A Cloudburst of Yellow Rain Reports

U.N. and Canadian investigators agree that chemical weapons are being used, but fail to endorse the U.S. discovery of mycotoxins

Two State Department officials lifted a large box onto the dais during a news conference on 29 November, pulled off a cardboard sheath, and revealed the most photogenic evidence produced so far in the investigation of chemical warfare in Asia. It was a Soviet gas mask, allegedly retrieved by a covert agent in Afghanistan in September 1981. The headpiece is apparently still contaminated with the fungal toxin T2, the suspected active ingredient in yellow rain.

The cameras clicked. The reporters murmured. And an official said no one need be afraid because the mask was sealed in an airtight container. One reporter gibed at the speaker, Robert Dean, deputy director of the Bureau of Politico-Military Affairs: "Why don't you slip it on for us Bob?"

So went the latest and most disturbing briefing in America's effort to persuade the world that the Soviets are using outlawed chemical weapons in Southeast Asia and Afghanistan. It preceded by one week the release of a less dramatic United Nations (U.N.) report, the product of 2 years of research, titled, "Chemical and Bacteriological (Biological) Weapons Report of the Secretary General." The U.N. investigators found two charges to be "well supported." These were claims by refugees that "harassing agents" were used against resistance fighters in Afghanistan and that "some toxic material" was used against the Hmong people of Laos. The U.N. team found no proof that fungal poisons (mycotoxins) were involved. But it also rejected a Soviet thesis (*Science*, 2 July, p. 32) that mycotoxins spread through Southeast Asia after the United States seeded the area with elephant grass.

American officials expected the U.N. report to be equivocal, and they took pains to lay out their own strongest evidence a week in advance. Dean told the reporters that "all the relevant government agencies" are now convinced that the Soviets and their allies are engaged in chemical warfare. The government claims to have "conclusive evidence" that compounds forbidden by the 1925 Geneva Protocol and by the 1972 Biological and Toxin Weapons Convention—

State Department trophy

Soviet gas mask allegedly found in Afghanistan tainted with T2 mycotoxin.

including the tricothecene toxin T2—are being used in Laos, Kampuchea, and Afghanistan. The Soviet Union signed the 1972 treaty, which forbids not just the use, but the possession of biological weapons. The latest attacks occurred as recently as October in Laos and Kampuchea, Dean said. The State Department called the press conference to display the gas mask, one of two recovered from Afghanistan, and to release a new report* to Congress and the U.N.

The bulk of the 12-page report lays out new and old evidence collected by U.S. intelligence agencies, including some findings produced by the analysis of blood, urine, and tissue samples taken from victims of gas attacks in Laos and Kampuchea. (The gas masks are the only physical evidence of chemical warfare in Afghanistan; given their origin, it is impossible to check on their *bona fides*.) Biological samples from 33 alleged victims in Southeast Asia have been screened, according to the report. "Specimens from 16 of these individuals show the presence of tricothecene mycotoxins." T2 and other tricothecene toxins have been found together in environmental samples collected at battle sites, apparently in combinations never seen in nature. Canadian and U.S. experts have concluded independently that these deposits could not have occurred naturally. The report says, "The finding of T2 toxin and HT2 toxin . . . in the blood, urine, and tissue of victims of these attacks provides unequivocal evidence of their use as weapons."

The Soviet response, issued by *Tass* the next day, was that all of this is a "brazen lie" and "a propaganda screen behind which the Reagan Administration is pressing forward its large-scale program of preparations for chemical and bacteriological warfare."

With the superpowers engaged in a verbal brawl such as this, it is all the more important that disinterested experts intervene. The credibility of the U.N. and of the general effort to control weaponry hangs in the balance.

There are signs that the U.N. may be ready to become more actively involved than it has been. The recent investigation was hampered by inadequate laboratory facilities, staff turnover, and poor data collection. On 26 November, the General Assembly voted 106 to 14 to call a special conference "as soon as possible" to review the 1972 toxin treaty and to design a new system for investigating complaints and checking on compliance. On 29 November, the General Assembly voted 71 to 18 to ask the director general of the U.N. to give chemical and biological warfare questions more visibility in the bureaucracy. In the past, such matters have been passed down to the disarmament staff. Now the director general has been asked to draw up a standing list of laboratories and experts competent to study these charges and to appoint a new investigative group responsible directly to him. Among the nations opposing both resolutions were Afghanistan, Laos, Vietnam, and the Soviet Union.

The only other relevant investigation† was conducted last spring by several Canadian officials led by Lieutenant Colonel G. R. Humphreys of the military surgeon general's office in Ottawa. With another officer and some diplomatic officials, he spent a month interviewing victims of gas attacks in refugee camps and hospitals along Thailand's border with Laos and Kampuchea. The Canadians also collected samples, but the analysis may not be available for some time, because, a laboratory official says: "We don't want any mistakes."

*"Chemical Warfare in Southeast Asia and Afghanistan: An Update," Special Report No. 104, U.S. Department of State, Washington D.C., November 1982.

†"An Epidemiological Investigation of Alleged CW/BW Incidents in Southeast Asia," Directorate of Preventive Medicine, Surgeon General Branch, National Defense Headquarters, Ottawa, Canada, 11 August 1982.

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Based on interviews and a reading of medical records, the Canadians concluded that chemical or biological agents are being used against unprotected troops and civilians in Southeast Asia. At least two different materials are involved, Humphreys says. One of them may contain mycotoxins. The other is a "knockout" agent. The Canadians saw and collected samples of yellow rain themselves, and Humphreys can testify to its devastating effects on Hmong villagers.

The Canadian report differs from the State Department's in two important respects. First, the Canadians found the American description of yellow rain poisoning to be exaggerated. Rather than producing immediate vomiting, hemorrhaging, and death, as claimed by the Americans, yellow rain was slow to produce effects and they seemed reversible, according to Humphreys. Those who died were chiefly the very young and very old who, in the absence of good medical care, became dehydrated by 10 or more days of vomiting and diarrhea. The Canadian description is compatible with the observed effects of tricothecene poisoning in laboratory animals.

Second, the Canadians concluded that a closely analyzed battle near Tuol Chrey, Kampuchea, exposed Khmer Rouge soldiers to a "highly potent" incapacitating agent, not yellow rain. The Canadians did not exclude the possibility that some mycotoxins were mixed with the knockout agent. This chemical did not appear lethal, Humphreys says, but did put soldiers out of action for several days. Humphreys is unequivocal: the substance used against the Khmer Rouge soldiers was not yellow rain but a volatile material suitable for use where friendly and hostile forces must operate in the same environment. This contrasts with the U.S. report, which stressed that the blood and urine of the Khmer Rouge victims at Tuol Chrey contained the mycotoxin T2, an alleged ingredient of yellow rain.

The State Department's November paper also emphasizes the fact that high levels of T2 were found in the stomach and intestine of a soldier who died a month after being exposed to the gas attack at Tuol Chrey. Humphreys found it "impossible to exclude blackwater fever [a variety of malaria] as a possible cause of death." Malaria is rampant among these soldiers. Another factor confuses the case. Humphreys believes the Khmer Rouge may suffer from the misuse of atropine, a drug commonly given by Khmer Rouge medics to soldiers who have been in chemical attacks. Atropine is an antidote only for classic nerve agents. If used wrongly, as Humphreys suspects may be the case here, it can produce a variety of bad side effects. One is the retention of urine. Blackwater fever also produces kidney failure. The soldier from Tuol Chrey, according to the Canadian report, died "in acute renal failure."

Thus, while the Canadian and U.N. inquiries give strong support to the charge that toxic sprays are being used in Southeast Asia, they leave unconfirmed the charge that the poison is specifically a mycotoxin. That uncertainty may end when the Canadian laboratory finishes its analysis of the 200 or so samples collected during Humphreys' visit to Thailand. Perhaps not. It is a good sign, in any case, that other countries have begun to examine the evidence.

—ELIOT MARSHALL

Arms Control Agency on Hold

Senate conservatives block Reagan appointees at ACDA, State in the name of Reagan policies

The Arms Control and Disarmament Agency is rounding out its second year under the Reagan Administration with several senior policy-level appointments still blocked as a result of actions by conservative Republican senators. A group of conservatives, led by Senator Jesse Helms (R–N.C.), stalled ACDA and State Department nominations as part of a campaign to pressure the Administration into heeding their views on foreign policy, including arms control.

As *Science* went to press, it appeared that a showdown could occur on 8 December when the Senate was scheduled to spend a full day dealing with an appointments backlog. There was no firm indication of the strategy that opponents of the foreign policy nominees would follow. The options include a filibuster.

At the beginning of December, the stakes were raised when Senate Majority Leader Howard H. Baker, Jr., indicated he would move to have the disputed nominations confirmed and conservatives countered with a threat to oppose the Reagan plan for Dense Pack deployment of the MX missile.

The tactic used to delay the appointment process involves the use of senatorial "holds," which discourage the sending of nominations to the Senate floor for confirmation. Such holds are not uncommon in the jockeying that often surrounds presidential appointments. What sets the present instance apart is the duration of the blocking action—well over a year—and the implacability of the opposition by GOP conservatives to the appointments by an Administration of their own party. In apparent retaliation, liberal Democratic senators have delayed action on nominees to posts at ACDA and State favored by the conservatives. The effect on ACDA is that the post of deputy director and three of four assistant director slots have been occupied by officials working in an "acting" status.

The White House has maintained its support of the ACDA nominees, who are the choices of ACDA director Eugene Rostow, whose appointment Helms initially questioned (*Science*, 8 May 1981, p. 646). Resolution of the nominations snarl, however, has been left to Senate Republican leaders. Reagan budget cuts have reduced ACDA manpower and resources. But the uncertainties over leadership are mainly blamed for sagging agency morale at a time when ACDA would be expected to be gearing up to support major arms negotiations.

At the center of the dispute now are the nominations of Robert Grey as deputy director of ACDA and Richard Burt as assistant secretary of State for European affairs. Another ACDA nominee, Norman Terrell, in line to be assistant director in charge of nonproliferation matters, left the agency at the end of November to take a post as associate administrator for policy of the National Aeronautics and Space Administration (NASA). Helms at one point this summer had offered to see Grey confirmed if Terrell withdrew. Grey proponents viewed Terrell's departure as opening the way to Grey's confirmation. Helms indicated

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