption that the plant stems and leaves and the water in the pond were contaminated naturally. It is only in that case that both the relative amounts of the mycotoxins and the amount of each of them in the various samples could be different.

In agriculture and forestry, chemical poisons are used at a rate of 1-5 kg/ha. According to United States Army manuals, lethal doses of neuro-paralytic agents in the target area can be produced by using less than 10 kg/ha. What sense does it make militarily to use mycotoxins if they must be used at the rate of 660 kg/ha., and one United States light transport aircraft,

the L-19, can carry barely sufficient mycotoxin to contaminate 0.5 ha.? As Professor Meselson appropriately pointed out, when water is contaminated by mycotoxins at a concentration of 66 ppm, death will occur if a person drinks several gallons of it.

The report mentions incidents in which people allegedly died of poisoning after drinking water from ponds in the "yellow rain" areas. However, death, could occur only if several tons of mycotoxins were used over each hectare of the pond. But in that case the roofs of buildings, the trees and the soil would have been covered with a thick layer of powder, and there would then have been no point in resorting to contrived methods of sample analysis.

The natural occurrence of trichothecenes in South-East Asia.
Analysis of blood samples

The report, like earlier statements by the State Department, submits as evidence the argument that microscopic trichothecene-producing Fusarium fungi do not occur naturally in South-East Asia and that the discovery of trichothecenes in the region and in the areas of the alleged chemical attacks demonstrates the involvement of the Soviet Union in the use of mycotoxins.

That assertion is contrary to scientific evidence. Prior to the Second World War, François Bugnicourt, a French researcher, described in some detail the occurrence of Fusarium fungus in South-East Asia. In 1975, the medical faculty of the former Saigon University published experimental data indicating that throughout 1974 the presence of spores of this fungus was regularly detected in the air of Saigon. The monographs Food Infections and Phytotoxins, published in the United States in 1979, and Genus Fusarium, published in the United Kingdom in 1971, contain very detailed data indicating that several species of toxigenic Fusarium fungi, capable under the natural conditions of South-East Asia of producing trichothecenes, are widespread in that region. It was proved long ago that Fusarium fungi exist everywhere and their spores are carried by air currents. Mycotoxins may be found on plants under almost any conditions of soil and climate, from the permafrost of the Arctic to the Sahara Desert. Furthermore, the fact that two toxins may be present simultaneously on a plant has been known in the scientific literature since 1972. There has been a reported case in which bread cereals were naturally contaminated with three different mycotoxins at the same time. All these facts refute the report's assertion that the combination of mycotoxins found on leaf samples from Kampuchea is unusual.

The discovery of mycotoxins in water samples should also cause no surprise. Japanese scientists (Ueno et al.) established in 1977 that toxigenic Fusarium fungi and the trichothecene toxins produced by them may be found in the bottom sediments of bodies of water. If the mycotoxins occur in the bottom sediments, they must also occur in appropriate concentrations in the water itself.

Consequently, in Kampuchea, Laos, Thailand and other countries of the region rice, fruit, vegetables and other fruit products may, in certain locations and at certain times of year favourable to the growth of Fusarium fungi, be contaminated with mycotoxins.

When toxic substances, including mycotoxins of the trichothecene group, enter the organism, the toxic substances themselves or their metabolites will necessarily be found in the blood, especially during the first days after intoxication occurs. Therefore the fact that a metabolite of T-2 toxin was discovered in the blood of only two of the nine "victims", as stated in the report, should be attributed primarily to natural intoxication.

An analysis of the blood of the "victims" was carried out several weeks after the "chemical attack". However, it is known from the published works of United States and Japanese authors that trichothecene toxins are completely eliminated from the organism in 2 to 4 days. The reference in the report to the "unlikely possibility" of strong binding of the mycotoxins to proteins and lipids, with a mention of Ueno's survey, is merely speculative. That survey is in fact concerned with the high affinity of trichothecenes for ribosomes, which is the cause of the mechanism of their toxic effect as inhibitors that suppress protein synthesis. But the survey contains no indications that such a binding to or affinity for ribosomes leads to a retention of trichothecenes in the organism for several weeks. The discovery of microscopic amounts of metabolites of mycotoxins in the blood of "the victims of the chemical attack" indicates merely that the T-2 toxin entered their bodies no earlier than 2 to 4 days before the analysis was carried out, not at the time of the "chemical attack", which allegedly took place several weeks earlier.

The report mentions the results of an analysis of the blood to determine white-corpuscle content. The analysis carried out at the United States Army Medical Research Institute of Infectious Diseases allegedly showed that eight of the nine "victims" tested had a depressed white cell count. However, it has been reliably established that a single administration of T-2 toxin to mammals (mice, rats, guinea pigs, cats and monkeys) - which would be the case in a chemical attack - causes a temporary increase in the number of white blood cells (leucocytes). A reduction in the number of white cells (leucopenia) is observed only after multiple administration of such mycotoxins over a period of several weeks. The available scientific data on the poisoning of humans by grain infested with Fusarium fungi also indicate that leucopenia occurs only as a result of prolonged daily ingestion of the mycotoxin-contaminated grain in food. The data on the supposed depletion of white corpuscles in the blood of the "victims" indicate only that these "victims" might have consumed contaminated food over a prolonged period.

A reduction in the white-corpuscle level may be the result of factors other than mycotoxins. Leucopenia is observed in cases of chronic poisoning with phenol, and especially with dioxin, which is still present today in rather large quantities in the natural environment of Indo-China as a result of the chemical warfare conducted by the United States Army in that region. Lastly, leucopenia is also observed in people who have suffered from virus diseases, including influenza.

Toxicity of trichothecenes

The report from the United States Department of State gives data on the toxicity of trichothecenes. The lethal doses of trichothecenes vary between 0.1 and 1,000 mg/kg. The median lethal dose (LD₅₀) for T-2 is given as 0.5 mg/kg.

However, this statement does not indicate the method of administration of the trichothecenes.

We give below some data on the lethal doses of three mycotoxins mentioned in various United States statements, as determined in experiments on laboratory animals. The data are taken from the scientific publications of United States and Japanese authors between 1961 and 1978. At the same time, for comparison purposes, we give data on the toxicity of other toxins and of American neuro-paralytic toxic agents.

<u>Mycotoxin</u>	<u>mg/kg</u>	<u>Laboratory animal</u>	<u>Method of administration</u>
T-2 toxin	3.8	Rat	Oral
	3.04	Mouse	Intraperitoneal
	4.97	Day-old chick	Intragastric
Nivalenol	4.0	Mouse	Intraperitoneal
	5.2	Mouse	Subcutaneous
	4.1	Mouse	Intraperitoneal
	0.17	New-born mouse	Subcutaneous
Diacetoxyscirpenol	23	Mouse	Intraperitoneal
	10	Mouse	Intravenous
	0.75	Rat	Intraperitoneal
	7.3	Rat	Oral
Batrachotoxin	0.002	Mouse	Subcutaneous
	0.005	Cat	Intravenous
Saxitoxin	0.18	Dog	Oral
	0.01	Mouse	Intraperitoneal
	0.012	Rat	Intravenous
	0.03	Rabbit	Intravenous
Sarin (GB)	0.2	Mouse	Intramuscular
	0.19	Mouse	Subcutaneous
	0.2	Rat	Intravenous
	0.03	Rabbit	Intravenous
VX	0.022	Mouse	Subcutaneous
	0.0063	Rat	Intravenous
	0.006	Dog	Intravenous

When trichothecenes are administered orally, a lethal outcome, as can be seen from the above table, may take place at mycotoxin doses amounting to several milligrams per kilogram of the animal's body weight. The report gives the characteristic toxicity of T-2 as $LD_{50} = 0.5 \text{ mg/kg}$, which contradicts the scientific data. As was reported by the Centre for International Policy (a private scientific research organization in the United States) in its publication Indochina Issues, No. 23, dated January 1982, in an experiment at the University of Illinois, enormous doses of T-2 toxin were fed to a pig which finally died of gastric haemorrhage. Dr. James Bamburg, co-discoverer of T-2 toxin, upon learning of the results of this experiment said: "I cannot see how dispersal from the air could lead to such high doses as were administered to that pig ...".

The report states that one of the "victims" spent 30 minutes in water contaminated with mycotoxins. But this mythical "victim" was not capable of distinguishing contaminated from uncontaminated water. A determination that the water was contaminated with mycotoxins, especially in such low concentrations, would require special laboratory equipment or reagents.

Described methods of use of mycotoxins and their effectiveness

Most accounts of the use of mycotoxins in Laos, Kampuchea and Afghanistan, including those in the report, refer to the spraying of mycotoxins from aircraft in the form of "yellow rain".

All trichothecenes are solids and can produce toxic effects in humans and animals if they enter the organism through the respiratory and digestive tracts. Unlike the American toxin VX, mycotoxins of the trichothecene group cannot produce toxic effects, let alone fatal intoxication, in humans by coming into contact with the skin.

Aerosol particles of mycotoxins can enter the organism with inhaled air if their size does not exceed 5 to 30 microns. However, an aerosol cloud of mycotoxins made up of particles of that size becomes dispersed at an aircraft's flight altitude and does not reach the surface of the earth in dangerous concentrations, since the settling rate of such particles is very slow. In that connexion, it is useful to mention the conclusion of the report of the United Nations Group of Experts (A/36/613, para. 54):

"In reviewing the reports, certain allegations of the use of chemical weapons could not be accepted outrightly, e.g. the supposed dissemination of chemical agents by aircraft flying at an altitude of 7,000 feet, since at that altitude such agents would be dispersed by the wind and diluted to such an extent that no effective concentration could reach a target. Similarly, such aerial spraying could not possibly affect - as it was alleged to have done - water supplies to produce toxicity and death, produce holes in the leaves of the trees or destroy soft tissues down to the bone."

After aerial spraying, mycotoxins can reach the surface of the earth if the size of their particles exceeds 200 to 600 microns. However, as stated above, such

particles do not enter the lungs with inhaled air and cannot affect humans through the skin.

The solid toxins CS-1 and CS-2 were used by the United States in Viet Nam for ground contamination. The size of the particles of these substances did not matter much, since CS is capable of evaporating (sublimating) and contaminating the air in the form of vapours. Mycotoxins have larger and more complex molecules and cannot build up dangerous vapour concentrations in the atmosphere through natural sublimation.

Symptoms of mycotoxin poisoning

In the absence of physical evidence of the use of chemical weapons, the main argument used in the State Department report is the assertion that the symptoms of intoxication described by "eyewitnesses" and the symptoms of trichothecene intoxication described in the medical and other scientific literature coincide.

These assertions and declarations are untrue. In October 1981, the magazine "Nature" printed a statement by Dr. D. Paterson, of the Central Veterinary Laboratory at Weybridge, who is experienced in research on the effect of mycotoxins on animals: "All of the symptoms observed by the eyewitnesses were not so specific that they can be considered objective evidence. The symptoms of intoxication caused by mycotoxins vary widely, depending on the type, ... and for that reason it is not obvious that the symptoms described could have been caused by mycotoxin poisoning".

The similarities in the poisoning symptoms described by "witnesses" from various parts of Laos, Thailand and Kampuchea are not surprising, since these statements were obviously prepared by the same people.

The United Nations Group of Experts confirmed that stories about the poisoning symptoms of "victims" in South-East Asia and Afghanistan were fabricated: "The Group discovered that some combinations of signs and symptoms presented were impossible: for example, the vomiting of blood or anal bleeding immediately after intoxication. This also holds true for the cases in which the toxic substance allegedly caused death instantaneously without any signs of intoxication."

Researchers at the Central Veterinary Laboratory in the county of Surrey, United Kingdom, showed in 1979 that the oral administration of DAS (diacetoxyscirpenol) to young pigs and calves in daily doses amounting to 0.1 LD₅₀ for 7 to 8 days did not provoke clinical symptoms of the haemorrhagic syndrome. They concluded that T-2 toxin, DAS and other metabolites of Fusarium tricinctum have no connexion with haemorrhage having an alimentary aetiology. Thus, the cases of vomiting of blood and bloody diarrhoea which are mentioned in the report can mean that the individuals studied suffered simply from some sort of food poisoning, not from intoxication by trichothecene toxins sprayed from aircraft.

Poisoning symptoms unknown to science are referred to in the report; it mentions the statement of an unnamed Afghan pilot who supposedly said that

"there ... was a specific gas that is absorbed by the body and leaves the skin so soft that a finger can be punched through it".

An equally ridiculous statement was made to a United States official by "a member of the [Afghan] resistance with considerable knowledge of Soviet weapons"; he said: "The corpses are extremely relaxed, with no evidence of rigor mortis. Flesh and skin frequently peel off if an effort is made to move the bodies".

The report contains several statements to the effect that the corpses of "victims" of chemical attacks took on a dark reddish colouring (in earlier stories, this darkening of the corpses was said to have been accompanied by tears in the skin, through which a yellow liquid flowed). Besides the well-known symptoms of ordinary food poisoning, such as nausea, vomiting, diarrhoea and weakness, the report lists some new ones: drowsiness, dizziness, convulsions, dark stools, excessive salivation, facial swelling, spasms and a feeling that the stomach is swollen and is "going up and down". These descriptions of poisoning symptoms contradict the data of toxicology.

Physical properties of the toxic substances allegedly used

In the pure state, trichothecenes are odourless and colourless solids, although the unrefined product may have a dark colouring due to impurities.

The initial official United States statements mentioned "testimony" that the chemical substances used sometimes were odourless and sometimes smelled of alcohol, lemon, pepper, or even dynamite or gunpowder. Mention was made of the use of "laughing gas", one of the nitrogen oxides. The Hong Kong magazine Asiaweek of 1 December 1978 was quoted as reporting that drops of some liquid were sprayed out of cannisters hung under aircraft wings, that they solidified after hitting the earth and that they could then be touched without danger, but that upon contact with moisture, this hypothetical substance was activated and began to exude deadly vapours.

According to "eyewitnesses", besides "yellow rain", colourless, white, green, gray, blue, red, blue-black and black substances were also used. They spoke of a combination of substances of various colours, there were supposedly even cases in which substances of three different colours were sprayed simultaneously from a single aircraft.

Chemical-weapons specialists know that modern combat toxic agents are odourless and colourless. The authors of the report, who are aware of this, advance the hypothesis that in addition to chemical weapons, coloured signal smoke was used to mark the limits of the areas of contamination, since the chemical attacks were experimental in nature. This statement, too, is unsupported by any evidence.

Physical evidence of the use of chemical weapons

The use of chemical weapons can always be demonstrated by means of tangible evidence. Physical and biological evidence of the conduct of chemical warfare by the United States in South-East Asia from 1961 to 1972 has been preserved to this day. There are living witnesses: Vietnamese who suffered herbicide and dioxin poisoning which damaged their reproductive apparatus (chromosomal aberrations). Dioxin is found over vast areas in the soil to this day. In areas where it was used there are remnants of spent smoke grenades containing CS, herbicide containers, and captured samples of herbicides and of other chemical weapons.

Although invented stories of USSR involvement in chemical warfare in South-East Asia and Afghanistan have been spread for several years, so far not one item of direct physical evidence has been produced.

Chemical shells, bombs, mines, aerial bombs and rockets, pyrotechnic equipment for sublimating toxic substances, and any other devices cannot be used without leaving some of their structural components in the areas of use.

In the report of the United States Department of State and in other American documents, including those of Congressional hearings, there are descriptions of hundreds of cases of the "use" of toxic agents. There are accounts of various devices allegedly dropped from aircraft ("a cone-shaped cylinder 1 metre long and 18 inches in diameter", "a 12-inch-long cylinder", "a cylinder 1 m long and as thick as an arm"). The report states that 60-mm chemical bombs, 120-mm chemical shells and even American 107-mm chemical rockets and M-79 grenade launchers were used, that canisters containing tear gas and other toxic incapacitants were dropped from helicopters and that explosions of rockets which were launched from aircraft and which exploded close to the ground or above the tree-tops were observed. One of these accounts states that the air-dropped containers released 2 or 3 whitish objects, "about the size of a lampshade", which dispersed toxic agents.

But despite the profusion of such observations, for some reason the "eyewitnesses" did not possess a single shell or bomb fragment, a single rocket, a single canister or a single cylinder.

In 1979, the United States Department of State quoted accounts published in the Bangkok Post of 12 October 1978, in National Review Bulletin of 13 November 1978 and in other publications concerning the use of mustard gas or a similar substance. The State Department report repeats the story of the use of mustard and nitrogen mustard.

The harmful properties of mustard gas have been well known since the First World War: mustard poisoning is characterized primarily by damage to the skin, eyes and respiratory tract, and, when ingested with water and food products, by damage to the digestive tract; such damage takes a long time to heal. After the skin blisters and sores have healed, permanent scars are formed. Even when victims are exposed to mustard vapours, the period of reddening is followed by a persistent pigmentation of the skin which remains for many months and years. For this reason, the actual facts relating to the use of mustard gas can be proved by physical evidence in all cases.

However, the doctors did not see a single victim of mustard gas.

Recently, especially in connexion with the events in Afghanistan, allegations about the use of neuro-paralytic agents have become more frequent. Such allegations are found in the State Department report.

The clinical picture of intoxication by neuro-paralytic agents such as sarin (GB) and soman (CD) is well known to United States doctors specializing in toxicology, at least from descriptions which they possess concerning accidental intoxication of humans by those substances.

In all cases of the actual use of neuro-paralytic agents, in addition to fatalities, there must be a certain number of people suffering severe intermediate or mild poisoning. Severe and intermediate poisoning cases require hospital care, with the use of special therapeutic substances, for periods of weeks and even months. It is fairly easy for toxicologists to establish the fact of poisoning by neuro-paralytic agents from the clinical evidence of the damage. However, the report contains no evidence of any objectively authenticated case of such poisoning. The United Nations Group of Experts, after investigating so-called "victims" of the use of chemical weapons who were being treated in hospitals, came to the conclusion that the illnesses of those patients were in no way connected with attacks using toxic agents or mycotoxins.

Other statements contained in the State Department report: some examples

In support of the statement that the socialist countries are giving practical consideration to the use of toxins for military purposes, mention is made of the fact that the properties of toxins are described in a textbook published in one of the member countries of the Warsaw Pact. However, a report of the Secretary-General of the United Nations entitled "Chemical and bacteriological (biological) weapons and the effects of their possible use" (1969) contains a description of the properties of botulinus toxin and of botulism, and a report of the World Health Organization (WHO) entitled "Health aspects of chemical and biological weapons" (1970) describes the properties of ricin and botulinus toxin. The logic of the State Department report would imply that both the United Nations and WHO are engaged in preparations for a toxin war.

Under United States Army regulations, authority to use chemical weapons in combat operations is accorded to the commanders of divisions or larger units. The State Department report assumes, without any justification, that the same rule applies in the Soviet Army, and also in the Army of the Socialist Republic of Viet Nam.

Information relating to the chemical weapons of the United States Army is extended without proof to the Soviet Union. For example, some of the accumulated stock of toxic substances in United States arsenals is stored in one-ton steel containers. This provides the basis for the following statement: "Soviet military forces are known to store [chemical] agents in bulk ..."

The report states that wooden crates with plastic canisters containing toxic substances were seen during the unloading of a Soviet vessel in the port of Saigon. The fact is that the American toxic agent CS-2 at one time was shipped to Viet Nam in plastic canisters packed in wooden crates, each crate containing 5 canisters. This, of course, is not mentioned in the report.

One of the ways in which United States troops in Viet Nam disseminated CS-2 was by releasing plastic canisters of the substance in powdered form from helicopters. Today this method is being attributed to the Vietnamese, who allegedly release canisters from MI-24 helicopters.

In the chemical warfare it conducted in South-East Asia, the United States Army dispersed toxic agents by means of 2.75-inch aircraft rockets. The report alleges that the USSR is also using these American rockets, but with a chemical warhead of its own manufacture. One of the "eyewitnesses" is said to have seen that such a warhead was fitted to the rocket "more loosely" than the standard American one. In one of the television broadcasts in the United States which publicized the book by S. Seagrave entitled Yellow Rain, a pilot who had defected was shown tracing a picture of the rocket with a stick in the soil. Such is the evidence put forward to demonstrate that chemical rockets are used by Soviet troops.

The report speaks of the presence of chemical battalions in the Soviet troop contingent in Afghanistan, the deployment of decontamination units at several locations, the issuing of protective equipment to Soviet troops, and the fact that the Soviet troops withdrawn from Afghanistan did not include chemical units. On the basis of these statements, it is concluded that the chemical-defence units were involved in the use of chemical weapons.

There is not a single chemical battalion in the limited contingent of Soviet troops in the Democratic Republic of Afghanistan. There are only chemical-defence units, which are an integral part of the regular structure of the army (whereas the report affirms that chemical units are attached to the Soviet forces specifically for the use of chemical weapons).

The presence of chemical-defence units in the limited contingent of Soviet troops in Afghanistan not only is explained by the structure of the army but also is justified by the use of American-manufactured chemical weapons by bands of insurgents, as was demonstrated at a press conference in Kabul in 1980. Wherever they are deployed, military elements have to concern themselves with preparation for combat. This is true in the case of the military units in Afghanistan. They must also set up decontamination stations and deal with matters relating to chemical and radiation reconnaissance. In addition to their duties relating to preparation for combat, the chemical-defence units in Afghanistan are currently performing additional routine tasks in connexion with the supply of water for military personnel. These are the facts concerning the chemical-defence units in Afghanistan.

The State Department report states that the "mujahidin" captured a Soviet military chemical specialist named Y. Povarnitsyn. He is a junior sergeant on

active service who was called up on 26 October 1980, underwent a five-month course of instruction in the chemical and radiation reconnaissance programme, including basic military training, and joined a chemical-defence unit in Afghanistan on 15 May 1981. On 30 May he disappeared without trace; it now transpires from the report that he was kidnapped by bandits. Only an ill-informed or ill-intentioned person could describe him as a "military chemical specialist".

The report repeatedly alludes to the involvement of Soviet military advisers in the use of chemical weapons in South-East Asia and asserts that they are responsible for training troops in chemical-warfare tactics, providing appropriate technical assistance, carrying out inspections and even taking a direct part in the use of chemical weapons.

The fact is that there are no "Soviet military chemical specialists" in Kampuchea or Laos, nor are there any in Viet Nam.

The report states that a Soviet vessel that sank some years ago near Odessa had been carrying chemical toxic agents and munitions bound for Viet Nam. The "signs of violent poisoning" among the divers carrying out the salvage work are described in detail, and it is alleged that military experts were involved in raising the vessel.

The facts are that on 13 January 1972 the vessel Mozdok, leaving Odessa harbour for ports in India with a cargo of agricultural machinery, steel, asbestos and chemicals, collided with the Bulgarian tanker Lom, was holed in the side and sank, together with the tanker, 4-1/2 miles from Odessa harbour. The chemical cargo was destined for the port of Bombay, India. The 724 tons constituting the total load of chemicals aboard the Mozdok included 615 tons of DDT dust in 30,159 cardboard-and-plywood drums, 41 tons of dimethylaniline in 197 metal containers, 49 tons of ortho-nitrotoluene in 200 metal containers, 18 tons of alpha-naphthylamine in 151 metal drums and 1-1/2 tons of metol in cellophane packets enclosed in 5 wooden cases. The raising of the Mozdok was accomplished by the 30th detachment of the Rescue, Salvage, Raising and Transport Operations service (30 ASPTR). Upon completion of all the preparatory operations, the ship was raised on 19 August 1974 and towed to Odessa harbour.

The chemicals on board were not off-loaded during preparatory operations, since access to them was obstructed and they were packed in safe containers. Some of the containers holding the DDT dust had been damaged in the accident. All the chemicals aboard the Mozdok were toxic, the most toxic of them being the DDT dust. The DDT dust had been intended for combating insects; the dimethylaniline for the manufacture of dyes, medicines and photographic reagents; the ortho-nitrotoluene for the manufacture of dyes; the alpha-naphthylamine for use in the rubber industry and for manufacturing dyes and photographic reagents; and the metol for manufacturing photographic reagents. The divers working around the sunken Mozdok showed no signs of chemical poisoning.

According to an inspection by Fisheries Inspectorate authorities, the release of DDT dust into the waters of Odessa Bay did not kill any fish. After the ship was raised, the Odessa port authorities sent the chemicals on board to the

manufacturing plants, except in the case of the DDT dust, part of which was distributed before June 1975 to 15 collective farms in the Odessa region, while the remainder was buried in accordance with technical environmental-protection regulations, at the village of Altestovo in Odessa province. Military specialists were not involved in either the work of raising the vessel or the off-loading of the chemicals.

Chemical warfare conducted by the United States in South-East Asia

The State Department report to the Congress does not contain a single word on the real chemical warfare that the United States Army conducted for many years in Indo-China. Unlike the allegations of Soviet involvement in the use of chemical weapons, the criminal acts committed in that region by the United States are extensively documented and described in both the general and the scientific literature. Witnesses of that chemical warfare, the true victims, are still alive, and the physical evidence remains as well.

In one sense, the United States Army's chemical warfare in South-East Asia still goes on even today. The after-effects of chemical warfare, like unhealed wounds, are still causing suffering among the Vietnamese people. The toll of victims of United States chemical weapons continues to grow, owing to the delayed effects of chemical warfare.

The United States tested 15 different chemicals and formulas for destroying crops, stands of cultivated plants, trees and shrubbery in South Viet Nam. Over 90,000 tons of such chemical agents was dropped on Vietnamese soil, causing major ecological shifts in the region. South Viet Nam's mangrove forests (500,000 ha.) were totally destroyed, while 60 per cent (about 4 million ha.) of its jungle and 30 per cent (over 100,000 ha.) of its lowland forests were affected. All its rubber trees perished. According to figures from the biology department of Hanoi University, of the many species of tropical rain-forest trees and shrubs in the affected areas, only some isolated species of trees and a few types of spiny grass unsuitable for cattle fodder have survived. Those portions of the affected lowland forests that have been put to agricultural use yield poor and unreliable harvests. Only 18 of 150 species of birds have survived, many of them species that have migrated from steppe areas. Amphibian and even insect life has almost completely disappeared. Where previously a sample catch of insects would yield 10,000 specimens, only about 10 can be caught today under the same conditions. The number of fish in the rivers has diminished, and the composition of the fish population has altered.

The lowland forests are not expected to recover naturally within the next 100 to 200 years. The mountain forests that died cannot be restored at all, since after their destruction, the soil layer was washed away by tropical downpours. In some areas the natural process of soil erosion was accelerated by artificially induced downpours which were the subject of special United States meteorological experiments in South Viet Nam.

There are still enormous swampy areas where the destroyed mangrove forests

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stood. This has caused a sharp decline in fish and shrimp stocks, and for that reason some two thirds of the original population has been forced to leave such areas.

Irremediable damage has been done to the health of the Vietnamese population. Many thousands of South Vietnamese died when the United States used its chemical weapons. Hundreds of thousands of survivors suffered damage to their genetic apparatus from the immediate effects of the toxic agents (chromosomal aberrations), and their blood composition was significantly altered; they suffer from diseases of the liver, the blood, the immune system, the lymphatic system and other organs; disruptions of the central nervous system and an increased incidence of illness are becoming apparent.

The deliberate use of the dioxin-containing Agent Orange was especially ruinous. The United States Army could not but be aware of the lethal properties of this extremely dangerous synthetic poison, if only through injuries suffered at a number of chemical enterprises, including an accident at a chemical plant at Amsterdam, New York, in 1963, as a result of which the plant was closed for 10 years and then obliterated from the face of the earth, with some parts of the buildings, equipment and soil being buried at sea. Dioxin is still being detected in Viet Nam, in areas where Agent Orange was used, in both surface and subsurface (down to 2 metres) soil samples. When it enters the human organism in water and food-stuffs, this poison causes tumoral diseases, especially in the liver and the blood, widespread congenital deformity in children, and numerous miscarriages. Medical statistics obtained by Vietnamese doctors indicate that these effects are still manifest many years after the United States stopped using Agent Orange, and there is reason to fear that they will increase in the future.

According to the findings of Dr. Tung, Chairman of the Vietnamese State Commission to Investigate the Consequences of Chemical Warfare, over the post-war period the proportion of children with congenital deformities in North Viet Nam, where chemical weapons were not used, averages 0.4 per cent annually, while in South Viet Nam congenital deformities are encountered 10 times as often (4 per cent); it should be borne in mind that the number of congenital deformities in North Viet Nam has also been rising as a result of the effects of dioxin, because the fathers of young families suffered dioxin poisoning in South Viet Nam. According to the findings of a survey of 956 families with fathers who had suffered dioxin poisoning in South Viet Nam and 593 families with parents who had had no contact with Agent Orange (the control group), the number of congenital deformities in children has risen by a factor of 15, the number of miscarriages by a factor of 1.5, and the number of premature births by a factor of 3.3.

According to information from a gynecological hospital in Ho Chi Minh City, the number of miscarriages suffered by patients there in the period 1967-1979 was on average of 35 times as high as in 1952, while pathological pregnancies (hydatiform mole of the uterus) were 4.2 times as numerous. According to the results of an investigation carried out in Thuan Hai province in the period 1976-1981, among 10,176 recorded pregnancies there were 657 abnormalities. In 395 cases miscarriages or premature births occurred, and 116 mothers had stillborn babies. Seventy-two mothers were found to have hydatiform moles of the uterus.

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seventy-four children were born with deformities. The gross deformities afflicting the new-born infants included anencephalia, (harelip), arrhinia, anotia and exophthalmos. There are very frequent cases of children born without extremities or with deformed extremities. There are cases of hydrocephalus, microcephalia, heart disease, genu varum, congenital cataracts and hermaphroditism.

According to information provided by Dr. Ton Than Tung, the number of deformed children born to former South Vietnamese servicemen in the town of Yen Bay in Hoang Lien Son province was 47 out of a total of 1,496 children (3.14 per cent), while only four out of the 1,438 children born to former North Vietnamese servicemen (0.27 per cent) were deformed.

Dioxin also causes deformities in animals. In Tay Ninh province there were cases of two-headed calves being born. The fish in the province's lakes have twisted spinal columns, shortened bodies and enlarged heads. The local population is afraid to use such fish for food.

In using the toxic agent CS the United States Army utilized no fewer than 10 different kinds of chemical weapons and equipment, including various types of hand grenades, rockets for multiple rocket launchers, airborne missiles, cluster bomb units, and plastic canisters and bags filled with the substance. By means of this toxic agent, the peaceful population was driven out of its villages and smoked out of caves and shelters. There were also some fatalities.

Apart from the direct results of the "herbicide" war waged by the United States in Viet Nam, a further consequence of that war is worth noting: the ecological change which has arisen in South-East Asia. There is reason to assume that the main goal of the "herbicide" war was to achieve that ecological change. A three-phase plan for altering the nature of the forests was developed and executed in South-East Asia.

During the first phase, the forests were repeatedly treated with herbicides, which were deposited at densities of 20 to 200 kg/ha., while the usual rates did not exceed 5 kg/ha. The second phase included burning dead wood with napalm, which, since the soil temperature rose to 120° and above, resulted in the complete destruction of soil microflora and microfauna and their nutrient medium. During the third phase, the topsoil was washed away by flood waters, tropical downpours and artificially created downpours in the hills.

In certain cases, the former forest areas sterilized in this way were artificially seeded (from the air) with elephant grass, a malignant, long-rooted, polyspermous weed which cannot be put to any practical use.

The overuse of herbicides, the sterilization of the soil and the sowing of weeds were not dictated by any direct military purpose. It is not to be ruled out that the mass destruction of forests, the sterilization of large areas of soil, the removal of the topsoil, and the growing of weeds foreign to the region were intended to achieve the long-range aim of radically changing the ecological background and artificially creating conditions which would be unfavourable for the "old" plants and favour the "new" ones. As a result of the "herbicide" war,

grasses, including the elephant grass brought from the United States, were given the advantage in development. When the new flora had gathered strength, it would become a nutrient medium for the corresponding microscopic plant life. After some time, the conditions would arise for the outbreak of an ecological explosion - an epiphytotic of new microfungi. Since the new flora would be essentially herbaceous and not arboreal, previously dormant microfungi of the genus Fusarium, which live selectively as parasites on herbaceous plants and whose natural enemies (microfungi of the genus Penicillium) had been annihilated, would become active.

Epiphytotics are known to develop in waves - outbreaks of plant mycosis are seasonal, the release of the conidia of reproducing microfungi is also seasonal, and the formation and spreading of spores occur episodically. Epiphytotics are predictable in the case of mycoses which have been thoroughly studied, but, unfortunately, this is not so in the case under consideration. It can only be expected that in the cases of fusariosis the episodic spread of Fusarium spores will be unavoidable, and the spores may be carried hundreds or even thousands of kilometres from the centres of the original local epiphytotics in the direction of the winds prevailing during the season when the conidia are released.

In Indo-China, the winds from the Gulf of Siam blow across the central regions of South Viet Nam to the southern provinces of Kampuchea, while the winds from the South China Sea blow along the northern spurs of the Truong Son mountain range to the south-eastern provinces of Laos. These winds can carry Fusarium spores from Viet Nam to certain provinces of the adjoining States (Kampuchea and Laos) - the very provinces in which the United States Air Force used herbicides in 1972, thus preparing the soil for plant fusarioses. As a result, epiphytotics of fusariosis could cover vast areas of South-East Asia.

All the areas stricken by fusariosis epiphytotics are unquestionably dangerous to their population, since the toxins produced by the Fusarium microfungi (trichothecene toxins) are, in large doses, poisonous to humans. And this danger of fusariotoxicoses is all the greater because the new species and strains of Fusarium microfungi produced during the epiphytotics can produce trichothecene toxins whose composition is unpredictable, or even mycotoxins of other structural types.

The Americans who carried out the experiment in South-East Asia expected an outbreak of new epiphytotics in the region; their study of fusarioses, which began in 1955, had not been without a purpose. Indirect evidence that they did expect this is the fact that they are still trying to obtain the information they require from South Viet Nam, hoping to detect the first signs of epiphytotics.

These facts reveal the hidden truth of who was really responsible for the mycotoxicoses in South-East Asia. The military leaders of the United States are the true guilty parties.

The conclusion which may be drawn from the State Department report of 22 March 1982 to the Congress is unambiguous: this document is a collection of unsubstantiated conjectures and accusations, devoid of any proof. It cannot stand

up to scientific criticism, nor even to elementary logical analysis. Conceived with the unseemly aim of slandering the Soviet Union and charging it with involvement in the use of chemical weapons, it is intended to distract attention from the real chemical warfare conducted by the United States in South-East Asia years ago and from its extensive preparations for renewed chemical warfare.
