

CHEMICAL WEAPONS CONVENTION BULLETIN

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THE PROPOSED CHEMICAL WEAPONS CONVENTION: AN INDUSTRY PERSPECTIVE

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On October 12, 1987, the Board of Directors of the US Chemical Manufacturers Association (CMA) adopted a policy of support for the Chemical Weapons Convention. CMA is a nonprofit trade association whose members represent over 90% of the basic chemical productive capacity of the United States. CMA has been, if not the sole, then certainly the strongest advocate of industry's interests in the debate on a chemical weapons treaty.

CMA traces its involvement in this issue back nearly a decade, though for many of those years it was a priority issue for only a limited number of companies. It had its home at CMA in a special panel funded and staffed by companies with an interest in phosphorous compounds. This was because of the early concentration of interest by diplomats in the CW agents based on phosphorous. Activity during this period was steady but generally low key, with a few lonely individuals carrying the industry's concerns on their backs.

In early 1987, however, CMA decided to throw the issue into the mainstream of its operations. The small phosphorous-focused panel was dissolved and the group was reconstituted within the Technical Department of the Association. This move, which greatly expanded the number of companies and professionals involved in the issue, occurred just as major shifts in the Soviet Union's negotiating position were sending the Geneva talks on an exhilarating rollercoaster ride.

CMA had long provided comments on technical proposals brought forward by US government agencies involved in the treaty process. The shift of the CMA activity to a more "generic" orientation, coupled with the sudden appearance of movement in the heretofore glacially slow talks caused the chemical industry to assume a more ambitious advocacy position. In the last two years this has meant:

- o the development and distribution of papers by industry [continued]

CONTENTS

| | pages |
|--|-------|
| Guest Article | 1-3 |
| Chronology | |
| June through Sept 1988 | 4-12 |
| US Presidential Campaign Statements on CW | 9 |
| Review: World CW Armament Part I: The USA | 12-18 |
| Calendar | 18 |
| Bibliography | 19 |

experts on issues such as the protocol for a routine inspection and possible means of safeguarding the confidentiality of trade secrets and other proprietary information;

- o participation in meetings, both in the US and abroad, with other industry, government and academic experts on how to resolve issues blocking completion of a workable treaty;
- o the establishment of an ongoing dialogue with other industry associations, both here and abroad, aimed at achieving a consensus on the outstanding questions; and
- o the formal adoption by CMA's Board of Directors in October 1987 of a policy committing the US chemical industry to work for a treaty to ban the manufacture, possession and use of chemical weapons [see CWC Bulletin No. 1].

The US chemical industry has not assumed a pro-treaty posture lightly. The Convention, when it comes, will cost US companies money. CMA expects that any verification regime will result in significant losses of confidential business information. Additional costs will be associated with disruptions in production due to compliance activities of inspecting teams and new paperwork burdens. [continued]

The Chemical Weapons Convention Bulletin is published under the auspices of the Federation of American Scientists Fund, in cooperation with the Arms Control Reporter. The goal is to provide information and analysis toward an effective multilateral treaty which will eliminate chemical weapons and help prevent the exploitation of biomedical technologies for hostile purposes. The Bulletin appears quarterly. It summarizes important developments and documents relevant to the projected Chemical Weapons Convention now being negotiated in Geneva. It also gives notice of recent literature and forthcoming events.

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Other national industrial groups, in Asia, Europe and North America have also realized that the treaty will bring new costs to industry. In July of this year, experts from the world's chemical industry traveled to Geneva for the second time in as many years to discuss important questions raised by the treaty with members of the negotiating teams. While better attended than the previous meeting, held in July 1987, the majority of the industry participants were from market-economy nations. This was not altogether inappropriate, since a majority of the questions focused on concerns of these states. Over a two day period, the concerns of the chemical industry were discussed with individual negotiating teams, with the Western Group of the Conference on Disarmament, and with the full Conference.

Confidentiality remains the central concern for industry. Industry experts pointedly noted that the Rolling Text of the Convention devotes less than a full page of language to the subject, scattered throughout the document. The fact that the Conference had not addressed the topic since the preceding summer was also pointed out to the negotiators. The discussion centered on the proposed Inspectorate and its procedures for safeguarding information that comes into its possession. This includes the need to find a way to ensure the fidelity of the inspecting personnel.

Another topic generating some attention was the need to develop a protocol for inspections which will ensure a minimum of disruption while allowing for meaningful verification work. An industry proposal for creating points in the standard inspection routine which would serve as decision points for early termination of the visit was offered as one way of dealing with this question while allowing the international authority created by the Convention to better manage its resources.

Along these lines, the West German proposal for ad hoc inspections was viewed with great interest by industry participants. Under ad hoc inspections, the international authority would have the power to extend inspections to non-declared facilities. This is consistent with industry's belief that the likelihood of detecting violations by examining declared plants is very low.

Industry has agreed that these problems need detailed solutions and is developing papers on each topic. This process will, it is hoped, offer new insights which may aid in achieving an effective prohibition of chemical weapons.

CHEMICAL INDUSTRY TAKES THE LEAD

On 28 April 1988, the President of the US Chemical Manufacturers Association, Mr Robert Roland, issued an official statement calling for a "strong, effective international treaty" to ban chemical weapons. It says that American, Canadian, Japanese and European chemical industry representatives have been working for several months on a set of recommendations that the CMA believes can facilitate agreement on a chemical weapons ban. When the recommendations are agreed to, "they will be sent to our negotiators along with our industries' pledge to do whatever we can to make such a treaty effective." (CD/PV.469; CMA News Release 28 April) [See also Chronology entries for 12 Oct 1987, 25-6 Jan 1988, and 21-22 and 28 July 1988]

THE MOSCOW SUMMIT TO THE MITTERRAND PROPOSALS

1 June From the Moscow Summit there issues a joint Gorbachev-Reagan communique which includes the following: "The leaders reviewed the status of on-going multilateral negotiations and bilateral US-Soviet consultations toward a comprehensive, effectively verifiable and truly global ban on chemical weapons, encompassing all chemical weapons-capable states. They also expressed concern over growing chemical weapons proliferation and use.

"The leaders reaffirmed the importance of efforts to address, as a matter of continuing urgency, the unique challenges of a chemical weapons ban and to achieve an effective convention. While noting the progress already achieved in the talks and the difficult problems with regard to effective monitoring of the global prohibition of chemical weapons and the non-use of dual-capable chemicals for chemical weapons purposes, the leaders underlined the need for concrete solutions to the problems of ensuring effective verification and undiminished security for all convention participants. They gave instructions to their respective delegations to this effect.

"Both sides agreed on the vital importance of greater openness by all states as a way to build confidence and strengthen the foundation for an effective convention. The leaders also emphasized the necessity of close coordination on a multilateral basis in order to ensure the participation of all CW-possessing and CW-capable states in the convention.

"Both sides strongly condemned the dangerous spread and illegal use of chemical weapons in violation of the 1925 Geneva Protocol. They stressed the importance of both technical and political solutions to this problem and confirmed their support for international investigations of suspected violations. Noting the initial efforts being made to control the export of chemicals used in manufacturing chemical weapons, the leaders called on all nations with the capability of producing such chemicals to institute stringent export controls to inhibit the proliferation of chemical weapons." (CD/846)

1 June At the UN General Assembly, during its third special session devoted to disarmament (UNSSOD-3) which began on 31 May, the President of Argentina, Raul Alfonsin, says: "I should like to confirm before this Assembly that Argentina does not possess chemical-weapon arsenals and that it will continue to commit all its efforts to the conclusion of a convention on chemical weapons." (A/S-15/PV.2)

1 June The Netherlands proposes at UNSSOD-3 that the Special Assembly "should agree that Member States accept in advance the admission to their territory of experts sent by the Secretary-General in case of the alleged use of chemical weapons." The Netherlands informs the Assembly that it "would in principle be ready to serve as host to the institutions to be established under the Chemical Weapons Convention." (A/S-15/PV.3)

1 June Venezuela declares at UNSSOD-3 that it "has no chemical weapons of its own or through third parties and that it does not intend to procure for itself in the future any of those abhorrent instruments of mass annihilation." Venezuela also comments on the "heavy contributions" from states parties which will be needed for the verification mechanism at present envisaged for the CWC and says: "This will no doubt have a negative effect on the universality which we wish for the instrument." (A/S-15/PV.3)

2 June Australian Foreign Minister Bill Hayden, addressing UNSSOD-3, says: "We know that what is at issue in a universal Chemical Weapons Convention is, in some respects, a potentially more comprehensive surveillance of a major global industry than has ever been seen before. But we believe we can institute such controls in a way which will both allow us all to be confident that chemical weapons have been removed and are not being re-produced, and allow the continued production and use of chemicals in our industries and agriculture in ways beneficial to economic and social development. The chemical weapons negotiations are at a crucial stage. They must not be permitted to falter. Let us make this special session the occasion on which the whole international community commits itself, unambiguously, to the abolition of these weapons and to the earliest possible conclusion of a chemical weapons convention." (Embassy text) [See further 20 June]

6 June The US Defense Department Director for Operational Test and Evaluation, John Krings, states in his annual report to the US Congress that US military tests indicate that the Bigeye binary nerve-gas bomb [for which production appropriations are being sought] is unreliable. (UPI 7 Jun, in Current News 7 Jun)

6 June FRG Foreign Minister, Hans Dietrich Genscher, tells UNSSOD-3: "A convention for the complete and verifiable prohibition of chemical weapons is within reach; it can be concluded by the end of this year.... I appeal to the international community to redouble its efforts in order that the final obstacles can be surmounted." (A/S-15/PV.8)

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7 June The UN circulates to Biological Weapons Convention member-states the first batch of annual reports filed with the Secretariat in the voluntary information exchanges on biological research activities that had been instituted at the Second Review Conference [see 15 Apr]. The reports are those of Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, the two German states, Ireland, Japan, the Netherlands, Norway, Poland, Spain, Sweden, Switzerland, Togo, the USSR and the UK. Reports subsequently submitted by Canada and the USA are circulated on 29 and 17 June respectively. (Official texts)

7 June The British Foreign Secretary, Sir Geoffrey Howe, proposes at UNSSOD-3 that the United Nations agree on procedures for investigating CW-use allegations automatically in order that "investigations can be undertaken as a matter of routine and without getting entangled by political considerations." (Official text)

7 June The Prime Minister of Israel, Yitzhak Shamir, proposes at UNSSOD-3 that a chemical-weapon-free zone be established in the Middle East, "on the basis of arrangements to be arrived at freely among all the States of the region." (A/S-15/PV.11)

8 June The Council of the Western European Union presents a report to the Assembly which states that, in response to its annual questionnaire, no member state had replied that production of chemical weapons on its mainland territory had passed the experimental stage and entered the effective production stage (WEU doc 1140). The Assembly is also informed, by one of its own committees, that "France has made legal provision for starting production of chemical weapons but without starting production, however" (WEU doc 1137).

8 June Yugoslavia proposes at UNSSOD-3 that the United Nations convene a conference during 1989 for the signing of the Chemical Weapons Convention, a deadline thereby being imposed upon the negotiations. The proposal is later repeated at the CD (CD/PV.466).

8 June The representative of Malaysia at UNSSOD-3 says: "Malaysia for its part has no chemical weapons and no intention of acquiring or developing them." (A/S-15/PV.13)

10 June In Madrid, at the informal semi-annual session of NATO Foreign Ministers, Hans Dietrich Genscher of the FRG reportedly states that "massive pressure" must continue to be exerted if the CWC is to be achieved and that "persuasion" must be used on the United States and other countries. (Jane's Defence Weekly 18 Jun)

13 June The US Secretary of State, George Shultz, tells UNSSOD-3 that the United States "is fully committed to pressing ahead" with a "comprehensive, verifiable, and truly global ban" on CW weapons, despite the "formidable obstacles" that remain. Further, "whenever evidence emerges that chemical weapons are being used, all nations must step up to their responsibilities, by bringing political pressure and moral persuasion to bear on offending states. States with chemical manufacturing capabilities have a special responsibility to work against proliferation. Strin-

gent export controls for the chemicals needed to make these weapons are a good place to start." (Official text)

14 June In Canada, open-air releases of kilogram quantities of nerve gas at Defence Research Establishment Suffield attract public notice (Calgary Herald 14 Jun) and become a political issue (Alberta Report 11 Jul). The Canadian Defence Minister, Perrin Beatty, commissions the Chairman of the Board of the Canadian Institute for International Peace and Security, William Barton, to "conduct a study and make recommendations to me concerning all chemical and biological defence research and training conducted by the Department of National Defence." The study is to be completed by the end of the year and will be made public (Edmonton Journal 12 Aug).

17 June Following his action on the outstanding Iranian request for a new CW investigatory mission [see 19 May], a request that was reiterated on 16 June (S/19946), the UN Secretary-General receives new authority from the Security Council on the basis of which he decides to dispatch the mission. The mission is delayed but arrives in Tehran on 1 July. (S/20060)

20 June Australian Prime Minister Robert Hawke announces that he had asked Foreign Minister Bill Hayden to set in train an effort against CW proliferation "pursued in cooperation with regional countries" (official text). Later an Australian official says that a number of countries in Southeast Asia, including ones where concern about CW was evident, were not members of the CD, so that one way of involving them in a counterproliferation effort was to discuss a regional disarmament initiative (ACR 704.B.294). Such an initiative might involve the formation of a regional caucus to influence the CWC negotiations or perhaps regional confidence-building measures (Pacific Research, Aug). Initial contacts with other governments commence in August (Intl Herald Tribune 13 Aug).

20-22 June The "First Symposium on the Chemical Defence of China," sponsored by the Chinese Chemical Society, takes place in Yiching. (ASA Newsletter 88-3)

24 June The US Senate votes 91-0 in favor of a resolution "to condemn the use of chemical weapons by Iraq and urge the President to continue applying diplomatic pressure to prevent their further use, and urge the Administration to step up efforts to achieve an international ban on chemical weapons." (Congr Record 24 Jun, S8533-6) It is the first formal Congressional endorsement of the CWC negotiations.

26 June UNSSOD-3 ends without adopting a Final Document. (NY Times 27 Jun)

29 June At the US Army depot in Fischbach FRG, a blockade protesting storage of CW weapons is broken by the police bodily carrying away demonstrators. (Reuter 28 Jun)

30 June At Bunkovo, 40 miles east of Moscow, a team of 13 British experts led by CD Ambassador Tessa Solesby visits a training base of the Soviet Chemical Troops (London Guar-

dian 1 Jul). According to the Commander of Soviet Chemical Troops, Col-Gen Vladimir Pikalov: "Today's demonstration in the training centre was organised in order to give the British delegation a possibility to see the entire process of measures to ensure protection from chemical weapons at this training ground" (TASS 30 Jun, in FBIS-SOV 5 July). The British team is on its way to Shikhany following the counterpart Soviet visit to the UK five weeks previously [see 24-26 May].

30 June - 4 July During its 3-day visit to the Shikhany military facility of the Soviet Chemical Troops, the British team acquaints itself "in detail with the characteristics of the chemical weapons of the USSR Armed Forces" and discusses proposals on verification (TASS 2 Jul, in FBIS-SOV 5 July; Financial Times 5 Jul). The team's program includes a tour of 16 sites, followed, on the last day, by a helicopter overflight after which the team asks to visit 11 more sites; all are opened to the visitors (TASS 3 & 4 Jul, in FBIS-SOV 5 July). Not opened, however, is one further site which the team on arrival (equipped with aerial photographs (London Daily Telegraph 5 Jul)) had asked to visit; it was stated to be under the jurisdiction, not of the USSR Ministry of Defence, but of the USSR Ministry of the Chemical Industry (TASS 4 Jul, in FBIS-SOV 5 July), and the necessary permissions could not be obtained at short notice (Pravda 7 Jul, in FBIS-SOV 11 July; London Times 5 Jul).

1 July Iraqi Foreign Minister Tariq Aziz, at a press conference in Bonn concluding a 3-day visit to the FRG, confirms once again his country's use of CW against Iran "from time to time," but states that Iran had used it first, "from the very beginning" of the war (dpa 1 July, in FBIS-NE 1 July; London Daily Telegraph 2 Jul). He was repeating what he had told the press at the beginning of May, during a diplomatic mission to Brazil (Brazilian News Agency 4 May, in Current News 6 May).

3 July Iraq alleges to the UN Secretary-General Iranian use of CW weapons on 20 June and 1 July, requests a UN investigatory mission, and states that "in one of the sectors on the front where the Iranian regime's armed forces were obliged to withdraw, the Iraqi forces have discovered a store of chemical weapons which that criminal regime was using against our armed forces" (S/19982). The Secretary-General accedes to the request, his mission arriving in Iraq on 10 July.

6 July The CD Ad Hoc Committee on Chemical Weapons reconvenes in Geneva for informal consultations.

6 July FRG Foreign Minister Genscher issues an appeal to CD member-states "to bring the negotiations aimed at achieving a ban on chemical weapons to a successful conclusion. If all parties take a constructive approach, the issues still outstanding can be resolved in a very short time. I appeal to the sense of responsibility of all participating Governments to end now the production and use of these terrible instruments of mass destruction...." (S/20000)

7 July The CD reconvenes in Geneva.

8 July The UN CW investigatory mission transmits to the Secretary-General its report on its inquiries in Iran [see 17 Jun]. The investigators had found it "possible to determine without any doubt that, in the course of June 1988, Iranian soldiers were affected by ... mustard gas"; 36 such cases were examined. The report states that mustard gas had been found in samples of soil and bomb fragments collected by the team; the fragments had evidently "come from bombs similar to those examined by the [UN] teams dispatched to ... Iran in 1984, 1986 and 1987."

As to other CW agents, the report states that, "while the effects of toxic organophosphorus compounds has [sic] been confirmed by clinical examination of some patients, the use of nerve gas or cyanide was not confirmed by chemical analysis in the field, no doubt owing to their rapid disappearance." The report accordingly suggests that it might "be necessary to review existing machinery for verification by UN teams of the use of chemical weapons in order to ensure the timely presence of experts at the site of alleged attacks."

As to the extent of the use of CW agents, the report states that "the findings of the present mission together with those of preceding missions support the conclusion that such use has become more intense and frequent." (S/20060)

The report is not distributed as a Security Council document until 20 July and is not publicly released until 1 Aug [q.v.].

11 July The 9th round of the bilateral US-Soviet Chemical Weapons Treaty Talks begins in Geneva (TASS 11 Jul, in FBIS-SOV 13 Jul). The topics scheduled for discussion are challenge inspection and a bilateral exchange of data that would go beyond the information provision advocated in a Western submission at the multilateral level [see 14 Apr], as well as other topics that had been listed during the April US-Soviet ministerial talks [see 22 Apr]. (AC Reporter 704.B.297) The round ends on 28 July (TASS 28 Jul, in FBIS-SOV 29 Jul).

11 July The Assistant Director of the US Arms Control & Disarmament Agency, Kathleen Bailey, speaking to the Dallas Rotary Club about the dangers of CW proliferation, says: "In the Gulf War ... Iran has used its own chemical weapons in limited circumstances. We believe that both [Iraq and Iran] used chemical weapons in the recent fighting around Halabja." She had preceded this by saying that Soviet-supported Lao and Vietnamese forces had used chemical weapons and toxins in Southeast Asia. (Official text)

13 July The UN CW investigatory mission transmits to the Secretary-General its report on its inquiries in Iraq [see 3 July]. The investigators had found conclusive clinical evidence of mustard-gas injury in 9 Iraqi soldiers. They detected mustard gas in fragments of 81mm mortar-bombs said to have been picked up after an alleged Iranian CW attack, furnished to them by Iraqi military authorities. The report also describes the investigation of what was described to the team as a store of Iranian chemical weapons that had been captured at Salamcha: crates of rusty 81mm mortar bombs. The crates had tested positive for mustard, but not the liquid drawn from one of the mortar-bombs. The report closes thus: "On the basis of the present investigation, the number of casualties and the extent of their injuries seemed less extensive than in previous investigations." Present throughout the report, and made almost explicit in

some parts of it, is the suggestion that Iraqi authorities may have manipulated the evidence. (S/20063) The report is not distributed as a Security Council document until 25 July and is not publicly released until 1 August [q.v.].

13 July US Congress passes the FY89 Defense Authorization Bill [but it is later vetoed by the President; see 3 Aug]. Its main CW provisions (H.REPT.100-753) are as follows. The deadline for demilitarization of US stockpiles of non-binary CW munitions and agents is extended to 30 April 1997. A sum of \$6.8mn is authorized to develop and demonstrate CWC compliance monitoring capabilities. Continued production of the 155mm binary projectile is authorized at \$45.9mn, 70 percent of the level requested. Production of Bigeye [see 6 Jun] is disallowed pending certification of readiness for full-scale production.

16 July The communique issued by the Warsaw Treaty Political Consultative Committee at the close of its 2-day meeting in Warsaw lists conclusion of the CWC among four "priority tasks in the field of disarmament." (CD/842)

18 July Iran announces its readiness to accept Security Council resolution 598 laying down procedures for a ceasefire in the Gulf War.

19 July The Netherlands at the CD declares information about its industrial production of the scheduled chemicals in accordance with the Western recommendations for multilateral data provision that had been submitted to the CD in the Spring. (CD/CW/WP.203) [See 14 Apr]

21-22 July American, Canadian, European and Japanese chemical industry representatives meet in Geneva, first among themselves and then, informally, with CD negotiators. They are still working on a set of recommendations aimed at facilitating agreement on a CW weapons ban [see 25-26 Jan]. The US CD ambassador later [see 28 July and Guest Article] says that the "exchanges made clear the need to devote greater attention to provisions for protection of confidential business information. They also highlighted the need to specify clearly what types of information should be considered confidential." (CD/PV.469, pp 5-6)

23 July US safety standards for BW and CW research [see 11 May] are defended by Defense Department official Thomas Welch at a hearing of the Senate Governmental Affairs oversight subcommittee. In the CW program, DOD "applies stringent safety, storage, maintenance, use and accounting requirements for all internal and contractor facilities that use chemical agents." These include unannounced inspections and rehearsals for hypothetical accidents. (AP in Wash Times 24 Jul) The GAO testifies to the committee that a number of dangers exist among the biological and chemical research sites around the country (GAO/T-PEMD-88-10).

An Army Inspector-General report on CW program safety is introduced at a second day of hearings on 28 July. It had found that the reporting system for chemical accidents was "encumbered with confusing definitions [and] overly stringent and duplicative reporting requirements." (Wash Post 30 Jul)

27 July Mamdouh Ateya, described as the former head of Egypt's CW department, says in an interview published in a semi-official United Arab Emirates newspaper, that Arabs should acquire CBW weapons as the only means of countering what he called Israel's nuclear threat. (Reuter quoting Al-Ittihad 27 Jul, in London Independent 28 Jul)

27 July The USSR notifies the UN that ten qualified Soviet experts -- generals and senior officers -- had been nominated to take part in investigations of the use of chemical and bacteriological weapons. Those experts will be in a position to proceed to the location of any such investigation at short notice. (Soviet UN mission press release)

28 July The United States declares to the CD the locations of its chemical-weapons production facilities in a working paper which also outlines how the facilities might be destroyed under the CWC (CD/849). US CD Ambassador Friedersdorf describes the disclosure as "another major step towards greater openness." He also announces US support for the Soviet proposal [see 18 Feb] for a multilateral effort to develop and test procedures for conducting inspections of chemical industry facilities and says that the US Government is already working on such procedures with the US Chemical Manufacturers Association. (Official text)

1 August The reports of the UN CW investigatory mission to Iran [see 8 July] and Iraq [see 13 July] are finally published. The AP wire story on the reports, much relied upon by English-language newspapers around the world, erroneously states that the reports "accused both Iraq and Iran of using chemical weapons" (as in Intl Herald Tribune 2 Aug).

3 August Alleging renewed Iraqi CW attacks the day previously in which more than a thousand civilians in the north-western Iranian town of Oshnaviyeh had been injured by mustard gas, Iran requests another UN investigation (S/20084). The Security Council decides that Resolution 612 requires that any new allegation of the use of CW weapons ought to be investigated, informing the Secretary-General of this on 5 Aug. The Secretary-General thereupon convenes an investigatory mission which arrives in Iran on 12 Aug (S/20134). Iraq denies the allegation (S/20089).

3 August President Reagan vetoes the 1989 Defense Authorization Bill on the reported grounds that it "would undercut his negotiating position in arms control talks with the Soviet Union" and "would 'gravely endanger the strategic defense program'." (NY Times, London Guardian 4 Aug).

4 August The Foreign Affairs Committee of the UK House of Commons issues a report based on hearings held earlier in the year (HCP 280, Session 1987-8). It contains the following: "In Washington ... the Committee found a number of individuals who frankly dismissed the chances of [a worldwide chemical-weapons] ban because of verification problems. Indeed, a senior member of the Administration told us that he could conceive of no verification regime which would both provide adequate guarantees of Soviet compliance, and also be workable under American law if applied within the USA.... Mr Younger [British Defence Secretary] told us in evidence that he believed the alternative idea of a limited ban on chemical weapons covering only NATO and

the Warsaw Pact would be just as difficult to verify as a global ban. His view was that it was better to be patient and work for global coverage."

4 August Expressing an attitude common among the negotiators, the head of the Austrian observer delegation says at the CD: "Although we are looking for the strictest monitoring possible, we have to admit that 100 percent verification is not feasible. As a consequence challenge inspection should be conceived in such a way as to provide a sufficiently high risk for potential violators of the treaty to effectively deter them from doing so." He says, further, that the "Austrian Government intends to take the necessary steps to be among the first group of States to sign the convention." (CD/PV.471)

9 August Peru declares at the CD that it "does not possess or produce chemical weapons." (CD/PV.472)

11 August The Soviet CD ambassador tells a plenary session of the CD about the Soviet position on a number of detailed issues currently engaging working groups of the CD Ad Hoc Committee on Chemical Weapons. It includes Soviet support for the idea of dividing the budget of the projected international organization into an administrative and an operational part; the contributions of each state party to the former would be assessed in the same manner as their contributions to the United Nations, while the share of the operational expenses would be apportioned to a state party according to the expenses of systematic international verification on its own territory. (CD/PV.473)

15-19 August The group of experts convened by the UN Secretary-General in accordance with A/RES/42/37C [see 30 Nov] meets in Geneva. Its mandate is to "develop further technical guidelines and procedures available to [the Secretary-General] for the timely and efficient investigation of reports concerning possible use of [CBW] weapons that may constitute a violation of the 1925 Geneva Protocol and other relevant rules of customary international law." The experts are from Bulgaria, Egypt, France, Sweden, the USA and the USSR. The report which they transmit to the Secretary-General on 19 Aug records consensus on underlying principles but states that insufficient time had been available to translate those principles "into the modalities and procedures required." It asks that the next session of the UN General Assembly consider renewing the mandate of the group for a further period of time. (Official text)

16 August Britain declares information to the CD about its CW capabilities and about its industrial production of the scheduled chemicals in accordance with the Western recommendations for multilateral data provision that had been submitted to the CD in the Spring [see 14 Apr] (CD/CW/WP.206). Britain also publishes details of its CW-agent production from 1938 to its cessation in 1956 (CD/856).

16 August FR Germany also declares information to the CD in accordance with the Western recommendations [see 19 Jul, 14 Apr] (CD/CW/WP.207). Its CD ambassador says that "the chemical industry of the Federal Republic of Germany ... shares without reservation our priority objective to achieve a comprehensive and effectively verifiable ban on

chemical weapons." On the proposed national inspection trials [see 18 Feb] he tells the CD that "preparations for a possible national experiment" are under way in his country. Further: "We would welcome the establishment of an informal group which could prepare multilateral trial inspections. In such a group experience made in the course of efforts undertaken nationally could be exchanged and as a result a standardized approach for the multilateral experiment could be elaborated." (Official text)

17 August The UN CW investigatory mission transmits to the Secretary-General its report on its inquiries in Iran [see 3 Aug]. On the basis both of clinical evidence and of chemical analysis, the investigators conclude that mustard gas, dropped in aircraft bombs of the type familiar from the previous UN investigation, had injured Iranian civilians, including children, at Oshnaviyeh (S/20134). The report is distributed as a Security Council document on 19 Aug and is publicly released on 23 Aug (London Independent 24 Aug).

20 August The UN-arranged ceasefire in the Gulf War begins. Iraqi forces launch a large-scale attack against Kurdish guerrilla bases in northern Iraq which includes the use of mustard gas, according to Kurdish Democratic Party sources. (London Guardian 24 Aug)

26 August The UN Security Council adopts a resolution condemning the use of CW weapons in the Gulf War and empowering the Secretary-General to investigate "allegations brought to his attention by any Member State concerning the possible use of [CBW] weapons that may constitute a violation of the 1925 Geneva Protocol or other relevant rules of customary international law." Also, the resolution calls upon all States to apply strict export controls upon any chemical products implicated in CW and states that the Security Council would immediately consider "appropriate and effective measures" if CW weapons were used again. (S/RES/620)

29 August - 3 September The Iraqi Kurdistan Front reports that chemical weapons are being used on a massive scale against civilians in the villages of Iraqi Kurdistan; it estimates that 500 civilians have been killed and 3000 injured in the latest attacks, with tens of those injured by the poison gases dying daily due to lack of medical treatment (CARDRI release 29 Aug). Kurdish radio states that 5000 Iraqi Kurds have died from chemical bomb drops over the past four weeks. Tens of thousands of Iraqi Kurds are fleeing to Turkey, bearing reports of fierce fighting in 8 provinces of northern Iraq (London Independent 2 Sep; London Sunday Telegraph 4 Sep); refugees say that 65 Kurdish villages have been attacked with chemical weapons (London Guardian 14 Sep). Turkish military doctors examining the sick among the refugees are reported as saying that many wounds are compatible with mustard-gas poisoning (London Times 2 Sep) (See also NY Times 1, 4, 5 Sep; Wash Post 1, 3, 4, 5 Sep). Kurdish refugees are also arriving in Iran. The Iraqi news agency quotes an official source as "strongly denying the use of chemical weapons in northern Iraq" (INA 2 Sep, in FBIS-NE 6 Sep).

30 August USACDA Director William Burns, addressing the CD, states that "the United States is committed to negotia-

BUSH AND DUKAKIS ON BANNING CHEMICAL WEAPONS

18 August Vice President Bush in his acceptance address before the Republican National Convention says: "In foreign affairs ... I will ban chemical and biological weapons from the face of the earth." (NY Times 19 Aug)

25 September Vice President Bush in the first Presidential Debate says: "I want to be the one to banish chemical and biological weapons from the face of the earth."

"... I want it [the US] to be the one to finally lead the world to banishing chemical and biological weapons." (NY Times 26 Sep)

29 September Governor Michael Dukakis in a statement released by his campaign says: "We also need to press forward in concluding a verifiable treaty with the Soviet Union and other nations to ban the production and storage of chemical weapons."

"A Dukakis Administration will meet the threat of chemical and biological weapons with tough, unequivocal action. There is no place on earth for these inhuman instruments of destruction." (Official text)

13 October Vice President Bush in the second Presidential Debate says: "I'd love to be able to tell my grandchildren four years after my first term, I'd like to say, 'Your grandfather, working with the leaders of the Soviet Union, working with the leaders of Europe, was able to ban chemical and biological weapons from the face of the earth.'" (NY Times 15 Oct)

21 October In a speech to students at the University of Toledo, Vice President Bush says: "And if I'm elected President, if I'm remembered for anything, it would be this: a complete and total ban on chemical weapons. Their destruction forever. That's my solemn mission." (Official text)

tion of a comprehensive, effectively verifiable and truly global ban on chemical weapons," adding that the 1984 US draft CWC remained the basis of the US position. He cautions the CD to "resist the temptation to rush to signature by passing over the details." (CD/PV.478)

1 September The leader of the Iraqi Kurdistan Democratic Party, Massoud Barzani, addresses an appeal to the UN Security Council "to fulfill its recent resolution to take immediate action against any nation using chemical warfare." (Congr Record 9 Sep pp S12134-5)

6 September With the close, according to the Iraqi Defence Minister (London Observer 18 Sep), of the offensive against Kurdish rebels in northern Iraq, Iraqi authorities declare

an amnesty for Kurdish refugees. The authorities later state that, by 22 September, the number of Kurdish returnees had reached 41,920. (INA 22 Sep)

6 September FR Germany makes detailed proposals to the CD on how its "ad hoc checks" scheme for nonproduction-verification [see 25 Jan] might operate in practice. The scheme would require each state party to establish a national register of its chemical industry, suitably defined, for submission to the Technical Secretariat of the international organization; facilities to be subjected to ad hoc checks would be selected by the International Inspectorate at random but in accordance with a weighting factor. The sole purpose of the checks would be to ascertain whether any scheduled chemicals not reported for the facility were being produced there at the time of the inspection. (CD/869)

6 September The representative of Egypt states at the CD that his country "considers that the prohibition of chemical weapons has become a basic norm of international law ... which should be scrupulously observed." And, addressing the problem of attaining universality for the CWC, he supports the Yugoslav proposal [see 8 June] for a UN conference open to all potential signatories because this would enable prior consultations on the largest scale possible; and he proposes that such a conference consider the insertion into the CWC of provisions for specific sanctions in the event of violation. What such provisions should comprise could be addressed during the forthcoming inter-sessional CD meetings. (CD/PV.480)

8 September The US State Department announces: "The United States Government is convinced that Iraq has used chemical weapons in its military campaign against Kurdish guerrillas"; previously, US officials had said that the Government had no conclusive proof (NY Times 9 Sep). But the British, Turkish and other West European governments are continuing to state that they have no definite evidence (London Guardian & Daily Telegraph 9 Sep). It is later stated in the American press with attribution to unidentified Administration officials that the government had delayed its announcement for almost a month in order to secure additional verification (NY Times 10 Sep), and that the US evidence included intercepts of Iraqi military communications, as well as information gathered from Kurdish refugees in Turkey (NY Times 15 Sep). The press continues to report statements by individual doctors and nurses that they are treating or seeing cases of CW injury (Economist 10 Sep; London Independent 14 Sep; London Times 15 Sep; London Times 19 Sep; Tageszeitung, 22 Sep; London Observer 2 Oct), though there are also reports of doctors diagnosing natural causes for conditions attributed to CW (NY Times 10 & 12 Sep), and of refugees dead from illnesses attributed to poison gas but showing no evidence of that at autopsy (NY Times 11 Sep).

9 September The Turkish Foreign Ministry announces that it has no evidence that there are people suffering from CW injuries among the refugees from Iraq. Its spokesman says: "The use of chemical weapons is a subject which Turkey follows sensitively. The information and findings obtained as a result of comprehensive examination and research conducted so far are not of a nature to confirm such allegations." (NY Times 10 Sep)

9 September The US Senate votes for a bill to impose punitive sanctions upon Iraq following the Administration's condemnation of Iraq's use of poison gas against the Kurds. If enacted into law, the bill would cut off \$800mn of US credits and credit guarantees and exports of sensitive US equipment to Iraq. It would also require US representatives to vote against all loans to heavily indebted Iraq and would bar US imports of Iraqi oil and petroleum products. The bill is entitled The Prevention of Genocide Act of 1988. (Congr Record 9 Sep S12133-38) [See further 28 Sep]

The Senate action elicits virulent expressions of outrage in Iraq, echoed in several other Arab countries, most commonly denouncing the Senate for unwarranted interference in internal Iraqi affairs. There are calls on Baghdad radio and television, and in the newspapers, for mass anti-US demonstrations. A vast march to post a "Baghdad masses protest memorandum" on the door of the US Embassy duly takes place on 11 Sept. The memorandum characterizes the Senate's action as "shedding false tears over a handful of stray people who betrayed their homeland and threatened peace in the region." (See FBIS-NE #176 through 180)

12 September The UK Foreign Office states that Britain now regards the evidence for CW having been used against the Kurds as "compelling," particularly that supplied from US sources, though not "conclusive" (Financial Times 13 Sep). Britain, Japan, the five Nordic countries, the United States, West Germany and Italy, joined by Belgium, China, France, the Netherlands and the USSR, urge the UN Secretary-General to initiate an investigation under Security Council Resolution 620 [see 26 Aug]. (London Guardian, Financial Times, London Daily Telegraph 14 Sep; AP in Boston Globe 14 Sep; NY Times 16 Sep)

12 September The German Democratic Republic reaffirms to the CD that it "does not possess any chemical weapons and has no such weapons from other states stationed on its territory"; also that it "is neither engaged in the development of chemical weapons nor has it facilities to produce them." It declares, further, the number of facilities it has which produce Schedule [2] or Schedule [3] chemicals. (CD/871)

12 September The CD Ad Hoc Committee on Chemical Weapons adopts a new "rolling text" (CD/874). The principle that chemical weapons production facilities, now defined (in a notably restrictive manner) for the first time, are actually to be destroyed, not converted to some other use, is now firmly established. Other major developments over the previous rolling text [see 20 Apr] are limited to additional language on challenge-inspection modalities, both in the rolling text proper and in the appended material on which consensus is still developing. The latter includes a report on the role of instrumental monitoring in nonproduction verification, as well as expanded language on the final clauses. There is much evidence in the text of the discord engendered by the French insistence [but see 29 Sep] on the option of maintaining production facilities in support of a "security stock" even during the destruction period.

13 September Finland describes to the CD the prototype database which has been developed in the Finnish CW Dis-

armament Verification Research Project for computerized storage and handling of CWC verification data, such as might serve the day-to-day needs of the future Technical Secretariat. The system, which runs on a MicroVax II and is documented in a new Finnish Blue Book, is offered for international experimentation and evaluation, applications for user passwords into the system being invited. (CD/PV.481)

13 September The UN Secretary-General asks Iraq to admit a team of experts to investigate the reports of poison-gas use against Kurdish guerrillas; if access is denied, the team, which is still being assembled, may instead seek to inspect Kurdish camps in Turkey. A joint UNHCR/International Red Cross team that had visited Kurdish refugees in north-west Iran says it has found no evidence of the CW attacks which the refugees had reported. (London Daily Telegraph 14 Sep) But on the following day the Turkish Foreign Ministry states that any request for a UN investigating team to enter Turkey would be refused, for it would "create a wrong impression that Turkish medical experts are inadequate to make related research." The Turkish Government would, however, continue to admit journalists and humanitarian groups (such as the UNHCR and the Red Cross) to the refugee camps. (London Daily Telegraph & Guardian, NY Times 15 Sep) Iraq refuses the UN request two days later (NY Times 17 Sep).

14 September The US State Department announces: "The US now believes that Libya has developed a chemical weapons production capability and is on the verge of full production of these weapons" (Wash Post & Times, London Guardian 15 Sep; NY Times 18 Sep). NBC Television reports that a plant 50 miles from Tripoli will soon be able to produce large amounts of mustard gas (Reuter 14 Sep); the factory is said to be a desalination plant, also intended for nerve-gas production (London Daily Telegraph 17 Sep). Responding to information received from the US Government, the Japanese Government states that it had found no evidence that a private Japanese machine-tool company had been involved in Libyan chemical-weapons production (Tokyo Kyodo 16 Sep, in FBIS-EA 16 Sep; Financial Times 17 Sep).

15 September The European Parliament adopts a resolution accusing Iraq of using CW to "exterminate the Kurdish population" and calling upon the 12 member states of the European Community to suspend immediately all deliveries of weapons to Iraq, as well as the export of material usable for the manufacture of chemical weapons. (Financial Times 19 Sep)

15 September The US CD ambassador, in a plenary statement reviewing the summer session's work, says that "the tempo of progress has slowed down" and specifies three issues "central to the success of the [CWC] negotiations": (a) the problem of ensuring undiminished security during the transitional period while chemical weapons and their production facilities are being destroyed; (b) the provisions needed in the CWC for dealing with the possible emergence of new CW agents; and (c) the proper approach on challenge inspection. In this last regard he commends a recent GDR proposal. (Official text)

16 September The British Foreign Secretary declines to condemn Iraq for using CW against the Kurds, saying Britain would await a UN investigation into the allegations. (London Guardian 17 Sep)

17 September Iraq News Agency reports that a statement issued by the Iraqi Foreign Minister, Tariq Aziz, "reaffirmed that Iraq respects and abides by all the provisions of international law and international agreements accepted by the international community, including the Geneva Protocol of 1925" on CW weapons (INA 17 Sep in FBIS-NE 19 Sep; Wash Post 20 Sep). Three days later the US State Department announces that it understands the statement to mean that Iraq forswears the use of the weapons in internal as well as international conflicts (Wash Post 21 Sep; Reuter in London Guardian 21 Sep).

19 September The Director of US Central Intelligence, William Webster, during a public speech in California, states that at least 10 countries are working to produce biological weapons, and that as many as 20 countries may be developing chemical weapons (Reuter from San Francisco 19 Sep, in Current News 20 Sep). The Director of Naval Intelligence, William O Studeman, had told the Congress in March: "Worldwide, some 10 countries possess a chemical warfare capability. As many are known or thought to be actively seeking it.... Five Asian states developing chemical warfare capability are: PRC, Taiwan, North Korea, Vietnam and Burma. PRC, Taiwan and North Korea are also involved in biological warfare programs." (House Armed Services Seapower subcommittee hearing, 1 Mar)

20 September In Geneva the summer session of the CD ends.

20 September Japan announces that its list of chemicals whose export to Iran and Iraq is banned is to be increased from 6 to 9, and restrictions will be placed on their export to other countries. The three additional chemicals are phosphorus trichloride, dimethyl phosphite and trimethyl phosphite. (Tokyo Kyodo, Reuter from Tokyo 20 Sep, both in Current News 21 Sep)

21 September The US Senate Foreign Relations Committee receives a staff report ("Chemical weapons use in Kurdistan: Iraq's final offensive," 46 pp) based on visits to Kurdish refugee camps in Turkey during 12-15 September. The report concludes that "overwhelming evidence exists that Iraq used chemical weapons on Kurdish civilians in a major offensive in northern Iraq that began August 25, 1988." Refugee eyewitness accounts are the principal evidence cited. (See Wash Post, NY Times 22 Sep)

22 September In the US Senate a bill is introduced which would impose economic sanctions against firms, US or foreign, "involved in the transfer of chemical agents or their related production equipment or technical assistance to Iran, Iraq, Libya and Syria" (Congr Record 22 Sep S13093-95). Dep Asst Secretary of State A. Peter Burleigh states that the bill would undercut international efforts to curb the spread of chemical weapons. (NY Times, Wash Post & Times 23 Sep)

23 September The joint US-Soviet statement from the Shultz-Shevardnadze talks contains the following:

"The two sides reaffirmed the objective of concluding as soon as possible a global convention on the comprehensive prohibition and destruction of chemical weapons, encompassing all CW-capable states.

"In reviewing progress toward this goal, the sides exchanged views on such issues as laboratory synthesis of super-toxic chemicals for medical and research purposes, bilateral data exchanges and other confidence-building measures.

"They agreed that the tenth round of Soviet-US bilateral consultations on chemical weapons will take place in Geneva from November 29 to December 15.

"The sides expressed deep concern about the recurrent use of chemical weapons, in particular against civilian populations.

"They shared the view that the expanding proliferation and use of chemical weapons continue to impart a sense of urgency to their discussions and highlight the absolute necessity of negotiating an effective and verifiable CW ban.

"They reaffirmed their support for the role of the UN Secretary-General in carrying out prompt investigations in order to ascertain the facts of such use.

"They further agreed that Soviet and US experts would meet on December 16, 1988, for a new round of talks on measures to halt the proliferation of chemical weapons." (Moscow News 28 Sep)

Foreign Minister Eduard Shevardnadze tells an end-of-talks press conference that the USSR was willing to disclose the locations of Soviet production facilities for CW weapons if the USA was prepared to reveal the size of its CW arsenal. (Washington Post 24 Sep)

26 September President Reagan says to the UN General Assembly: "The use of chemical weapons in the Iran-Iraq war ... jeopardizes the moral and legal strictures that have held these weapons in check since World War I. Let this tragedy spark reaffirmation of the Geneva Protocol outlawing the use of chemical weapons." (NY Times, Wash Times & Post, London Guardian 27 Sep) He goes on: "I call upon the signatories to that protocol, as well as other concerned states, to convene a conference to consider actions that we can take together to reverse the serious erosion of this treaty." (NY Times 27 Sep) It is not immediately clear what sort of conference he has in mind (Wash Post 27 Sep; NY Times 28 & 30 Sep). Soviet Foreign Minister Shevardnadze later describes the conference proposal as "a very good idea" (NY Times 27 Sep).

28 September The US House of Representatives votes 388-16 to impose sanctions against Iraq, declaring that "Iraq's use of chemical weapons is a gross violation of international law." The bill would bar the export of weapons and sensitive technology to Iraq, but would not go as far as the Senate sanctions bill [see 9 Sep] (which would also halt US credit and ban US imports of Iraqi oil) unless the President was unable to assure Congress that the Iraqi Government had renounced chemical weapons and was willing to admit a UN investigatory mission. (NY Times 28 Sep; London Daily Telegraph, Financial Times 29 Sep) A House-Senate conference must agree on a version to go forward for President Reagan either to veto along with the whole tax bill or to sign into law. His administration has been opposing both bills (NY Times, Wash Post 28 Sep).

29 September President Mitterrand of France, addressing the UN General Assembly, states that France is ready, "as of this moment, to renounce any possibility of producing chemical weapons" as soon as the CWC enters into force. He believes that production facilities as well as stockpiles should be "subjected to international surveillance before they are dismantled." (Official text)

In addition to announcing this major shift in the French position, the President also declares that France, as depositary of the Geneva Protocol, favors the proposed meeting of states parties [see 26 Sep]. He says that the meeting "will aim at making a solemn reaffirmation to the commitment of the nonuse of chemical weapons, at preventing their proliferation, at encouraging new accessions to the Protocol, at improving investigative procedures -- in short, at indicating a common desire for the success of the work currently being carried out at Geneva within the con-

text of the Conference on Disarmament." Later, he states that France is prepared to host the conference in Paris (NY Times 30 Sep). [See Calendar]

He puts forward a third proposal, also betokening a major shift in French policy, for an increased UN role "in the struggle against the proliferation and the use of chemical weapons": "Let us create a situation which would make it impossible for any State to use chemical weapons with impunity to settle its external or internal problems. If any State does use them, I think it would become necessary, among other measures, to impose an embargo on all deliveries of products, technologies and, more generally, weapons to that State. France is ready, after consultation with its partners, to submit a draft resolution to this effect."

He states that France "has no chemical weapons." This is said to have surprised "several US officials." (Wash Post 30 Sep)

REVIEW: WORLD CW ARMAMENT

A survey of what has been disclosed about the stocks of CW weapons and the factories for making them that exist around the world today, prepared by Julian Perry Robinson, University of Sussex, UK

PART I: THE UNITED STATES

INTRODUCTION

When the projected Chemical Weapons Convention comes into force, each state party will be required to declare in detail its stocks, if any, of the weapons and its production facilities formerly used for making them. Such information is now available only in fragmentary and unreliable form. Where there is ignorance of the true dimensions of something feared, people tend to assume them large rather than small. So what some states parties declare may fall far short of what others expect. In that event the mutual confidence among parties which will be vital to the treaty at least until its verification provisions are fully operative may fall prey to recrimination and accusation.

This problem is illustrated by what happened after the Soviet Foreign Ministry announced, on 26 December 1987, that the USSR's stocks of CW weapons comprised no more than 50,000 tonnes of chemical-warfare agents. That figure in fact fell within the range of estimates which different US agencies had previously developed for the size of the Soviet stockpile, a range -- 30,000 to 700,000 agent tons¹ -- whose remarkable breadth was due to the paucity of up-to-date intelligence which the President's Chemical Warfare Review Commission had criticized in 1985.² But the Soviet figure was one-sixth as large as the most widely quoted of those different agency estimates. This stimulated many publicists into commentary -- not on the shortcomings of current intelligence, but on the duplicity of the Soviets. What had been presented as a confidence-building disclosure of hitherto secret information by the USSR resulted in a new wave of mistrust.

It also encouraged the CWC negotiators in their pursuit of remedies. New schemes have since been put forward in Geneva for disclosure of sensitive items of information ahead of the treaty itself, and for validation of that information. Not only is there the necessity of building confidence. There is also the fact that the size of the CWC inspectorate cannot be stated, and therefore its structure and powers negotiated, until the size of what is to be inspected is known. Pending agreement among the negotiating governments on how best to proceed, several of them have, like that of the USSR, been making unilateral disclosures. The data-base on which the CWC inspectorate is to found its operations is thereby starting to fill. But it has a long way to go, and the problem of data validation prior to entry-into-force of the treaty (if that is really what is needed) is not yet solved.

Until that happens the body of information about CW stockpiles, factories, etc which already exists in the public domain will continue to exert its own particular influence. It will direct public attitudes on such fundamental matters as the adequacy or otherwise of projected verification arrangements for the CWC -- the security risks, in other words, of having a treaty in place of an open option to retaliate in kind against adversary CW. But it does not require a great deal of study to discover that much of what people take to be fact about the state of CW armament today, especially its proliferation and its military usefulness, is actually no more than opinion, and opinion that may have been directed, for all one can tell, by the most

prejudicial of interests. Nor is it uncommon for what appears to be information to reveal itself as misinformation, even disinformation, that has acquired credence simply from repetition. There are just too few reliable or disinterested sources of knowledge on the subject, and too many uncritical users.

Starting here, therefore, is a review of what has been published over the years about key features of world CW armament today. It begins with the CW-weapon-possessor state about which most is publicly and reliably known, the United States. Later parts will address the Soviet Union, France and other known or purported possessors.

CW ARMAMENT OF THE UNITED STATES

The US Government has now made public much information about its CW armament. To be found in its official publications are descriptions of each type of CW agent and munition in US stockpiles today; the percentages of the total tonnage of available CW agent held in different categories of munition; the exact locations of all stocks of CW agents and munitions held within the continental United States, as well as the relative sizes of these holdings; and the locations of all production facilities which would be subject to destruction under the CWC as currently drafted.

Most of this information first became public in unclassified US military manuals and then in the environmental impact statements (EIS) which, since the National Environmental Policy Act of 1969, the Army has been obliged by US public law to file on some of its activities, starting with the sketchy 18-page EIS for Operation Red Hat (the removal of the Pacific CW stockpile from Okinawa to Johnston Atoll) in 1970 and culminating in the 1900-page EIS for the Chemical Stockpile Disposal Program³ that is now just beginning. A part of the disclosure was also due to actions deliberately taken to assist the CWC negotiations, most notably in the commissioning and then, in 1972, the publication by the US Arms Control & Disarmament Agency of a contract study detailing the history and operations of the US factories for nerve gases and their precursors.⁴ The US Government has presented the Conference on Disarmament with excerpts from the draft Disposal Program EIS.⁵ Another such official compilation made available to the CD is the "Information Presented to the Visiting Soviet Delegation at the Tooele Army Depot, 18-21 November 1987."⁶

Significant matters which the US Government has not disclosed are: the total tonnage of stockpiled CW agents; the actual numbers held of the different types of munition; and the quantity and whereabouts of the US CW weapons that are stored in Europe. Seemingly plausible estimates may, however, be made from data released over the years by US officials, especially in testimony to budget-oversight committees of the Congress.

Types of CW agent held

US holdings of toxic chemical antipersonnel agents are currently limited to four blister gases (vesicants),

three, perhaps four, nerve gases, one psychochemical incapacitant and three or four irritants. The last of the choking and the blood gases (which, in the forms of phosgene and cyanogen chloride, comprised some 60 percent of the total agent tonnage on hand at the time of the Korean War⁷) was destroyed in 1982.⁸ The irritants are not classified as CW agents by the US Government because they are available for use for domestic law-enforcement purposes. The stockpiled agents are as follows:

Agent H: mustard gas -- bis(2-chloroethyl) sulphide -- in the crude form made from ethylene and sulphur monochloride by the Levinstein process. Total US production during 1940-43, which is when most of the H was made, was 87,300 tons,⁹ done at Edgewood, Maryland; Huntsville, Alabama; Rocky Mountain, Colorado; and Pine Bluff, Arkansas, arsenals.¹⁰ H was declared obsolete in 1968, most of the supplies then remaining being dumped at sea.¹¹ Some H-filled projectiles for 155mm cannon, presumably old Navy stocks,¹² still await disposal.

Agent HD: mustard gas in the relatively pure form produced by water-washing and vacuum-distilling agent H. US production commenced in 1945, at Edgewood and Rocky Mountain arsenals.¹⁰ It continued intermittently until 1955. Current stocks are held mostly in 1-ton bulk-storage drums. There are also mortar and cannon shell that were filled with HD at Redstone and Rocky Mountain arsenals during the 1950s.⁸ Little significant deterioration of the agent has been observed.¹³

Agent HI: also known as "runcol," this is a further variant of mustard, being the reaction product of thiodiglycol incompletely chlorinated to yield a 60:40 mixture of mustard gas and higher mustards, chiefly agent I. It was originally developed in Britain as a vesicant for cold-weather or high-altitude aerial-spray use. The first US holdings, dating back to 1943, were supplied by Canada and Britain;⁹ perhaps all of the present holdings were, since there is no public record of a US factory for HI. Current stocks, which seem undeteriorated despite their age, are mostly in 1-ton bulk storage drums,¹³ but some HI is also held in mortar bombs.³

Agent L: the arsenical vesicant also known as "lewisite," which is chiefly 2-chlorovinyl dichloroarsine. Some 20,000 tons were made from arsenic trichloride and acetylene at Huntsville, Pine Bluff and Rocky Mountain arsenals during 1942-3, production being halted by a belatedly unfavorable operational assessment of the agent. It was formally declared obsolete in 1955, by which time most of the stocks had been dumped at sea.¹⁰ A small supply is held in 1-ton bulk-storage drum.³

Agent GA: also known as "tabun," O-ethyl dimethylphosphor-amidocyanidate, the first of the nerve gases. Germany produced about 12,000 tons of it during 1942-45.¹⁴ A press report states that a thousand tons were shipped to the United States after the war.¹⁵ A small quantity remains, held in 1-ton bulk-storage drums.³

Agent GB: the principal US CW agent, isopropyl methylphosphonofluoridate, also known as "sarin." It is a nonpersistent nerve gas that was made at Rocky Mountain arsenal dur-

ing 1952-57 by a process which German workers were still developing at the close of World War II.¹⁴ The precursors were methylphosphonyl dichloride ("dichlor"), hydrogen fluoride and isopropanol. The dichlor was made at the Muscle Shoals Phosphate Development Works, Alabama, from elemental phosphorus (already being produced there) by way of phosphorus trichloride, dimethyl phosphite and then the latter's high-temperature pyrolysis product.⁴ Both bulk and weaponized stocks of GB are maintained, the latter dating from 1953-1969¹⁶ and currently comprising aircraft bombs and ammunition for tube and rocket artillery.³ The GB was produced to a specification requiring a purity of at least 92 (later 88) percent by weight. All production lots were initially stabilized with tributylamine, with subsequent munition fills being restabilized with diisopropylcarbodiimide.¹⁷

Agent TGB: a thickened form of sarin nerve gas, listed by the US Navy in 1985 alongside H and VX as a standard fill for its 90-gallon aircraft spraytank.¹⁸ The public record does not confirm that TGB or its thickener is actually stockpiled.

Agent VX: the second mainstay US CW agent, O-ethyl S-diisopropylaminoethyl methylphosphonothiolate, a persistent nerve gas which the US Army developed during the mid-1950s from a British discovery. It was made to a 92 percent purity¹⁷ specification at Newport Chemical Plant, Indiana, during 1961-68 from sulfur and "QL," the latter being made on site from phosphorus trichloride by way of methyl dichlorophosphine and then diethyl methylphosphonite.⁴ Both bulk and weaponized stocks of VX are held, the latter comprising aircraft spraytanks, landmines and ammunition for tube and rocket artillery.³ Diisopropyl and dicyclohexyl carbodiimides were used as stabilizers.¹⁷ Recent surveillance has shown that the stockpiled VX, like the GB, is very stable and is unlikely to deteriorate significantly during the 1990s. The contrary was once feared.²

Agent BZ: 3-quinuclidinyl benzilate, an anticholinergic first reported by a commercial drug house in 1952, whose effects on both the mind and the body can disable people temporarily for a period of days. Some 50 tons were manufactured by a US Army contractor during 1963-64, most of the supply being filled then into air weapons at Pine Bluff Arsenal.¹⁹ But major unpredictabilities in the effects of the agent were later recognized, and it was declared obsolete in 1977. The stocks -- 10,700 lbs in bulk storage, the rest as 166,000 lbs of 50% BZ burning mixture inside 1500-odd cluster munitions²⁰ -- are now being incinerated.

Agents CN, CS and CR: irritant agents adopted by the US Army in 1919, 1959 and 1973 respectively, primarily for riot-control purposes. Some 8,600 tons of CS in various forms were procured by US forces at the time of the Vietnam War,²¹ most of it being used then for military purposes.

CW-capable weapons

During the 1950s and 1960s, when the CW-weapons acquisition program of the United States was at its height, toxic chemical munitions were being studied or developed for virtually every weapon system in the US force struc-

ture, ranging miniaturized devices of the clandestine services up to intermediate-range ballistic and cruise missiles. More than 40 different munitions, exclusive of the irritant-agent ones, are said to have gained service approval then for inclusion in operational inventories.²² But when, in 1969, production was abruptly halted, no more than 25 or so of these standardized munitions had actually entered the stockpile. For some of those that did, the delivery systems for which they were designed have since been withdrawn from service or replaced by others for which the munitions are unsuited or have not been qualified. US CW-capable weapons are therefore less varied than they once were. Nor, for some years yet, will the resumption of production which occurred in December 1987 make much difference. The resumption is introducing a supply of the new M687 binary artillery round into the stockpile, but this munition is of a category that is available anyway in substantial and serviceable quantity: projectiles for disseminating GB from 155mm howitzers. The full range of CW-capable US weapons appears³ to be as follows:

Mortar, 4.2 inch: mustard-gas (HD and HT) cartridges are available for this weapon which is, however, being replaced by a new mortar of 120mm calibre.

Howitzer, 105mm: HD and GB cartridges are held for this weapon, which also is obsolescent, though still deployed with some Army and Marine Corps units.

Howitzer, 155mm: mustard gas (H and HD) and nerve gas (GB and VX) projectiles are available which can be fired from all versions of this weapon, which is and will remain the backbone of US artillery. The stocks of the nerve-gas rounds were refurbished a few years ago.²

Howitzer, 8 inch: recently refurbished nerve-gas projectiles -- VX and, mostly, GB -- are available² for all versions of this corps artillery weapon.

Strike aircraft: late-1950s designs of 500-lb and 750-lb general-purpose bombs, deliverable by today's frontline US Navy and US Air Force strike aircraft, have been stockpiled with a GB fill in place of the high explosive. The Navy also has a more modern 500-lb-class GB bomb, the Weteye, that is qualified for aircraft such as the Harrier. For delivery of persistent agents there are only spraytanks, in two varieties (Navy and Air Force), pending production of the Bigeye binary VX spraybomb, but they cannot be used on aircraft more recent than the Skyhawk or the Phantom.

Obsolete weapons: awaiting disposal are supplies of mustard and GB projectiles for the 155mm long-range field gun; and GB and VX rockets for the Army's old 115mm multiple launcher. Almost in this category also is the supply of VX landmines; they are judged to be no longer compatible with modern manoeuvre-warfare tactics.² Nerve-gas warheads for the Honest John heavy artillery rocket were discarded in 1976.³

Stockpile size

Total US worldwide holdings of CW casualty agents may with some confidence be estimated to fall within the

range 30,000 to 32,000 short tons. Data supporting this estimate include the following:

(a) In May 1974 the Defense Department informed the House Foreign Affairs Subcommittee on National Security Policy and Scientific Developments that there had been an "almost 75 percent reduction in world-wide [US CW-agent] stockpiles since World War II."²³ The official history of the Chemical Warfare Service in World War II records overall production of CW agents then as about 146,000 short tons.¹⁰ According to the Disposal Program EIS,³ between 4300 and 7300 tons of agent have been destroyed in demilitarization projects since May 1974.

(b) In May 1982 the Defense Department informed the Senate Appropriations Committee that 8 percent of the total CW agent stockpile was held in "rockets which have deteriorated and for which launchers no longer exist."²⁴ Referring to those same rockets in May 1985, an Army witness told the House Defense Appropriations Subcommittee that they contained "approximately 2533 agent tons."²⁵

Other such official data allow this total-stockpile estimate to be disaggregated in various ways:

| <u>Agent</u> | <u>Approximate quantity held (tons of agents)</u> | |
|--------------------------|---|---------------------|
| | <u>in bulk</u> | <u>in munitions</u> |
| HD and HT mustard gas | 13,000 | 4,000 |
| GB and VX nerve gas | 6,200 (30% VX) | 7,600 |
| Others (H, L, GA and BZ) | small | small |

| <u>CW-capable weapon</u> | <u>Approximate number of munitions held for the weapon and filled with:</u> | | |
|--------------------------|---|-------------------|---------------------|
| | <u>mustard</u> | <u>GB</u> | <u>VX</u> |
| Mortar (4.2-in) | 470,000 | 0 | 0 |
| Howitzer (105mm) | 480,000 | 900,000 | 0 |
| Howitzer (155mm & 8-in) | 300,000 | 200,000 | 300,000 |
| Strike aircraft | 0 | 13,000 (bombs) | 900 (spraytanks) |

The margin of uncertainty in these disaggregated (and rounded) estimates is of course no smaller than that of the overall estimate.

The current testimony of the Defense Department is that only 10 percent of the agent stockpile is militarily useful; beyond that, 18 percent has "limited value," another 11 percent is in munitions that are either irreparably defective or for the obsolete weapons noted earlier, while the remaining 61 percent is unweaponized. Placed in the "limited value" 18-percent category are the mortar and howitzer mustard-gas rounds, the 105mm GB rounds, the landmines and the spraytanks. The "useful" 10-percent category comprises the bombs and the 155mm/8-in GB and VX rounds.²⁶ Those percentages had been quoted in a number of earlier releases, including the Joint Chiefs military posture

statement of Jan 1985. In his Feb 1985 annual report to the Congress, the Defense Secretary wrote: "the US stockpile of militarily useful chemical weapons contains only about half the agent required to support our field commanders' needs."

Deployment

In 1978 the House Military Construction Appropriations Subcommittee received the following submission from the Army: "There are a total of 13 sites where [US] chemical agents or munitions are stored. Two are overseas; one in the Federal Republic of Germany and the other at Johnston Island, Pacific. There are eleven sites in the United States."²⁷

Of the 11 US sites, two -- Dugway Proving Ground, Utah, and Redstone Arsenal, Huntsville, Alabama -- were listed as containing only "RDT&E quantities," while a third -- Rocky Mountain Arsenal, Denver, Colorado -- has since been cleared of CW weapons. For the others, their contents are described in some detail in the Disposal Program EIS³, as shown in the table in the right hand column:

In a recently declassified Joint Staff paper of Dec 1962, the European storage location for US CW weapons in Europe then is given as the Rhein Ordnance Depot at Kirchheim-Bolanden; it held HD and GB, both bulk and weaponized, in relatively small quantity (3902 short tons of munitions and agents).²⁸ Later things changed, for in June 1975 the Army testified to the Congress that the German stockpile contained only nerve gas, both GB and VX, but no mustard, and that the supply was all weaponized.²⁹ It was understood to comprise only 155mm and 8-in artillery projectiles. Its whereabouts was not disclosed, but press speculation has since fastened, perhaps erroneously, on the US Army depot at Fischbach, near Pirmasens, in the Palatinate. Information about the content of the Pacific stockpile was contained in official releases at the time of Operation Red Hat.³⁰ In 1982 the Army designated 40 percent of the Pacific stockpile as obsolete and available for disposal.⁸

Such data allow another disaggregation of the total-stockpile estimate, as shown in the table below:

| <u>Storage location</u> | <u>Holdings, as a proportion of the total US CW-agent holdings</u> |
|---|--|
| Tooele Army Depot Tooele, Utah | 42.3% (H, HD, HT, L, GA, GB, VX) |
| Pine Bluff Arsenal Pine Bluff, Arkansas | 12.0% (HD, HT, GB, VX, [BZ]) |
| Umatilla Army Depot Activity Hermiston, Oregon | 11.6% (HD, GB, VX) |
| Pueblo Army Depot Activity Pueblo, Colorado | 9.9% (HD, HT) |
| Anniston Army Depot Anniston, Alabama | 7.1% (HD, HT, GB, VX) |
| Aberdeen Proving Ground Edgewood, Maryland | 5.0% (HD) |
| Newport Army Ammunition Plant Newport, Indiana | 3.9% (VX) |
| Lexington-Blue Grass Depot Activity Richmond, Kentucky | 1.6% (H, GB, VX) |
| Overseas | 6.6% [mustard, GB, VX] |

Agent type

Approximate quantity (tons of agent) stored in

| | <u>Johnston Atoll</u> | <u>West Germany</u> | <u>USA</u> |
|--------------------------|-----------------------|---------------------|------------|
| Weaponized nerve gas | 1,100 | 400 - 500 | 6,000 |
| Weaponized mustard gas | 350 | 0 | 3,700 |
| Bulk nerve/mustard gases | 150 | 0 | 19,000 |

In terms of munitions rather than their agent payload only, the German stockpile would seem to total about 6500 tons. According to former Defense Secretary Weinberger, the German stockpile "is in fact in excellent condition."³¹ It is due to be withdrawn from the Federal Republic by 1992 in accordance with an agreement concluded between President Reagan and Chancellor Kohl in May 1986.³²

Production capacity

In a submission to the CD in July 1988 the US Government stated that it had production facilities that would be subject to destruction under the CWC at five locations: Rocky Mountain Arsenal (sarin production), Newport Army Ammunition Plant (VX production), Pine Bluff Arsenal (difluor and QL production), Muscle Shoals (dichlor production) and Aberdeen Proving Ground (pilot plant).³³ Much was already in the public domain about each one:

Rocky Mountain Arsenal. In standby status here since 1957 is the one US production facility for GB.⁴ Of its three self-contained GB-production units, one was converted in the 1970s for chemical demilitarization purposes; so were much of the adjacent munition-filling facilities.³⁴ By the time of layaway its capacity had been increased⁴ from 750 tons per month⁷ to around 2500 t/mo, maybe more. One may estimate, however, that only about 13,000 tons of GB were actually produced during its five years of operation.

Newport Army Ammunition Plant. In standby status here since 1969 is the one US production facility for VX; there are also munition-filling facilities. No information is available on production capacity, but the 5000 or so tons of VX which one may estimate were produced resulted from considerably less than full-capacity operations.⁴

Pine Bluff Arsenal. This is now the location of the Integrated Binary Production Facility. The difluor mentioned

in the CD submission, otherwise known as "DF," and the QL are needed in the current production program as fill for, respectively, the M687 binary projectile (being assembled here) and the Bigeye spraybomb.

Muscle Shoals. The public record does not seem to indicate whether the dichlor production facility noted in the CD submission is a new one built to furnish the dichlor needed at Pine Bluff Arsenal for DF production, or whether the reference is solely to the old facility maintained in standby since the days of the GB programme, when its capacity was about 100 tons of dichlor per day⁴.

Aberdeen Proving Ground. In what used to be the Edgewood Arsenal there is a variety of pilot-plant facilities which have been used to produce developmental quantities of most types of US CW agents and munitions, including binary munitions and binary reactants.

Information was not contained in the CD submission about the facilities where metal parts for chemical munitions are produced. Nor was there information on former mustard-gas factories.

Production capacity for chemical intermediates that could be used to make CW agents exists in the private US chemical industry. In 1983 the US Government told the CD how many US companies were actually making certain of these precursors. Five companies were producing "chemicals containing the P-methyl and/or P-ethyl bond"; five, too, were producing phosphorus trichloride; and five, again, were producing phosphoryl chloride. A further 14 companies (but some of them perhaps counted more than once) were reported to be making chemicals from six other families of precursor. No company was producing pinacolyl alcohol. The names of the companies, their production capacities, their annual outputs and the end-uses of the products were not specified.³⁵

The CD has since developed new listings of precursors and other industrial chemicals that it wishes to bring under control. Up-to-date information on private US production capacity for the newly listed chemicals will presumably soon be furnished by the US CD delegation.

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- 33 CD/849 of 28 July 1988.
- 34 R Mikulak, "Destruction of US chemical weapons production and filling facilities," in SIPRI, Chemical Weapons: Destruction and Conversion, London: Taylor & Francis, 1980, pp 57-66.
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CALENDAR

- o "Congress for prohibition of chemical weapons world-wide and a free zone of chemical weapons in Europe," sponsored by the Federation of German Trade Unions, 19-20 Nov, Mainz, West Germany, tel. (06131) 2816-0 [open]
- o "Ways Out of the Arms Race," Second international scientists' conference at Imperial College, London, 2-4 Dec. Included are papers and workshops on chemical warfare. Registration fee; limited numbers. Write Dr. John Hassard, Blackett Laboratory, Imperial College, London SW7 2BZ, England
- o Conference on Disarmament Ad Hoc Committee on Chemical Weapons: open-ended consultations, 29 Nov - 15 Dec, and limited-duration session, 17 Jan - 3 Feb 1989 [closed]
- o "Australia Group" meeting, November [closed]
- o The tenth round of the bilateral US-USSR chemical weapons treaty talks scheduled 29 Nov - 15 Dec
- o The tenth round of the bilateral US-USSR chemical weapons treaty talks scheduled 29 Nov - 15 Dec
- o The next round of the bilateral US-USSR talks on measures to halt the proliferation of chemical weapons scheduled to start 16 Dec
- o Geneva Protocol conference, to be hosted by France [see 26, 29 Sept], scheduled 7-11 Jan 1989 (NY Times 21 Oct)
- o 14th Pugwash Workshop on Chemical Warfare, tentatively scheduled for Geneva in Jan 1989 [invitation only]
- o AAAS annual meeting, San Francisco Hilton, 14-19 Jan 1989; to register, write AAAS Annual Meeting Registration, Room 830, 1333 H St. NW, Washington DC 20005
 - 16 Jan 8:30 am -- Implementing a Global Chemical Weapons Convention [Matthew Meselson, Harvard University, presiding; Robert Mikulak, USACDA; Nikita Smidovich, Ministry of Foreign Affairs of the USSR; Ruediger Reyels, Ministry of Foreign Affairs of West Germany; Will Carpenter, Monsanto Agricultural Company; Edward Tanzman, Argonne National Laboratory]
 - 17 Jan 2:30 pm -- Biological and Toxin Weapons: the Renewed Threat [Robert Sinsheimer, UC Santa Cruz, and Barbara Rosenberg, Memorial Sloan-Kettering Cancer Center, presiding; Jay Jacobson, U of Utah School of Medicine; Col David Huxsoll, Ft Detrick MD; Keith Yamamoto, UC San Francisco; Ray Zilinskas, U of Maryland-Baltimore; Erhard Geissler, Academy of Sciences of the German Democratic Republic]
- o Symposium on the current status of biological weapons, at the joint meeting of the American Society for Biochemistry and Molecular Biology and the American Society for Cell Biology, San Francisco Hilton, Tuesday 1 Feb 1989, 7 pm. [Sinsheimer, Meselson, Rosenberg, Geissler, and Philip Russell, Ft. Detrick]

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BASIC READING

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- Stockholm International Peace Research Institute (SIPRI), The Problem of Chemical and Biological Warfare, New York: Humanities Press, 6 vols, 1971-75; also see documented annual reviews of developments in the CBW field are to be found each year back to 1982 in the SIPRI Yearbook: World Armaments and Disarmament, which is now published by Oxford University Press
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