

CHEMICAL WEAPONS CONVENTION BULLETIN

News, Background and Comment on Chemical and Biological Warfare Issues

ISSUE NO. 20

JUNE 1993

Quarterly Journal of the Harvard Sussex Program on CBW Armament and Arms Limitation

CHEMICAL WEAPONS CONVENTION: VALIDATION OF ACCREDITED LABORATORIES AND ANALYTICAL MEASUREMENTS

Graham S Pearson

*Director General, Chemical and Biological Defence Establishment,
Porton Down, Salisbury, Wiltshire SP4 OJQ, England*

A key element of the Chemical Weapons Convention (CWC) which opened for signature in Paris in January 1993 is the verification regime and at the heart of the effectiveness of this regime is the ability to analyse samples to determine whether they contain traces of a chemical which may have been produced for purposes prohibited or permitted by the Convention. Analytical measurements underpin all the elements of the verification regime to a greater or lesser extent whether it be verification of the destruction of chemical weapons, destruction of chemical weapons production facilities, routine inspections under Article VI, challenge inspections under Article IX or investigations of allegations of use again under Article IX. It is unlikely that any claim of non-compliance can be substantiated without analytical evidence to prove that the material involved is one that is being used for a prohibited purpose under the Convention. Consequently, the validity of the analytical measurements will have great importance in regard to the status and success of the Convention.

The importance of analytical measurements has long been recognized in investigations of allegations of use of chemical weapons. There have been numerous allegations of use during the past decade ranging from the yellow rain saga in South East Asia, the UN Secretary-General's investigation of attacks of Iran, the analysis of samples from Kurdish villages in Northern Iraq, and the allegations of use in Africa including Angola and Mozambique. Valuable information has also been gained from the analysis of samples in support of the UN Special Commission on Iraq during the past two years. The Chemical and Biological Defence Establishment (CBDE) at Porton Down has analysed samples from many of these incidents and has developed a good understanding of the standards required in sampling and analysis to obtain unequivocal results that can be used, if positive, as the basis for subsequent political or diplomatic action. For the yellow rain investigations, analytical methods were developed for trace level detection of trichothecene mycotoxins in biomedical samples¹ and in environmental residues and foodstuffs.² For allegations of the use of mustard agent, nerve agents, Lewisite and their

decomposition products, analytical methods based on gas chromatography and combined gas chromatography-mass spectrometry have been developed³ and used to analyse the samples collected by Gwynne Roberts in Northern Iraq.⁴ The analytical work carried out by CBDE in support of the UN Secretary-General's investigation in Mozambique is available on request from the UN.⁵ Very recently samples collected from Northern Iraq by the Physicians for Human Rights/Middle East Watch organisations have been analysed by CBDE and shown to contain traces of nerve agent Sarin (GB) and its decomposition products as well as sulphur mustard and its decomposition products.⁶

It has become apparent that unequivocal evidence about an alleged use is most readily obtained from the analysis of samples whose provenance is known. It is now appreciated that forensic techniques need to be applied throughout from the taking of samples through the chain of custody back to the laboratory carrying out the analyses. The collection of samples needs to be documented and validated so that there can be no subsequent arguments as to the location; techniques are required such as continuous video recording of the taking of the sample along with the reading on a GPS (Global Positioning System) unit followed by the sealing of the sample into containers with tamperproof seals. The associated documentation needs to record not only the collection of the sample, which needs to be witnessed, but also all available collateral evidence relating to the alleged attack

<i>Guest Article by Dr G S Pearson, CB</i>	1-5
<i>Progress in The Hague: Quarterly Review</i>	5-9
<i>Editorial Comment: Chemical Analysis, Assured Access and Open Publication</i>	7
<i>News Chronology: February-May 1993</i>	9-23
<i>Forthcoming Events</i>	19
<i>CWC Non-Signatory States</i>	23
<i>Recent Publications</i>	23-24

including validation that the location at which samples are being collected is identical to that at which the attack occurred. The latter is a key point as samples taken from the wrong place will not be informative.

Samples need to be transferred from the location at which they have been collected by a documented chain of custody to the analytical laboratory. The analytical laboratory needs to have expertise in the analysis of chemical warfare agents in a variety of substrate materials. Experience has shown that general purpose analytical laboratories are not able to extract the maximum information from samples. This article addresses the requirement for validation of the laboratory and of its analytical measurements.

Importance of Analytical Measurements

The importance of sampling and analysis for the Convention has been addressed elsewhere.⁷ It is essential if the CWC is to be held in high regard that the acquisition of samples and their transfer under a documented audit trail to the laboratories in which they are to be analysed and their subsequent analysis must be carried out under conditions that give confidence to all States Parties to the Convention that the results are accurate and can be relied upon. Analytical measurements will be required in the destruction of chemical weapons to confirm that the weapons indeed contain the material declared to be within those weapons and to ensure that the effluent from the chemical weapons destruction plant is safe for the environment into which it is released. In the destruction of chemical weapons production facilities, analytical measurements will be needed to ensure that the plant has been adequately decontaminated and so can be safely dismantled. Under Article VI, inspections will take place of facilities declared as producing Schedule 1, Schedule 2, Schedule 3 chemicals and other plants producing discrete organic chemicals after the fourth year following the Convention's entry into force. Analysis may be necessary to confirm that materials are indeed as declared, and apart from at permitted locations, the absence of any Schedule 1 chemical. Analysis will be necessary to confirm that the materials being produced are indeed as declared.

A much greater dependence on analytical measurements will apply for challenge inspection where the inspectors will wish to examine samples of various types to determine whether there are any traces of prohibited materials present. Such analytical measurements may involve a wide range of substrates and, potentially can require analysis for any of the Scheduled chemicals. In the context of challenge inspection it is important to recognise that the CWC prohibits the use of any toxic chemicals for chemical weapons purposes and analytical methods and measurements may well be required for materials that are being misused yet are not listed in the Schedules. Finally, in respect of allegations of use, samples will require to be analysed rigorously to determine whether there are any traces of prohibited toxic chemicals. Once again, the range of sample matrices will be extremely wide ranging from military materiel or environmental samples through clothing and vegetation samples to biomedical samples taken from casualties.

There is likely to be a role for analyses carried out on site during an inspection, especially for routine inspections and the analyses needed to monitor the destruction of chemical weapons and chemical weapon facilities. Off-site analysis should, however, also be available to supplement on-site analysis. The greater analytical capability available off-site will strengthen the effectiveness of the Convention and its deterrent value. For challenge inspection and investigations of alleged use, off-site analysis will be essential partly because the time available for challenge inspection may be insufficient to allow time for analyses to be carried out in a rigorous and careful way. For challenge inspection and alleged use, the most sensitive analytical techniques need to be used and these will only be available at off-site expert analytical laboratories.

Why is Validation Necessary?

Validation of the analytical methods and measurements is vital to ensuring that the results obtained can be relied upon as being accurate and free from false negatives and false positives. The Convention will rapidly come into disrepute if analytical methods and measurements appear unreliable. In particular, frequent and large numbers of false positives would be particularly damaging to the regime as confidence would be rapidly lost. It is therefore essential to consider how the methods and measurements may be validated in such a way that the results can be relied upon by the Organisation for the Prohibition of Chemical Weapons (OPCW) and by the Member States of the Convention. There are several stages which need to be validated as it is necessary to consider laboratories, methods and results.

Accreditation of Laboratories It will be essential that laboratories carrying out the analysis of samples for the OPCW shall be accredited for that purpose. Accreditation will be required to provide confidence to the OPCW and to Member States that analytical work carried out in that laboratory is reliable, accurate and trustworthy and conforms to the standards set by the national accreditation body. It is not enough to say that a laboratory has had experience in analysing samples containing chemical warfare agents; it must be shown to have carried out its analyses of chemical warfare agents using validated analytical methods so that there can be no doubt about its findings and a very high degree of confidence that any other laboratory carrying the same analysis on the same samples would report the same results.

Analysis of samples could be carried out by an OPCW staffed laboratory or by a network of accredited laboratories. It is believed that the most cost effective solution would be for the OPCW to have its own small accredited laboratory which would be responsible for splitting samples which would then be analysed by a network of accredited laboratories. The arguments that lead to such a conclusion include the following:

- a. Accurate and unequivocal results particularly for challenge inspections and investigations of allegations of use will require confirmation by analysis in more than one accredited laboratory.

- b. Samples taken during inspections are likely to be split with one part of each sample being provided to the State being inspected. That State will need to be able to analyse its part of the sample.
- c. Accredited laboratories are likely to be working on improved techniques for analysis. Although the OPCW will require samples to be analysed by validated methods, the possibility that improved methods may also be used will strengthen the deterrent effect of the Convention as a State considering cheating will not be sure that traces will not be detected. In addition, the OPCW will need to audit or otherwise ensure appropriate levels of quality control amongst its network of accredited laboratories.
- d. National analytical laboratories will be required to support national chemical defence programmes. The importance of maintaining effective chemical defence and of the web of deterrence have been addressed elsewhere.⁸

Validated Analytical Methods Such methods are an integral part of the accreditation of laboratories. The validated method is only validated for use based on the specific procedures and equipment in the laboratory. The analytical procedures used in the analysis of drugs in accredited laboratories under ISO [International Standards Organization] Guide 25 are based on the United Nations Division of Narcotic Drugs recommended methods. A parallel approach for the CWC would appear to be well worth considering.

Certified reference materials An essential element in any reliable analytical method is the use of reference materials as standards in order to provide confirmation that a material found in the sample is indeed identical to a standard sample of the same material. The reference materials utilised in the analytical methods need to be certified and controlled in such a way that there can be no doubt as to their purity and consequently there can be great confidence in an analytical results which show the presence of that material in a sample.

Proficiency testing The final element in ensuring that the results of analytical methods and measurements carried out in an accredited laboratory is the successful demonstration of the analytical capability in proficiency testing. Such proficiency testing involves the analysis of blind samples which may or may not have been spiked with chemical agents or their breakdown products and which can validate the adequacy and acceptability of the analytical methods being utilised by that laboratory. Such proficiency testing needs to be repeated at intervals to ensure that standards are being maintained.

The preparation of the samples to be analysed blind could be carried out by one of the network of accredited laboratories in the same way as has been done in the round robins that have already been organised by Finland.⁹ Indeed there are positive cost and technical advantages in these blind samples *not* being prepared by the OPCW small laboratory as that laboratory will then not require to hold any certified reference materials and, consequently, this

will eliminate the possibility of OPCW samples being inadvertently contaminated at the OPCW laboratory when splitting samples. Clearly the OPCW will need to oversee the proficiency testing, may wish to witness the preparation of blind samples and might with advantage hold the key to the blind samples.

Approaches to Validation

There has been a long international tradition of validated physical measurements which can be traced back to international physical standards. Recent years have seen an extension of these approaches to chemical measurements and initiatives are being mounted in many countries, and in groups of countries such as the European Community as well as world-wide to harmonise and standardise systems for the validation of chemical measurements. The CWC should not aim to develop its own separate system but should, I believe, adopt these international initiatives so that the OPCW can be confident that analytical measurements carried out in any country will be correct and that analysis of replicate samples by other laboratories in other States will produce similar results. Adoption of such an approach would be cost effective. The OPCW needs to approve a system of validation to ensure comparability of results between the different laboratories and, most important of all to ensure that results obtained in different laboratories will be reliable and free from false positives and false negatives. Utilization of the internationally agreed analytical standards programmes will also ensure that the analytical methods selected are fit for the purpose.

International Standards

There are currently three internationally recognised quality standards for chemical analysis. Each one has particular strengths and it will be important that the OPCW selects an appropriate standard to which all accredited laboratories will be required to work.

ISO Guide 25 This is concerned with the assessment of the quality of analytical methods and measurements. It also requires an assessment of the technical competence of the laboratory. It is a system designed for laboratory work and it is especially appropriate for analytical testing using documented methods and it sometimes employs performance testing. It is extensively used in Europe, Australia and New Zealand.

Good Laboratory Practice (GLP) This is concerned more with the organisational process and conditions under which laboratory studies are planned, performed, monitored recorded and reported. It is widely recognised and required for registration of new medicines, agricultural chemicals, pesticides and associated toxicological testing. It is not as suited to analysis and places emphasis on the calibre of staff. Although it is recognised world-wide, many countries do not have a compliance unit and in some countries there is a prior requirement to have a regulatory requirement before a laboratory can be assessed for GLP.

ISO 9000 This is concerned with the assessment of the capability of an organisation to implement and maintain a quality system. It normally covers all the work of an organisation but does not cover technical competence. It is primarily appropriate for manufacturing and service industries.

The Preferred Option

A key element for the success of the OPCW will depend on analyses being carried out by validated and defined methods. The Convention will come into disrepute if the OPCW does not require high standards of analytical methods and measurements so that results obtained in any approved laboratory will be comparable and can be relied upon with confidence. The international standard which requires the definition and validation of the analytical methods, the use of certified reference materials and proficiency testing in accredited laboratories is ISO Guide 25. The other international standards (GLP, ISO 9000) are more system oriented and are unlikely to provide as high a degree of confidence in the analytical results obtained.

Internationally, in Europe good progress is being made by WELAC (Western European Laboratory Accreditation Co-operation) and EURACHEM (the focus for analytical chemistry in Europe) to aid chemical laboratories in gaining accreditation.¹⁰ A guide is at a near final state of preparation which addresses the scope, traceability, equipment, calibration, reference materials, reagents, the use of computers and measurement uncertainty, quality control and audit procedures. The scope has to be as specific as possible with detailed documented test procedures which need to be defined in terms of the analyte type, the matrix type, the technique/method and the concentration range. For sampling, a sampling strategy needs to be validated which must address labelling/chain of evidence, the information required, the homogeneity of the sample, stability and storage as well as contamination. Methods must be validated, documented and authorised before use. Quality control needs to be written in to the documentation of the methods through the use of blanks, standards, spikes and control samples. Reference materials used must be of known adequate purity and composition and these should preferably be internationally or nationally recognised standards. Purity needs to be considered in relation to the accuracy of the analysis and possible interferences arising from impurities. Quality control needs to be introduced by using stable samples or standards at regular intervals to check the performance of the method. Proficiency testing schemes should be drawn up preferably under the draft ISO/IUPAC (International Union of Pure and Applied Chemistry)/AOAC (Association of Official Analytical Chemists) harmonised proficiency testing protocol which addresses organisation, sample preparation/distribution, estimation of the true result and the scoring of laboratories performance as well as defining acceptable performance.

The Way Forward

Chemical analysis that is reliable and accurate is essential to underpin the Chemical Weapons Convention. The

world-wide initiatives on quality standards for chemical analysis should be utilized to the maximum to devise the optimum system to meet the requirements of the OPCW. In order to enhance the standing of the CWC, it is suggested that ISO Guide 25, might usefully be considered as the basis for the accreditation of laboratories, the validation of analytical methods and the achievement of a system in which all States Parties can be confident that the analytical results will be free from false negatives and false positives.

ISO Guide 25 is being introduced into Europe through the activities of WELAC and EURACHEM. Signatories of WELAC are Denmark, France, Netherlands, Sweden, UK, Ireland, Italy, Finland and Spain are applying to join and Austria, Belgium, Germany, Greece, Iceland, Norway, Portugal, Switzerland wish to apply when they are ready to do so. Additionally, East European countries are keen to join and action is being taken internationally to extend the approach world-wide. As the OPCW is based in The Hague, it is suggested that approaches should be made to EURACHEM and WELAC to determine whether a Working Group to develop a system of laboratory accreditation and method validation to meet the OPCW requirements should be established under WELAC/EURACHEM. Any such systems should be developed in such a form that it can then be extended easily and without undue effort to the rest of the world. This should not present particular difficulties since ISO Guide 25, already an internationally agreed standard, is the basis for laboratory accreditation and method validation.

It is essential that the OPCW address the question of how to ensure that the analytical results that will be vital to underpin the effective operation of the Convention are quality controlled so that they are reliable and free from error. A whole series of false positives following challenge inspections could bring the Convention into disrepute and such an outcome must be prevented through the adoption of appropriate quality standards for the analytical methods and measurements of chemical agents and related products. The approaches outlined above should provide a cost effective solution.

References

1. P Begley, R M Black, B E Foulger, P D Jeffery and R W Read, "The detection of trace levels of trichothecenes in human blood using capillary gas chromatography - electron capture negative ion chemical ionisation mass spectrometry", *J. Chromatography*, 367:87-101 (1986); and R M Black, R J Clarke and R W Read, "The detection of trace levels of trichothecene mycotoxins in human urine by gas chromatography - mass spectrometry", *J. Chromatography*, 367:103-115 (1986).
2. R M Black, R J Clarke and R W Read, "Detection of trace levels of trichothecene mycotoxins in environmental residues and foodstuffs using gas chromatography with mass spectrometric or electron-capture detection", *J. Chromatography*, 388, 365-378 (1987); and R M Black and D Upshall, "Assessing the danger", *Chemistry in Britain*, July 1988, pp 659-664.
3. R M Black and R W Read, "Detection of trace levels of thiodiglycol in blood, plasma and urine using gas chromatography-electron capture negative ion chemical ionisation mass spectrometry", *J. Chromatography*, 499:261-270 (1988); R M Black and R W Read, "Methods for the analysis of thiodiglycol sulphoxide, a metabolite of sulphur mustard, in urine using gas chromatography-mass spectrometry", *J. Chromatography*, 558:393-404 (1991); and R M Black, R J

- Clarke and R W Read, "A method for the analysis of 1,1'-sulphonylbis[2-(methylsulphonyl)ethane] and 1-methylsulphonyl-2-[2-(methylthio)ethylsulphonyl]ethane, metabolites of sulphur mustard, in urine using gas chromatography-mass spectrometry", *J. Chromatography*, 558: 405-414 (1991).
4. A Hay and G Roberts. *J. American Medical Association*, 263:1065 (1990); and R M Black, R J Clarke, D B Cooper, R W Read and D Utley, "The application of headspace analysis, solvent extraction, thermal desorption and gas chromatography to the analysis of chemical warfare samples containing sulphur mustard and related compounds", *J. Chromatography*, 637:71-80 (1993).
 5. *Report of the Mission Dispatched by the Secretary-General to Investigate an Alleged Use of Chemical Weapons in Mozambique*, UN Document S/24065, 12 June 1992. Appendix V of this report summarizes the work of CBDE and states that the complete CBDE report is available upon request from the Office for Disarmament Affairs.
 6. CBDE Porton Down, *Report on Analysis of Samples Collected in Northern Iraq*, reference TG 1090/8/85/93, 31 March 1993, distributed at press conferences held in Washington DC and London on 29 April 1993. The results will be submitted for publication in the scientific literature.
 7. Mary C French and Graham S Pearson, "Sampling and Analysis for the Chemical Weapons Convention", *Verification Report 1993*, VERTIC, London (forthcoming).
 8. Graham S Pearson, "Chemical Protection and Verification: Complementary Partners", *ASA Newsletter*, No. 34, February 10, 1993; and Graham S Pearson, "Prospects for CB Arms Control: The Web of Deterrence", *Washington Quarterly*, Spring 1993, 145-162.
 9. Finland, Ministry for Foreign Affairs, *International Interlaboratory Comparison (Round-Robin) Test for the Verification of Chemical Disarmament*, (three volumes, Helsinki, 1990-92).
 10. Further information on EURACHEM/WELAC can be obtained from the EURACHEM Newsletter issued by the EURACHEM Secretariat, PO Box 46, Teddington, Middlesex TW11 ONH, United Kingdom.

© British Crown Copyright 1993/MOD
Published with the permission of the Controller of Her Britannic Majesty's Stationery Office

Building the Organisation for the Prohibition of Chemical Weapons

The Preparatory Commission for the OPCW has adopted a comprehensive programme of work for 1993 and a budget of \$8.84 million to go with it. Securing the unanimous agreement of a hundred participating governments was not easy, but it finally happened on 22 April, during the second plenary session of the Commission, 78 years almost to the minute after the first poison-gas cylinders of World War I were discharged at their victims. The Chemical Weapons Convention, opened for signature on 13 January 1993, had set out the rules and the underlying norm for an international regime of chemical disarmament and nonproliferation. Now, with that decision on programme and budget at last taken, work could begin on the detailed procedures which states must follow in order to give the regime practical significance: the procedures that will enable states parties to do what they have undertaken to do and provide one another with assurance that they are really doing it. The preparations for actually implementing the treaty could start.

The Commission, through its two Working Groups of diplomats representing member states — Working Group A on Budget and Administration, and Working Group B on Verification and Technical Cooperation and Assistance — has tasked Groups of Experts to produce recommendations for the procedures of the regime. May 10 saw the convening of the first Experts' Group concerned with the real core of the Chemical Weapons Convention, its provisions for verifying compliance. Several other such groups have since begun work. By the time of the third plenary session at the end of June, some results should be visible to the outside world, transparency permitting.

The first of the present quarterly reviews [see *CWCB* 19, pp 1-4] described how the preceding several months had been used to negotiate agreement on the requisite organiza-

tional and administrative arrangements. There now exist, on the one hand, the Commission's own structures of Working and Experts' Groups and, on the other hand, led by the Executive Secretary of the Commission, Ian Kenyon, a burgeoning Provisional Technical Secretariat (PTS). The relationship between the two is still in a formative stage. It is through the PrepCom structures that the wishes of member states are transmitted, some more strongly than others, this resulting in the setting of policy. Resources of expertise, too, are made available by member states through the PrepCom structures, but so, increasingly, are they available through the PTS, whose main job is to assist PrepCom activity. The PTS is also, however, the embryo OPCW Technical Secretariat — an oddly low-key designation for the projected international inspectorate, aid organization and associated headquarters establishment. Its staff, being international civil servants, may neither seek nor accept instructions from any government or from any other authority external to the Commission. So the possibility of tension between the PTS and the PrepCom structures cannot be excluded. It could well be a constructive tension.

Actions by Member States By the time of the Commission's first plenary session (8-12 February), 137 states had signed the Chemical Weapons Convention and were thus entitled to become members of the Commission. By the time of the second plenary (19-22 April), five more had signed (Armenia, Bahrain, Kyrgyzstan, Nicaragua and Saint Lucia) and three others (Laos, Latvia and Rwanda) have done so since then, bringing the total, at the time of writing, to 145.

Sweden ratifying the treaty, the first industrialized country to do so, has brought total ratifications to 4 out of the 65 required for entry into force. Current PrepCom planning assumes that the treaty will enter into force in January 1995

— in other words, that the other 61 ratifications will be in by July 1994. It remains to be seen whether those countries where ratification processes commonly take years to complete, such as the United Kingdom, have in fact started in time. If not, they stand to lose the important advantages of original membership of the OPCW.

Eight states signatories participated for the first time in the Preparatory Commission during the second session: Albania, Bolivia, Costa Rica, Honduras, Mali, Togo, Yemen and Zambia. Of those that participated in the first session, 11 did not do so in the second: Burkina Faso, Cape Verde, Dominican Republic, Estonia, Gambia, Lithuania, Mauritania, Paraguay, Samoa, Senegal and Slovenia. Vietnam informed the PTS during the intersessional period that it would be unable for reasons of cost to participate in any meetings or other activities of the Commission. As of 19 April, only 26 of the then 142 member states had paid their assessments for the first three months of PrepCom work.

Actions of individual states within the Preparatory Commission and its structures are shielded from the gaze of outsiders by the rules of procedure, which, under Rule 32 of the set approved at the second plenary, continue to stipulate that PrepCom meetings are not to be open, for example to the public, industry or other nongovernmental bodies, unless a special decision is made to the contrary. There is thus no way for citizens, corporate bodies or other associations to assess the contributions and performance of their governments or to judge whether contributions which they themselves could make would be worthwhile. Only in formal working papers submitted to the Commission itself or to its two Working Groups (but not its Experts' Groups) are individual state contributions on display. Such papers, however, are the exception, not the rule, the preferred form of written contribution evidently being the informal paper, Experts' Group paper or even non-paper. Certain of the reports from the Groups of Experts have rested heavily on initial drafts previously prepared by one or another national delegation, or on subsequent interpolations from capitals in the not-infrequent instances of a group finding itself without a particular competence. Such origins, often necessitated by the extremely tight working schedules, are rarely evident in the publicly available documentation. All in all, it is not easy for onlookers to discover who are the real movers and shakers of the PrepCom world.

During the period under review (March through May), five formal working-papers were published at plenary or Working-Group level. Four of them (by Bulgaria, Finland, France and, jointly, the Netherlands, Switzerland and the UK) addressed the incipiently competitive business of national programmes for training OPCW inspectors [see News Chronology, 19 April]. The fifth was a compilation jointly prepared by Austria, South Africa, South Korea and Turkey entitled *Quick Reference Guide to the Basic Rights and Obligations of a State Party to the Chemical Weapons Convention*, based on a Japanese original.

Member states have continued to use the five regional groupings for consultative purposes. Exactly what the

composition of each regional group is does not seem to be a matter of public record. It is known, however, that there are instances of particular states either belonging to more than one regional group or being admitted to none at all. The case of Israel [see News Chronology, 14 March] became prominent during the second plenary, at least in the corridors. Although Israel should by geography participate in the work of the Group of Asian States, members of that group have chosen to exclude it. The Group of West European and Other States considered the possibility of Israeli participation on an ad hoc basis for the duration of the PrepCom, but has been unable to agree on the matter.

Progress in the Provisional Technical Secretariat

On 22 February, PTS staff moved into a building provided by the Dutch government overlooking the grounds of the Peace Palace, where the International Court of Justice has its seat. The PTS currently occupies two floors of the building and will eventually be the principal occupant. It will have a total staff of 57 people by October — 28 in professional positions, with 29 support staff — according to the 1993 PrepCom budget. By the end of May there were 32 staff members.

Not all of the senior staffing levels, i.e. those where individual appointments are made by the Commission itself rather than the PTS chief executive, have yet been filled: a candidate from the Group of African States has still to be nominated as head of the Technical Cooperation and Assistance Division. Two new senior appointments were announced at the second plenary: Li Chang-he of China as Deputy Executive Secretary, and Reuben Lev of the United States as head of the Administration Division, replacing the previous candidate who had declined the post. The heads of the Verification, External Relations and Legal divisions had been approved at the first plenary — respectively, John Gee of Australia, Serguei Batsanov of Russia, and Félix Calderón of Peru.

Other PTS appointments have been as follows. Agnès Marcaillou of France is now on secondment from the UN as Special Assistant to the Executive Secretary. In the Administration Division, René Haug of Switzerland is head of Information Systems, Vladimir Iossifov of Russia is Conference Services Manager, A Duhr of Belgium is Language Coordinator, and Henk Antvelink of the Netherlands is Deputy Personnel Manager. In the Verification Division, Bunro Shiozawa of Japan heads the unit on Declarations and Confidentiality, and Ralf Trapp of Germany and Don Claggett of the USA head the two Industry units. In the External Relations Division, Hassan Mashhadi of Iran heads the Governmental Relations unit. Also expected to take up posts are V R Jimenez of Cuba in the Verification Division, for Technical Support; Anil Wadhwa of India in the External Relations Division, for Media and Public Affairs; and Shahbaz of Pakistan in the Technical Cooperation and Assistance Division, for Assistance.

Besides permanent staff, the PTS also has people on short-term and temporary agency contracts as well as people on loan from the governments [see News Chronology, 1

Chemical Analysis, Assured Access and Open Publication

Chemists of the UK Chemical and Biological Defence Establishment at Porton Down, using sensitive methods of chemical analysis and careful validation procedures, have found mustard, sarin and characteristic breakdown products in soil or metal fragments from bomb craters near a Kurdish village in northern Iraq. Unambiguous analytical results were obtained even though the samples were collected four years after reports of a chemical attack [see News Chronology, 29 April].

As the Porton findings illustrate, modern analytical chemistry has much to contribute to the effectiveness of the CWC. But securing the benefit of what chemists can do in support of the treaty will also depend on the political commitment of the OPCW and its member states to ensuring appropriate access to relevant sites and facilities. It will depend, further, on the open publication of OPCW analytical methods and results.

Without international insistence on appropriate access, essential samples may be unobtainable, diminishing the deterrence value of challenge inspection and weakening the incentive for compliant states to participate fully in the treaty regime.

And without open publication of its analytical methods and results, the OPCW would be denied the enhanced credibility and effectiveness that can be brought to it by the attention and support of the international scientific community. The more that the worlds' scientists regard the work of the OPCW as a shared enterprise, the more the treaty regime will gain in informed and vigilant international support.

The reliable detection of sarin and mustard in 4-year old Iraqi bomb craters required rigorous validation pro-

cedures to ensure against false positives. Such precautions included high-resolution mass spectrometry, testing of glassware blanks before each analysis, and blind proficiency testing of spiked and blank samples. The importance and principles of such validation are discussed in this issue's guest article by Graham Pearson.

As with its recent positive findings for mustard and nerve agent in samples from Iraq, Porton's earlier, entirely negative findings for trichothecene mycotoxins in samples from alleged "yellow rain" attacks in Southeast Asia were carefully validated and then openly reported.¹ The time has surely now come for the US government to provide an open report of its own careful, extensive and entirely negative findings for trichothecenes in all of the 251 samples collected from alleged attacks in Southeast Asia from 1979 to 1985 and analysed by the US Army Chemical Systems Laboratory.² In this and in certain other cases of alleged chemical attack as, in recent years, Angola, Mozambique and Azerbaijan, highly publicised claims of chemical warfare have been based on inadequate analytical procedures whose political exploitation eroded confidence in the international regime against chemical warfare.

Clearly, a major benefit of the CWC will be the replacement of the present uneven and often inadequate standards for the conduct and reporting of chemical analyses for prohibited substances with standards that are internationally agreed and that protect compliant states and the international community against false accusations while enhancing the deterrence of potential violators.

1. UK Ministry of Defence, written answer to a Parliamentary question, 19 May 1986: *Hansard* (Commons), vol 98, col 92.
2. US Army, written response to questions from the Senate Foreign Relations Committee, February 1992 (unpublished).

April]. The latter, at the end of the period under review, included the British, French, Netherlands, South African and US governments.

Thus far, the PTS has been fully occupied servicing the PrepCom structures: negotiating for improved conference facilities for the plenary and Working-Group sessions, finding suitable premises for meetings of the Experts' Groups, making sure that member states receive copies of all the relevant papers generated within the PrepCom structures, and performing secretary/rapporteur/drafting duties for each of the Experts' Groups.

The PTS has also been able to start some outreach work: it has launched a periodic newsletter entitled *OPCW Syn-*

thesis. The first number came out at the beginning of April, the second at the beginning of June. The newsletter is distributed to states signatories, industry and other non-governmental organisations. It publishes information about the activities of the Commission and the PTS in a less formal style than the official reports. It is obtainable from PTS/OPCW, Laan van Meerdevoort 51A, 2517 AE Den Haag, The Netherlands.

Progress in the PrepCom Structures In all, 101 signatory states have so far participated in plenary sessions of the Preparatory Commission, 93 at the first, 89 at the second. So large a body can work properly only through an array of subsidiaries, which is one of the reasons why the

Commission operates at three different levels: the Groups of Experts, which report to one or another of the two Working Groups, which themselves report to the Commission in plenary session. These structures became fully operational during the period under review. With plenary approval of the budget and programme of work clearly imminent, Working Group B under Sylwin Gizowski of Poland could allocate tasks on core implementation questions to several new Experts' Groups. The second plenary duly authorized the scheme.

It is the Experts' Groups, therefore, which are now the driving force of the whole enterprise. What in fact goes on in them is, with good reason, kept confidential. Their output is not published until it is formally submitted to the sponsoring Working Group for approval, by which time it will also have been sent out for consideration in national capitals. Thus far, the Experts' Groups have been as follows:

- On PrepCom Rules of Procedure, a group of experts from 40 member states chaired by Natalino Ronzitti of Italy met and completed its work during 1-5 March. Working Group A accepted its draft Rules with amendments, and recommended their adoption by the Commission at its second plenary. However, the report of Working Group A noted that "with regard to rule 32 [see above] some delegations considered that this rule may need to be reviewed in the future to provide greater transparency in the work of the Commission". Expressing such concern were Australia, Iran, the Netherlands and certain Latin American delegations. On the rules as subsequently adopted by the plenary, decisions of the PrepCom are to be taken by consensus. When this cannot be achieved, decisions on procedural questions are to be made by a simple majority of those voting. On substantive matters a two-thirds majority is required.
- On First Year Budget and Work Program, a group chaired by Albert Dojas of Argentina met and completed its work during 8-17 March. Working Group A accepted its recommendations, which were adopted by the Commission at its second plenary. Of the \$8.84 million in the budget, some \$5.2 million are for personnel costs, \$2.4 million for conference costs and \$1.3 million for communications, computers, travel, contract studies, office materials and other services.
- On the PrepCom Privileges and Immunities Agreement with the Host Government, a group also chaired by Natalino Ronzitti met during 1-5 March, producing an interim report, and then resumed work in May.
- On PrepCom Financial and Staff Regulations, a group met during 18-24 March with Ralf Trapp of Germany in the chair and produced interim reports on both of its topics. Work resumed on 26 April, and recommended Staff Regulations have since been finalized.
- On OPCW Permanent Building Requirements, a group chaired by Radoslav Deyanov of Bulgaria produced an interim report during 25-26 March and resumed work on 29 April. Its progress is dependent on the outcome of other studies.
- On Data Systems, a group mandated by Working Group A (like all the others just listed) began work on 26 April.
- On Verification-Related Tasks Requiring Expertise of Chemical Engineers, a group mandated by Working Group B began meeting on 10 May, chaired by Bernhard Odernheimer of Germany.
- On Inspection Safety Procedures, a group chaired by a US expert also began work on 10 May.
- On Tasks Related to the Implementation of CWC Provisions on Technical Cooperation and Assistance, a group chaired by an Indian expert began work on 24 May.
- On Inspection Team Composition, a group chaired by Johan Santesson of Sweden met during 24-28 May, finalizing a report.

Further Experts' Groups — on Verification-Related Tasks Requiring Chemical Sampling and Analysis, on Industry Declarations, on Inspector Training Requirements, and on OPCW Laboratory Requirements — were mandated by Working Group B, but by the end of May had not yet started work.

The two Working Groups of the Commission have met only during the periods of plenary sessions, for reasons of economy. Working Group B convened for the first time during the second plenary. The principal actions which they have taken thus far — mandating Experts' Groups and considering their reports — have all just been noted.

So have the key decisions taken at plenary level. During the period under review here, March through May, there was only one plenary session. Its principal achievement was approving the 1993 programme and budget proposed by Working Group A. As for the new rules of procedure which it adopted, the PTS has since reported in *OPCW Synthesis* that, during their plenary consideration, "delegations emphasized the importance of access to meetings of the Commission by bodies such as nongovernmental organisations and Industry associations".

The plenary was also called upon to resolve a most heated controversy — whether languages other than English would be used in the Experts' Groups. States promoting the provision of translation and interpretation facilities for these meetings, led by France, argued that exclusive use of English would deny many states the right to full participation in the Commission's work. The United States, Japan and other major contributors to the Commission's budget argued that the need for such services was limited, that their provision would expand the annual budget by upto \$2.5 million, and that delays caused by routine use of interpretation and translation would make it impossible for the Com-

mission to complete its work before the projected entry of the CWC into force in early 1995. In fact the issue was only provisionally resolved during the session. The agreed plenary report states that “whenever Expert Group meetings are formally convened and require specific interpretation services, the Provisional Technical Secretariat will, on a case-by-case basis, aim to make these services available in any of the languages of the Commission”. The Executive Secretary undertook to provide such services within the agreed budget and to prepare a study for the next PrepCom plenary on language service options available. The final report records the Latin American Group’s regret that there was “no permanent solution” of the language issue and France’s intent to “return to this question at the time of the next plenary session”. Japan stated its concern that the

compromise reached left “room for abuse in the field of languages which will ... inevitably have financial implications”. It warned that it was not prepared to support an expansion of the 1993 budget should such abuse occur. A request by a state for interpretation and document translation for *all* expert group meetings might be considered abusive by some states.

The third plenary session is set for 28 June through 2 July. The fourth is now provisionally scheduled for 27 September through 1 October.

This review was written by Peter Herby of the Quaker United Nations Office, Geneva, and Julian Perry Robinson.

News Chronology

February through May 1993

What follows is taken from the CBW Events data-base of the Sussex-Harvard Information Bank, which provides a fuller chronology and more detailed identification of sources. The intervals covered in successive Bulletins have a one-month overlap in order to accommodate late-received information. For access to the data-base, apply to its compiler, Julian Perry Robinson.

1 February Qatar signs the Chemical Weapons Convention, becoming the 134th state to do so.

1 February In Germany, the Chancellory has plans to amend Article 10 of the Basic Law so as to give the Federal Intelligence Service, the BND, express responsibility for “preventing the international proliferation of weapons of mass destruction”, so *Der Spiegel* reports State Minister Bernd Schmidbauer as saying. Reunification has anyway necessitated revision of the Basic Law, and this particular amendment would allow evidence from communications-intercepts by the BND to be used in court against German citizens or firms accused of violating counterproliferation controls. {DerS 1 Feb}

2 February Oman and the United Arab Emirates sign the Chemical Weapons Convention.

2 February Germany tells the Conference on Disarmament in Geneva that it is “fully committed to this process of improving the verification provisions of the BW Convention”. {CD/PV.640}

3 February In Washington DC, the US Army completes the first phase of Operation Safe Removal: the removal and cleanup of 141 old munitions, including chemical rounds, from the site of a housing development at Spring Valley, in the north-west of the District. The munitions had been encountered on 5 January when a sewer was being dug. Families were evacuated from the area at the highpoint of the operation. An Army Chemical Warfare Service research station, Camp American University, had been located on the site during 1917-19. The site is one of some 7000 such FUDS — Formerly Used Defense Sites — across the United States. Phase II of the operation is to be a detailed investigation of the Spring Valley FUDS, including archival research and nonintrusive subterranean ex-

amination by the Corps of Engineers. {CBIAC Newsletter Spring 1993; ASA Newsletter 8 Apr}

4 February In Paris, the Ministry of Foreign Affairs announces that France will be offering training courses in CWC verification open to candidates from any country that has signed the convention. The first session, a 3-month one for 15 participants, is to begin in Paris in mid-September. The organizer is Dr Pierre Cannone.

5 February In Moscow, *Pravda* reports that the mustard/lewisite storage depot near Gornyy [see 26 Oct 92] in Saratov oblast is located in Krasnopartizanskiy rayon, and that a detoxification facility is to be built there in order to destroy the CW agents, more than 1000 tonnes of them, in an environmentally safe manner. {*Pravda* 5 Feb in BBC-SWB 11 Feb 93}

6 February From firms in Russia, sales videos are reported to be circulating in Germany that seek to boost arms exports; *Der Spiegel* reports, further, that Russian dealers are said increasingly to be offering for sale in the West BW-weapon strains of bacteria from military research laboratories. {DPA 6 Feb 93 in FBIS-WEU 8 Feb}

6 February Botulinal toxin, which in the end was not listed in the CWC control schedules, may shortly find an additional peaceful application, so newly reported medical trials suggest: its use to remove facial wrinkles. {*New Scientist* 6 Feb}

7 February In Bosnia-Herzegovina, the presidency of the Tuzla regional assembly issues a communiqué stating that, since the people of the region have been left with no alternative, toxic chemicals are to be distributed to all fronts and activated if road-blockades in Herzegovina and central Bosnia are

not lifted, and if Dubrava airport near Tuzla is not opened immediately. {Radio Beograd 8 Feb in FBIS-EEU 9 Feb} In particular, chlorine-filled railroad tankers are to be positioned within range of Serbian artillery [see also 30 Oct 92]. The UN Protection Force in Bosnia-Herzegovina says it is aware of the communiqué. {AFP 8 Feb in FBIS-EEU 8 Feb} The Bosnian ambassador to the UN informs the Security Council that representatives of his government "have attempted to convince Tuzla authorities to resist such actions, but regretfully have had no success". {S/25262} Shortly afterwards, however, Bosnian Defence Minister Bozo Rajic announces that resort to chemical weapons is no longer unavoidable, for cooperation between the Bosnia-Herzegovina Army and the General Staff of the Croatian Defence Council has led to the lifting of crucial road-blockades. {Croatian TV 9 Feb in BBC-SWB 11 Feb}

8 February Yemen signs the CWC.

8 February President Clinton, reorganizing his National Security Council, has elevated the profile of nonproliferation, so *Chemical & Engineering News* reports, by separating that function from arms control in general. The NSC nonproliferation staff is directed by Daniel B Poneman, with Elisa Harris, formerly of the Brookings Institution, as his deputy for CBW, missiles and advanced conventional weapons. {C&EN 8 Feb}

8 February In Santiago, Chile, Acting Foreign Minister Edmundo Vargas states that his country has never possessed chemical weapons, as a recent Russian report had alleged [see 28 and 29 Jan]. {EFE 9 Feb in BBC-SWB 11 Feb} Later the government announces that Chile is ready to receive international inspectors to verify that it has neither stockpiles of chemical weapons nor manufacturing equipment for them. {Interfax 12 Feb in FBIS-SOV 16 Feb; EFE 12 Feb in FBIS-LAT 16 Feb}

8-12 February In The Hague, the OPCW Preparatory Commission convenes for its first session. Participating are 93 of the 137 states that have thus far signed the CWC. The session is opened by the UN Secretary-General through his Special Representative Vicente Berasategui. It is addressed by Netherlands Foreign Minister Dr P H Kooijmans, and by the Acting Mayor of the city. The Commission then adopts its agenda and provisional rules of procedure. The latter state that plenary meetings of the Commission shall be held in private unless decided otherwise [see 9 Nov 92]. The proceedings thereupon became closed to all but accredited representatives of the participating governments.

According to the formal report adopted by the Commission at the close of the session, the Commission elects Ambassador Azikiwe of Nigeria to be its first six-monthly chairman. The representatives of Chile, Hungary, Iran, Tunisia and the USA are elected as vice-chairmen. The Commission decides to establish a Provisional Technical Secretariat and, as its head and chief executive officer, appoints Ian Kenyon of the UK who is to serve as Executive Secretary of the Commission as well. The Commission also decides to establish two subsidiary bodies: Working Group A, to be headed by Ambassador Alberto Villamizar of Colombia to assist the Commission in examining budgetary and administrative matters; and Working Group B, to be headed by Sylwin Gizowski of Poland to assist the Commission in the examination of Verification and Technical Cooperation and Assistance. It requests Working Group A to start work on specific tasks immediately, establishing Groups of Experts as necessary. The Commission adopts a budget of \$1.8 million

for its initial three months of operation, authorizing the Executive Secretary to incur expenditures upto that amount. CWC signatory states have already contributed \$1.177 million, and promises of immediate further contributions made during the session raise the total above \$2 million [see also 9 Nov 92].

9 February Mauritius ratifies its signature of the Chemical Weapons Convention, becoming the second country to do so [see 20 Jan].

9 February In Namibia, it is announced that the Department of Water Affairs is testing water from the Caluque dam for the absence of contamination from possibly leaking chemical weapons reportedly held in ammunition dumps near the Kunene river, upstream in Angola. The workers with the German humanitarian agency clearing minefields in Angola who had originally spoken to reporters of such weapons [see 26 Jan] say they had discovered them after being asked by Angolan authorities to check ammunition dumps at Xangongo and Cahama where, after the 1991 peace accords, both warring sides had been depositing weapons. At the Xangongo dump they had found 18 phosgene munitions of 122mm calibre; at Cahama, 60 SAM-5 missiles without warheads but with toxic fuel. They call for a UN survey of all possible chemical-weapon sites in the country. {*Namibian* 10 Feb in FBIS-AFR 19 Feb}

The Namibian Government subsequently announces that there is no evidence that chemical weapons have ever been used in Angola. It releases a Cabinet statement saying that the 122mm chemical munitions found by the German aid-workers were in fact projectiles of Russian origin used for illumination, not chemical warfare. {Channel Africa radio 14 Feb in FBIS-AFR 19 Feb}

11 February Iran is purchasing chemical weapons from North Korea, according to the European representative of Mojahedin-e Khalq, the Iraq-based Iranian opposition movement. Dr Saleh Rajavi says, too, that Chinese and Iranian engineers are working to instal chemical warheads on Scud missiles supplied by China or North Korea. {*Quotidien de Paris* 11 Feb in FBIS-NES 19 Feb}

12 February In Bosnia-Herzegovina, the Army sends a protest note to the UN Protection Force stating that "in the last 11 days, the aggressor has violated the norms of international war law by continuing to make intensive use of chemical weapons, primarily against the population in the broader regions of Srebrenica, Sarajevo, and Brcko. In addition, the aggressor is using phosphorus artillery shells and incendiary ammunition aimed at the further destruction of human life and mass destruction of property. Out of the 14 artillery attacks with shells containing chemical substances, the strongest were on the villages of Omerbegovaca and Dizdarsa, where the aggressor used 80 shells filled with chemical agents." {RBH 12 Feb in BBC-SWB 15 Feb}

This protest note succeeds earlier reports broadcast from Sarajevo alleging Serbian use of chemical weapons in those eastern parts of the country [see also 27 Dec 92]. {RBH 30 and 31 Jan in BBC-SWB 1 and 2 Feb} The Bosnian Serb army general staff had denied the charges, {Tanjug 31 Jan in BBC-SWB 2 Feb} but they continued to be heard. Two days prior to the protest note (which was the tenth of the year), a broadcast report from the Brcko commune press centre stated: "The enemy has launched from Cadjavac 80 mortar bombs charged with chemical agents of the tear gas and asphyxiating gas types

against the region of Omerbegovaca. The aggressor also attacked the region of Dizdarsa using howitzers, tanks and mortars, as well as a lethal chemical agent: asphyxiating gas.” {RBH 11 Feb in FBIS-EEU 11 Feb} Photographs are later published abroad of Bosnian Muslim fighters in action at Brcko wearing respirators. {e.g. Ind 26 Feb}

13 February Iran is exhibiting “chemical ammunition” and other items of armament and military equipment at the five-day international defence-industries exhibition in Abu Dhabi, according to the Iranian news agency IRNA. {IRNA 13 Feb in BBC-SWB 15 Feb}

13 February In the United States, a commissioner of Tooele County, Utah, proposes, with some support, that the nation’s entire stockpile of chemical weapons should be accepted for destruction in the new chemdemil incinerator at Tooele Army Depot [see 31 Aug 89] in return for a new county hospital. {*Salt Lake Tribune* 16 Feb via CN}

14 February In Angola during fighting in Huambo, UNITA “dropped toxic gas at a children’s home in Capango Ward, killing more than 25 children”, according to a communiqué issued next day by the Angolan Armed Forces General Staff [see also 1 Jan]. {Radio Nacional de Angola 15 Feb in BBC-SWB 17 Feb}.

15 February South Korea will probably ratify the CWC within two years even if North Korea does not join the treaty, say officials in Seoul: “There were calls to link Pyongyang’s joining of the CWC with Seoul’s ratification of the convention. But because of CWC’s domestic impact, we plan to go ahead with ratification as soon as we are ready in order to protect precision chemical industry.” Officials say that between 20 and 30 Korean chemical companies are likely to come under inspection once the treaty is in force. {Yonhap 15 Feb in FBIS-EAS 16 Feb}

15 February In Russia, there appears to be movement towards finalization of the chemdemil plan [see 19 Jan]. An official of the lead agency, the Presidential Commission on CBW Convention Problems, is reported as saying that three chemdemil facilities are to be set up in the near future: one through conversion of the Khimprom association in Novocheboksarsk, and two to be built in Saratov oblast and Udmurtia for conversion of lewisite-mustard [see 5 Feb]. The official, Igor Vlasov, is also reported as saying that the complete destruction of Russian chemical weapons will be finished by

2005, and that over 3 billion rubles and \$543 million have been allotted for this purpose. {Radio Rossii 15 Feb in FBIS-SOV 17 Feb}

15 February In Russia, a 15-strong team of US officials flies from Moscow to Volgograd to visit a former chemical-weapons production facility there [see 19 Jan]. {RIA 15 Feb in BBC-SWB 17 Feb} The visit is reportedly taking place within the framework of the 1990 bilateral chemical-weapons destruction agreement. {ACR 704.B.548}

15 February In Libya, a construction project at Tarhuna, 40 miles southeast of Tripoli, has had supplies of equipment from German firms blocked by the German Federal government, which today confirms that it has intelligence identifying the project as being for a second Libyan poison-gas factory [see 15 Dec 92], as *Die Welt* has just reported. {*Die Welt* 15 Feb in FBIS-WEU 16 Feb} echoing an earlier story in the British periodical *Economist Foreign Report*. According to the previous reporting, the chief contractor at the Tarhuna project is a Thai company that had worked on the Rabta project [see also 12 May 89]; and investigations of several German supplier companies are under way. {Reuter in IHT 16 Feb; AP in BG 16 Feb; AP in WP 17 Feb; IHT 18 Feb} Later, US intelligence agencies are reported as saying that Libya is indeed building a chemical-weapons factory near Tarhuna — underground, and disguised as part of a water project — to augment the chemical complex at Rabta. {NYT 18 Feb} US officials reportedly say that the Tarhuna facility is considered to be about three years from completion, and that the site at Sebha [see 10 Apr 91] is now dormant. {WP 19 Feb}

The Libyan foreign ministry denounces the reporting as “psychological terrorism” and invites international news media to Tarhuna to verify that the project is part of Libya’s “Great Man-Made River” project. {Great Jamahiriya radio 20 Feb in FBIS-NES, 22 Feb} Foreign Minister ‘Umar al-Muntasir makes the following statement to an Egyptian news agency: “It is not true that we have secret factories to produce chemical weapons. All our factories are for peaceful purposes, such as water projects. The West is escalating its campaign against us because we do not believe in signing the international treaty on banning chemical weapons unless this treaty is signed by all the countries in the region without exception.” {Al-Ahram Press Agency 21 Feb in FBIS-NES 23 Feb}

16 February In Russia, the Nuclear Risk Reduction Center established under the bilateral USA-USSR agreement of 15 September 1987 (principally in order to exchange INF-Treaty

Glossary of Abbreviations

ACR	<i>Arms Control Reporter</i>	FAZ	<i>Frankfurter Allgemeine Zeitung</i>	NYT	<i>New York Times</i>
BG	<i>Boston Globe</i>	FBIS	<i>Foreign Broadcast Information Service</i>	Obs	<i>Observer</i> (London)
BS	<i>Baltimore Sun</i>			OPCW	Organisation for the Prohibition of Chemical Weapons
CBW	Chemical/biological warfare	FT	<i>Financial Times</i>	PTS	OPCW Provisional Technical Secretariat
CD/	Conference on Disarmament document	Guar	<i>Guardian</i> (London)	RBH	Radio Bosnia-Herzegovina (Sarajevo)
C&EN	<i>Chemical & Engineering News</i>	HansC	<i>Hansard</i> (Commons)	S/	UN Security Council document
CN	<i>Current News Early Bird</i>	HC	House of Commons, UK	SWB	<i>Summary of World Broadcasts</i>
CR	<i>Congressional Record</i> (daily edition)	IHT	<i>International Herald Tribune</i>	TL	<i>Times</i> (London)
CW	Chemical warfare	Ind	<i>Independent</i> (London)	USDSD	<i>US Department of State Dispatch</i>
CWC	Chemical Weapons Convention	ITA	<i>Inside the Army</i>	WP	<i>Washington Post</i>
DerS	<i>Der Spiegel</i>	ITAF	<i>Inside the Air Force</i>	WT	<i>Washington Times</i>
DN	<i>Defense News</i>	ITP	<i>Inside the Pentagon</i>	WSJ	<i>Wall Street Journal</i>
DW	<i>Defense Week</i>	JDW	<i>Jane’s Defence Weekly</i>		
		KZ	<i>Krasnaya Zvezda</i>		

notifications with a counterpart centre in the United States) is for the first time visited by journalists. Its chief, Lt-Gen Vladimir Medvedev, says: "As other arms control treaties come into force, the Center will expand exchanges of warnings and information. I am referring to treaties intended to regulate the reduction and limitation of strategic offensive weapons, the Open Skies regime and the liquidation of chemical weapons." {ITAR-TASS 16 Feb in BBC-SWB 18 Feb}

16 February In Washington, plans for a 'Nonlethality Strategic Initiative' are once again being floated, now that Bush appointees who had been blocking earlier consideration have departed, so *Defense Week* reports. {DW 16 Feb} The Army has said that the draft doctrine and requirements paper *Operations Concept for Disabling Measures* being circulated for comment by its Training and Doctrine Command [see 4 Sep 92] is not expected to be finalized until late summer. {*Defense Electronics* Feb}

17 February In India, the Minister of State for Chemicals and Fertilizers, Eduardo Faleiro, announces that India is beginning to conform to international commitments on chemical weapons and toxic chemicals. He speaks specifically of the pesticide sector. {Press Trust of India 17 Feb in BBC-SWB 19 Feb}

17 February In Russia, the formerly secret Virological Centre in Moscow oblast is the subject of a television programme. The precise location of the facility is not given, but video footage says "Moscow 68 km". Buildings where work on biological weapons had once taken place are shown in a demolished state. Describing past weapons work, Director A A Makhlay says: "We had information that, back in the 1930s, an extensive program for the development and even the production of biological weapons had been adopted in Japan. In 1941 the United States drew up such a program. Later Britain also followed suit. They too had such a program. After the war we knew this; naturally, we had information to this effect, but in view of the situation prevailing after the war, no one was in a position to do anything about this. We simply could not, for understandable reasons. We did not respond until the early 1950s [see also 10-11 Sep 92].... We worked on the development of experimental samples, we were testing experimental samples." He continues: "We were working with spotted fever agents, we were working with agents of Venezuelan equine encephalomyelitis, and some other arboviruses".

The head of the Russian Defence Ministry Biological Defence Directorate, N T Vasilyev, says: "We only had experimental samples...which were tested in laboratory and field conditions. Individual lines were set up, which could have been used in wartime for the production of these specific cocktails. However, no biological weapons were produced or stockpiled in our country. We had no biological weapons. Individual studies were carried out in this sphere, and if there had been a government decision, a special decision, then prior to 1985 this task could have been carried out, given additional effort." {Ostankino Television 17 Feb in FBIS-SOV 1 Mar} [See also 2 Dec 92]

Two days previously, an official of the presidential Commission on CBW Convention Problems, Igor Vlasov, had been reported by a Moscow news agency saying that "work related to the possible production of biological weapons in Russia has been fully stopped and all pilot facilities for producing germs have been dismantled". He had also stated that, since the late

1940s, annual spending on BW programmes had been between R30m and R100m. {RIA 15 Feb in BBC-SWB 17 Feb}

20 February In Belgium, Antwerp police confiscate 7850 cans of irritant agent CS found during a routine check at the Falconplein. Two Poles suspected of importing the weapons from eastern Europe are held in custody. {*De Standaard* 23 Feb}

21 February In Switzerland, a Zurich engineering firm, Bioengineering of Wald, suffers its third bomb attack in less than a year. An Iranian opposition group, described as previously unknown, claims responsibility, accusing the firm of having provided Iran with biological weapons. This the firm denies, saying that it had made no deliveries to the Middle East for some time and none to Iran for more than a year. {Swiss Radio International 23 Feb in FBIS-WEU-24 Feb}

A British television documentary on BBC *Panorama* later speculates about Israeli responsibility for the attack. The documentary addresses the general subject of "Iran's determination to pursue weapons of mass destruction in all categories — biological weapons, chemical weapons, nuclear weapons — and also the missiles to deliver them", in the words of interviewee Robert Gates, latterly Director of US Central Intelligence [see 15 Dec 92]. {TL 9 Mar}

22 February In India, during his address to the joint session of parliament, President Shankar Dayal Sharma describes the Chemical Weapons Convention as "a universal and non-discriminatory treaty which should be regarded as a model for future multilateral disarmament negotiations". {All-India Doordarshan Television 22 Feb in BBC-SWB 24 Feb}

22 February Kyrgyzstan signs the CWC.

22 February In Iraq, officials threaten to shoot down two UN helicopters carrying UNSCOM inspectors engaged in a complex and novel form of search for weapons proscribed under Security Council resolution 687 (1991), in this case ballistic missiles. The search, led by Nikita Smidovich of Russia, concerted inspectors on the ground, the helicopters and aerial surveillance by a U-2 aircraft. {Reuter in FT 22 Feb; Reuter in IHT 23 Feb and 24 Feb; FT 25 Feb; NYT 24 Feb} Two ballistic-missile inspection teams are involved, UNSCOM 50 and UNSCOM 51, as well as people from the chemical destruction team, UNSCOM 38. {S/25391*}

23 February In the United States, the General Accounting Office releases a new study of the Army's chemdemil effort [see also 16 Jun 92]. {GAO/NSIAD-93-50} In describing the various problems, delays and shutdowns at the Johnston Atoll prototype facility [see 2 Jan] on which the other eight planned facilities are to be modelled, as well as the time required to obtain the requisite environmental permits, the report raises doubts about the ability of the Army to meet its current chemdemil schedule. {ITP 25 Feb}

24 February Bahrain signs the CWC.

24 February In Cuba, President Fidel Castro is asked during a news conference why Cuba should deny itself chemical weapons by joining the CWC. He says there is a political reason and two practical reasons. The political reason is "in order to have coordination with many countries" by supporting the

"worldwide movement against chemical weapons". A practical reason is: "We do not have the resources to undertake production of chemical weapons, with all the needs the country has... We would not have...either the missiles or the aircraft to deliver them, or enough of them to make an impression in a chemical war." The second practical reason is: "we would be competing against a country that has all the chemical weapons it wants, and superdeveloped technology. Would it be good for us to introduce the use of chemical weapons in a war between the USA and Cuba? If they introduce them even if we do not, we would have no other alternative but fatherland or death. It is better to have a nation than to die, but it is better to die rather than to live without a nation."

Later he says: "We would have greater capabilities for making progress in the field of biology, or trying to make biological weapons. We have never even thought about making biological weapons, because of morality, simply because of ethics. They have used biological weapons against us. We apply the same reasoning to biological weapons as to chemical weapons.... We already have enough to do with the need to cope with conventional weapons, which are the only weapons we have for our defence... [W]e prefer to...defend ourselves with conventional weapons, because we are sure that with conventional weapons in the war of the people as a whole, we can make imperialism pay too high a price for an invasion of our country." {Cuba Vision 26 Feb in BBC-SWB 27 Feb}

Cuban Foreign Minister Ricardo Alarcon de Quesada had set out the "political reason" in more detail during a newspaper interview some weeks previously: "This agreement [the CWC] is important because it marks the first time since the creation of the UN that the manufacture and use of a weapon has been prohibited. This is unprecedented; it was never agreed on between two or three powers like Russia or the USA. This agreement was discussed by each and every one of the 120 signatory countries. Of course, the convention is a formality, but it offers the basis for discussion in a new and unknown situation: the absence of an opponent to the USA and its overwhelming worldwide hegemony." {Prensa Latina 2 Feb in BBC-SWB 5 Feb}

24 February On the report of Chinese noncompliance with the BWC which President Bush had included in a statutory annual report to the Congress the previous month [see 19 Jan], the *Washington Post* quotes unidentified US intelligence officials as saying that, for political reasons, similar passages in both the classified and unclassified versions of the two previous annual reports — consensus intelligence-community statements — had been deleted by the White House prior to transmission to the Congress. {WP 24 Feb} [See also 18 Nov 91]

According to the *Post*, those same officials "said US intelligence concerns about China are partly based on evidence that China is conducting biological research at two ostensibly civilian-run research centers that Americans say are actually controlled by the Chinese military. The research centers were known to have engaged previously in production and storage of biological weapons, the officials said. They said US suspicions intensified in 1991 when one of the suspected biological centers was enlarged. Suspicions heightened further last spring, after Beijing made what one US official termed a 'patently false' declaration to the United Nations that it had never made any germ weapons or conducted any work...to bolster defenses against a biological attack." The Chinese Foreign Ministry subsequently describes all this as groundless, denying that China has a germ-weapons programme. {WP 26 Feb}

24 February In the US Congress, the newly confirmed Director of Central Intelligence, R James Woolsey, gives public testimony on the complexity of the challenge posed to the intelligence community by the proliferation of weapons of mass destruction. He lays stress on the value of human intelligence [see also 28 Jan]: "Well placed, first hand information can pull together seemingly unrelated technical tidbits to build a convincing, accurate picture."

As regards CBW [see also 15 Dec 92], he says: "More than two dozen countries have programs to research or develop chemical weapons, and a number have stockpiled such weapons, [including] Libya, Iran and Iraq. The military competition in the always volatile Middle East has spurred others in the region to pursue chemical weapons. We have also noted a disturbing pattern of biological weapons development following closely on the heels of the development of chemical weapons".

About the Iranian CBW programme he says: "Iran...used chemical weapons in response to Iraqi use during the Iran/Iraq war, and it can still manufacture hundreds of tons of chemical agent a year. Although it produces primarily choking and blister agents, Iran may also have a stockpile of nerve agents. Biological weapons, if not already in production, probably are not far behind." [See also 21 Feb]

Later: "Iraq's biological weapons capability is perhaps of greatest immediate concern. Baghdad had an advanced program before Desert Storm, and neither war nor inspections have seriously degraded this capability. The dual-use nature of biological weapon equipment and techniques makes this the easiest program to hide."

Also giving testimony is the director of the CIA-based inter-agency Nonproliferation Center, Gordon Oehler, who speaks of biological-weapons experiments in North Korea involving anthrax, cholera and plague bacteria, in this regard confirming the recent Russian report [see 28 Jan and see also 19 Jan]. {WSJ 25 Feb}

25 February In Tokyo, the Budget Committee of the House of Representatives is told by Chief Cabinet Secretary Yohei Kono that, even if no clear proof of Japanese association with the abandoned chemical weapons in China is obtained by the survey team that is to be dispatched there later in the year [see 11 Jan], Japan will hold talks with China on the matter based on the spirit of the 1972 joint communiqué which restored diplomatic relations between the two countries. He says that there is a "strong possibility" that the weapons were indeed abandoned by the Japanese Imperial Army. {Kyodo 25 Feb in FBIS-EAS 25 Feb}

25 February In Russia, the chemical-weapons storage facility at Kambarka has recently received its first visit by American journalists, according to an account published in today's *Wall Street Journal*. The facility, constructed in the early 1950s, holds some 6300 tons of lewisite in 80 storage tanks. Plans are being developed for detoxification of the lewisite, possibly by the German company Metallgesellschaft AG if the German government agrees to cover the costs, currently estimated at some \$185 million. {WSJ 25 Feb} [See also 21 Dec 92]

25 February In the United States, the General Accounting Office releases a report on the state of the chemical and biological detection equipment available to US armed forces. {GAO/NSIAD-93-2} The study had been requested by Senator John Glenn, reportedly after learning that *Desert Shield/Storm* troops had kept chickens near their quarters to act as CBW-

agent detectors. {ITP 25 Mar} The report is critical of past Army CB detection efforts, noting in particular that troops deploying to the Persian Gulf during the war over Kuwait had almost no capability to detect biological weapons. The report states: "In the six years preceding Operation Desert Storm, less than 7 percent of total chemical and biological detection research and development funds went to biological agent detection". The Defense Department had told the GAO that this was because their analyses had shown the use of biological weapons to be unlikely, despite intelligence warnings of the increasing availability of BW weapons. This assessment had since been revised, and biological detection now consumed nearly 30 percent of CB detection R & D funds. Even so, the GAO report states, the Army is still not doing enough on the detection of emerging threats, such as microencapsulated and genetically modified organisms.

25 February In the US Congress, Representative Glen Browder of Alabama releases at a press conference the final report of the House Armed Services Committee Special Investigation into the Chemical and Biological Weapons Threat which he had been chairing since its commissioning seven months previously [see 9 Nov 92]. {ITA 1 Mar} The broad conclusion reached by the inquiry is stated in its letter of transmittal as follows. "At the same time as the demise of the Soviet Union, with its sizeable chemical/biological arsenal, the chemical and biological threat has increased in terms of widespread proliferation, technological diversity and probability of use. To meet the changing threat, the United States must pursue a three-pronged response. First, we should push hard for ratification and implementation of the Chemical Weapons Convention; second, we must maintain a strong chemical-biological defense program; and third, we must continue to maintain a strong and intimidating force to deter enemies who might not be convinced by international treaties or effective defenses that the maintenance and use of chemical or biological weapons are unacceptable."

The report contains several specific recommendations, notably that the Army's role in managing the nation's CBW defences should be greatly strengthened, and that the entire CBW defence programme should be placed under Defense Acquisition Board oversight. It also recommends that a "strong verification and inspection regime, similar to that established in the Chemical Weapons Convention, should be adopted in the Biological Weapons Convention".

28 February From Iraq comes further reporting that government forces are poisoning waters of the Howeiza marshes as part of the continuing suppression of Shia resistance [see 3 Aug 92]. The reporter is a London *Observer* journalist who had spent ten days with Marsh Arabs in southern Iraq. {Obs 28 Feb}

28 February In Bosnia-Herzegovina, Serbian forces shell civilians in the vicinity of Cerska and Konjevic Polje awaiting US Air Force drops of humanitarian-aid packages, according to the press service of the Bosnian Second Corps Command in Tuzla, which states further that the bombardment also includes chemical agents of the choking-gas type [see also 12 Feb]. {RBH 1 Mar in FBIS-EEU 2 Mar}

1 March In the United States, the CIA Directorate of Intelligence releases an unclassified version of its January report *The Defense Industries of the Newly Independent States of Eurasia*. It provides maps disclosing for the first time the exact

locations of former Soviet production facilities and test ranges for missiles and for nuclear and CBW weapons; in all, 12 test ranges and, for CBW-weapons production, 12 production facilities. {WT 9 Mar}

1 March US Army Aberdeen Proving Ground is fined by the state of Maryland for violation of environmental law through improper storage and handling of hazardous wastes. This is the first such action in the United States against an Army installation. The hazardous wastes involved included a repository of CW test munitions at "N-field" in the Edgewood area. {BS 2 and 3 Mar via CN}

2 March In Bosnia-Herzegovina, the Serbian army general staff complains to the UN Protection Force that Muslim forces three days previously had been using chemical weapons [see also 18 Jan] — specifically, "chemical grenades, a kind of tear gas" — in an artillery attack on the village of Kikici just to the north of Gradacac: "The fighters of the Serbian Republic and the local population experienced a pricking in the eyes and nose, nausea and digestive problems. Six fighters had such a high degree of intoxication that they had to be hospitalized." The Serbian complaint seeks urgent action by the UN Security Council because "the norms of international war law have been grossly violated". {Tanjug 2 Mar in BBC-SWB 5 Mar} [See also 12 Feb]

2 March In the UK, a television documentary is screened about US Army tests on conscripts of LSD and other candidate CW incapacitating agents during 1955-75. {ITV *First Tuesday*}

2-3 March The US Arms Control and Disarmament Agency hosts an international conference on CWC Verification Technology Research and Development. {CBIAC *Newsletter* Winter and Spring issues}

4 March In Iraq the official news agency INA releases the transcript of an interview which President Saddam Hussein had given to a US television reporter on 13 February. Asked whether he planned to develop and use nuclear and chemical weapons, the Iraqi leader had said: "we will always be ready to act positively and effectively to make the entire Middle East a zone free of weapons of mass destruction". {INA 4 Mar in BBC-SWB 6 Mar}

5 March In The Hague, the Combined Group of Experts on the Rules of Procedure and Privileges and Immunities under Working Group A of the OPCW Preparatory Commission completes a 5-day session and produces two reports. One is its *Initial Report on Privileges and Immunities*, basically setting out a list of topics to be dealt with at a later stage. The other forwards its recommended *Draft Rules of Procedure* for the OPCW Preparatory Commission. The *Draft Rules* make no change to the provisional rules [see 8-12 Feb] as regards access by non-governmental organizations to sessions of the Commission and meetings of the subsidiary bodies; they envisage no increase in transparency. The group has been chaired by Professor Natalino Ronzitti of Italy and has included experts from 40 states signatories.

6 March In the Russian Federation, the Tatar parliament adopts a special resolution proclaiming Tatarstan a zone free of mass destruction weapons. Thereby prohibited is the transport

of chemical weapons across the republic to chemdemil facilities [see 19 Jan]. {ITAR-TASS 6 Mar in FBIS-SOV 8 Mar}

6 March In Moscow, the newspaper *Pravda* carries an article critical of the Chemical Weapons Convention, portraying it as grossly favouring the United States. Its argument turns on the absence of provisions in the treaty for verification of compliance with the prohibition of chemical-weapons development. {*Pravda* 6 Mar in FBIS-SOV 9 Mar}

8 March In Belgium, a royal order is promulgated implementing the law of 5 August 1991 controlling the import, export and transit of munitions and military technologies. As regards CBW weapons, the order extends to all items falling within the scope of the 1925 Geneva Protocol and the 1972 Biological Weapons Convention; it also expressly controls 10 of the 12 chemicals and families of chemicals listed in schedule 1 of the Chemical Weapons Convention. {*Belgisch Staatsblad* 6 Apr pp 7325-34}

9 March In the UK, the Treasury publishes its supply estimates for the financial year beginning on 1 April 1993. The estimates indicate that some £400,000 of UK contribution to the OPCW Preparatory Commission is to come from the Defence Ministry budget for the year. {HC papers 495-I session 1992-93}

9 March Nicaragua signs the CWC.

10 March In the UK, the Foreign and Commonwealth Office convenes a large "awareness raising seminar" principally for people involved in biotechnological research and industry. Its primary purpose is to explain the government's new export controls aimed at preventing the proliferation of biological weapons and to launch a *BW Awareness Raising Booklet* [see 31 Dec 92]. There are presentations from several government departments and a BW threat briefing by the Defence Staff. The idea is floated of the government vetting university intakes of overseas students as means for controlling transfer of "intangible technology". {Ind 16 Mar; *Trust and Verify* no 36}

10 March In the US House of Representatives, a Veterans' Affairs subcommittee holds hearings on assistance for veterans exposed to CW agents as a result of war service, especially those on whom mustard gas and lewisite had been tested during World War II [see 6 Jan]. {NYT 11 Mar 93} The Defense Department announces that it is rescinding the secrecy oath and other non-disclosure restrictions imposed on test participants, and declassifying research records, so as to help those who took part qualify for veterans' benefits. The Veterans' Affairs Department announces that it is amending its regulations so as to extend eligibility for benefits, and that it is planning to conduct mortality, morbidity and other studies of test veterans, once the Defense Department has made available the relevant personnel records.

11-18 March In Iraq, a 19-strong team of UN inspectors conducts the third UNSCOM biological-weapons inspection, UNSCOM 53. The team includes CW and ballistic-missile specialists, and is led by Dave Franz of the United States. It visits at least one site each day. An UNSCOM official in New York later says that the team had followed up previous inspections and gathered information for future monitoring. {AP in CN 11 Mar; *Arms Control Today* Apr; ACR 701.B.111}

Thank you

With this the 20th issue of the *Bulletin*, production has moved to the University of Sussex in England, home base of one of the editors. Having taken this plunge, we in the Harvard Sussex Program owe a debt of gratitude to the Federation of American Scientists for its unstinting willingness over the years since 1987 to produce and distribute our quarterly journal for us. Our debt is particularly large to Lora Lumpe at the FAS, who guided us through the last 16 issues with great skill and good humour, latterly assisted by Ann Walsh. Lora joined the venture at issue no 3, initially to assist the original producer, Gordon Burck, before he left FAS for the EAI Corporation. We thank them all most warmly and, for his encouragement throughout, the President of FAS, Jeremy Stone.

12 March The US Defense Department issues a plan to close 31 of its large military installations and to shrink or consolidate 134 of its smaller ones. Fort McClellan, Alabama, is on the closure list, except for its live-agent Chemical Defense Training Facility; the Chemical School would, as had been proposed two years previously, move to Fort Leonard Wood, Missouri [see 12 Apr 91]. Decisions on the plan will rest with the Base Closure and Realignment Commission, whose recommendations are due to go to President Clinton on 1 July. {NYT 13 Mar; ITA 22 Mar; *Armed Forces Journal International* Apr}

13 March In Bosnia-Herzegovina, reports of Serbian use of poison gas in northern and eastern parts of the country again [see 28 Feb] begin to be heard from Sarajevo on Radio Bosnia-Herzegovina. {RBH 13, 14 and 15 Mar in BBC-SWB 15, 16 and 17 Mar} The Serbian army general staff issues a statement [see also 2 Mar] saying that, in order to synchronize anti-Serbian propaganda, the Muslim leadership in Sarajevo has given fresh instructions to its forces in Srebrenica to spread disinformation about an alleged use by the Serbian side of poison gases. {SRNA 14 Mar in BBC-SWB 16 Mar}

14 March Israel has informed the UK that the continuing non-inclusion of Israel in any UN regional group may impair its ability to comply with the CWC and influence its readiness to accede to the Biological Weapons Convention. The Tel Aviv newspaper *Davar* reports that, during talks in London with UK Foreign Secretary Douglas Hurd, Israeli Deputy Foreign Minister Yosi Beilin had expressed extreme disappointment with European attitudes towards Israel's mooted inclusion in the group of West European and Other states. The report continues: "Ever since the establishment of the State of Israel, the Arab states have prevented it from joining the Asian geographical group, while the EC countries, led by Britain, plan to reject Israel's request to be accepted in the WEO". {*Davar* 15 Mar in FBIS-WEU 16 Mar}

15 March Vietnam informs the OPCW Provisional Technical Secretariat that it cannot afford to participate in the meetings and other activities of the OPCW Preparatory Commission. It states further that, as it will not be participating, it need not contribute to the expenses of the Commission.

15 March The construction project at Tarhuna, Libya, reported in the foreign press over government denials to be the site of the country's second chemical-weapons factory [see 15 Feb], is said by the German newspaper *Frankfurter Allgemeine* to involve companies from Austria, Denmark, France, Italy, Japan, Poland, Switzerland, Thailand and the UK, as well as the three German companies which the US State Department had publicly accused of involvement. The newspaper quotes "US security circles" as saying that the expensive separate air-admission and air-discharge systems of the tunnels should have given certain of the foreign firms "clear" indication that a chemical facility was being built. The newspaper gives details showing how at least some of the companies, including the German ones, had been misled into unwitting cooperation. {FAZ 16 Mar} Further particulars of foreign commercial participation in the Tarhuna project appear in newspapers in different parts of the world over the next two weeks.

A London paper reports a successful campaign by the British government to block a shipment of chemical-process equipment which a Libyan firm had ordered from the Malaysian subsidiary of a London-based multinational engineering group; the shipment had been destined for a facility near Benghazi reportedly under construction to produce precursor chemicals for the Tarhuna factory, including a pinacolyl alcohol plant of capacity exceeding 100 tonnes per year. {Guar 22 Mar}

Bangkok newspapers carry reports attributed to highly placed but unidentified sources detailing activities of Thai companies doing business as procurers for the Libyan chemical-weapons programme, charging up to five times the normal market price for goods supplied, and providing large numbers of Thai workers. {*Siam Post* 28, 29 and 30 Mar in FBIS-EAS 29 and 30 Mar; *Bangkok Post* 30 Mar in FBIS-EAS 30 Mar} Some but not all of these details are later confirmed to the press by Deputy Interior Minister Suthat Ngoenmun. General Charan Kunlwanit, secretary general of the National Security Council, tells reporters that he had visited the US State Department in February in order to explain the situation — viz, that as a democratic country unwilling to violate human rights, Thailand could not impose restrictions on where its people worked. {*Siam Post* 30 Mar in FBIS-EAS 30 Mar}

15 March From Russia, Dr Vil Mirzayanov [see 23 Jan] addresses an appeal to the Commission on Human Rights of the European Parliament. The prosecution has in the meanwhile established a special expert commission to advise the court before which he will eventually be tried, but the prosecution has rejected five of the six experts he had proposed for it. The Supreme Constitutional Court of the Russian Federation has been petitioned for a ruling on the constitutionality of the prosecution. {BS 19 Mar}

15 March The 1979 anthrax epidemic in Sverdlovsk, USSR [see 22 Sep 92]: an article published in *Proceedings of the National Academy of Sciences of the USA* (90: 2291-94, F A Abramova *et al*) presents pathoanatomical evidence that people who died had been infected by inhalation of anthrax spores, not by ingestion of contaminated animal products. {NYT and WSJ 15 Mar} The report, which makes no observations on the origin of the inhaled spores, is the first publication from a study group of scientists from Russia and the United States led by Dr Matthew Meselson of Harvard University, funded by the MacArthur Foundation. The year previously, the team had conducted investigations in Sverdlovsk (Ekaterinburg) [see 4-14 Jun 92]

and, since then, had been continuing to collect epidemiological data there, assisted by Ural State University.

The leader of the study group tells reporters that a second report is in preparation and that it will deal primarily with epidemiological aspects of the anthrax outbreak, addressing questions of the timing and location of the release of anthrax pathogen into the air. {*Harvard University Gazette*, 19 Mar; *Science* 19 Mar; *New Scientist*, 20 Mar} He says that among the several aspects of the outbreak still to be explained are the absence among those who died of people aged less than 24, the occurrence of a number of cases of cutaneous anthrax, and the nature of the activity responsible for the release of anthrax spores into the air. {*ASA Newsletter* 8 Apr}

17 March In The Hague, the Group of Experts on the First Year Budget and Work Program under Working Group A of the OPCW Preparatory Commission completes a session which had begun on 8 March. It produces two main papers. One is a draft recommendation on the first-year programme of work for the Commission. Among its attachments is a paper by the PTS identifying 136 specific issues which the Preparatory Commission will need to address. The proposed programme rests on the assumption that the CWC will enter into force in January 1995. The other main paper is a draft decision approving an appended budget for 1993 and scale of assessments for contributions of signatory states. Also transmitted by the group is a paper setting out the supporting calculations for the budget. The paper includes charts showing in detail projected PTS staffing during 1993. The group has been chaired by Albert Dojas of Argentina.

17 March The US Arms Control & Disarmament Agency is seeking \$62.5 million in its Fiscal Year 1994 budget request, including \$16 million to help implement the Chemical Weapons Convention, so Acting Director Thomas Graham says in testimony before an Appropriations subcommittee of the US House of Representatives. {DN 22 Mar}

18 March From Bosnia-Herzegovina, intensified Serbian bombardment of Sarajevo is reported just as the peace talks between the three warring sides resume in New York. According to a government statement, Serbian forces are using "all weapons available...poisonous gas included". An aide to Vice President Ejup Ganic states that the Serbs have been employing tear gas in the bombardment. {WP 19 Mar} Early next day, according to Radio Bosnia-Herzegovina, Serbian aircraft drop "several bombs with chemical agents" in the region of Srebrenica. {RBH 19 Mar in FBIS-EEU 19 Mar} [See also 13 Mar]

Three days later, after a number of other such reports, {RBH 20 and 21 Mar in BBC-SWB 22 Mar} Bosnia-Herzegovina communicates the following to the UN Security Council: "Today, Sarajevo was shelled by Serbian and Montenegrin forces, with some sections of the city exposed to toxic gases (this can be corroborated by UNPROFOR). As a result, scores of civilians suffered irritation and others, more directly exposed, suffered from bleeding from their respiratory systems." {S/25459}

19 March Iraq has completed the destruction, under UNSCOM supervision, of its bulk stocks of nerve gas. Speaking in Baghdad, UNSCOM representative Ron Manley of the UK says that 70-75 tons had been destroyed. Still to be completed, he says, is the destruction of weaponized agents and of bulk mus-

tard gas, currently running at rates of, respectively, 20-100 munitions and 1-2 tonnes per day. {Reuter in WP 20 Mar; ACR 704.E-2.85}

19 March Armenia signs the Chemical Weapons Convention.

19 March From Russia, a member of the Volsk city council, Vladimir Petrenko, is reported by an American newspaper, the *Baltimore Sun*, describing how his health had deteriorated after he had volunteered, in 1982, for reliability tests of antichemical protective clothing at the Shikhany CW research establishment during which he became exposed to an unidentified poison gas. {BS 19 Mar} Some two months previously, a local Saratov newspaper had also reported his story; the journalist involved, Sergei Mikhailov, was subsequently arrested, and is now awaiting trial. {*New Scientist* 8 May}

22 March Concerning the inspections of biological facilities envisaged in the Russo-UK-US *Joint Statement on Biological Weapons* [see 10-11 Sep 92 and 18-21 Nov 92], an unidentified US official tells a reporter that "issues remain on how to implement this" and that diplomatic exchanges are continuing. {ACR 701.B.111}

22 March In the US Senate, Senator John McCain introduces reports on Iraq's nuclear and chemical weapons programmes which he had commissioned from the Congressional Research Service some months previously (the report on BW weapons is not yet ready). He comments on the contributions which American, European and Indian corporations had made to the Iraqi CW programme, and says that international arms control efforts alone cannot be relied upon to stop the spread of mass-destruction technologies. He continues: "We need to use the full power of the American economy to confront supplier countries and companies with powerful sanctions in terms of a loss of access to American market". {CR 22 Mar pp S3380-1}

The CRS chemical report relies mainly for what it says about Iraq's actual weapons on some of the information already placed in the public domain by UNSCOM. For what it says about suppliers, the report relies exclusively on the domestic and foreign press, not on UNSCOM information. {*CRS Report for Congress* 93-292 F}

22 March President Clinton transmits to the US Congress a status report on Iraq's compliance with the UN Security Council ceasefire and related resolutions. Addressing Iraq's refusal to accept resolution 715 (1991) which mandated the creation of a long-term monitoring regime for the Iraqi weapons-of-mass-destruction infrastructure [see 28 Oct 92], the report states that the "international community must insist on such long-term monitoring".

The Administration also releases several related factsheets, including one entitled *Harassment of UNSCOM Inspectors* which details a wide variety of incidents in which UN inspectors were subjected to threats and physical abuse in Iraq. The factsheet says: "While some of these incidents may be spontaneous, the bulk of them appear to be the result of a coordinated government campaign to intimidate and humiliate the UNSCOM and IAEA inspectors". {USDSD 5 Apr}

24 March In The Hague, the Group of Experts on Staff Regulations and Financial Regulations under Working Group A of the OPCW Preparatory Commission completes a session which had begun on 18 March. It produces an *Initial Report on*

Financial Regulations and an *Initial Report on Staff Regulations*. The group has been chaired by Dr Ralf Trapp of Germany.

25 March Switzerland informs the CD that, by way of contribution to the establishment of the OPCW in The Hague, "it plans to offer, as far as possible, the services of its renowned nuclear and chemical laboratory in Spiez and an advanced chemical industry and it also intends to train some 60 inspectors for the organization". {CD/PV.648}

26 March In The Hague, the Group of Experts on the OPCW Building under Working Group A of the OPCW Preparatory Commission completes a two-day session and produces an initial report. Sweden had submitted to it a working paper addressing the OPCW need for a Central Laboratory. The group has been chaired by Dr Radoslav Deyanov of Bulgaria.

26 March The bilateral Russo-US talks in Geneva on chemical weapons [see 19 Jan] conclude their 21st round. An unidentified US official later tells *Arms Control Reporter* that the two sides had resolved questions on the June 1990 bilateral destruction agreement and on Phase II inspections under the 1989 Wyoming Memorandum of Understanding, and that agreed texts had been sent to Moscow and Washington for executive approval. {ACR 704.B.549} A few days earlier, a US official had spoken to ACR of work being done during the bilaterals on the inspection protocol for the destruction agreement [see 4 Apr 91 and 13 Nov 92]. The official had also said that the form of the Wyoming Phase II data-exchange [see 13 Nov 92] was "pretty well wrapped up", but that the actual exchange would not take place until Phase II had formally begun, 90 days after all of its aspects had been agreed, including modalities for verifying exchanged data. {ACR 704.B.548} An unidentified official of the US On-Site Inspection Agency tells ACR that no Phase-II activities are anticipated before mid summer. {ACR 704.B.549}

26 March In Britain, Parliament is informed by an Education minister that the government "are discussing with representatives of the universities and colleges...the most effective means of ensuring that postgraduate students and researchers from countries where there is a proliferation concern cannot gain access to relevant technologies through study or research in United Kingdom higher education". {HansC 26 Mar} [See also 10 Mar]

27 March In Japan, the Ministry of International Trade and Industry tells reporters that about 100 chemical factories in the country will be liable to international inspection under the Chemical Weapons Convention. The ministry also states that implementation of the treaty will require 2000-3000 factories, about half of all chemical factories in Japan, to submit regular reports to the government on their operations. The ministry is to launch a nation-wide survey of chemical factories on 1 April. {Kyodo 27 Mar in FBIS-EAS 29 Mar} [See also 13 Jan]

27 March In Papua New Guinea, government troops are again [see 15 Jan] using chemical mortar bombs against villages on Bougainville Island, according to the secessionists, whose news release states that the bombs give off fumes that cause itching, vomiting and severe headaches. {Radio Australia 3 Apr in BBC-SWB 5 Apr}

27 March In Iraq, an 8-strong UNSCOM team led by Nikita Smidovich of Russia arrives to resume the task initiated on 26 January of monitoring the Ibn Al-Haytham missile research centre, and to extend the monitoring to other facilities in Iraq where there is work on solid propulsion and related technologies. Three days later, Chief Inspector Smidovich tells reporters that this novel form of inspection activity — “interim monitoring” — is proceeding smoothly: the Iraqis “have accepted the task for the new monitoring team and we have no problems at the moment”. {IHT 31 Mar} However, he is told by General Amer [see 5 Dec 92] on 1 April that Iraq is cooperating in order to determine whether, as it suspected from the “modalities of the monitoring team”, UNSCOM is “trying to overlap in a discreet fashion Iraqi obligations under resolution 687 (1991) and resolution 715 (1991) [on the ongoing monitoring and verification plan: see 22 Mar]”; if so, the team will no longer be welcome. {S/25620}

27 March The US Defense Department releases its budget request for Fiscal Year 1994. The request, it later transpires, would increase the current Biological Defense Program by 54 percent to \$170.8 million; and further substantial increases are projected for subsequent years.

A major expenditure item is Army procurement of 38 Biological Integrated Detection Systems. US armed forces at present have no BW-agent detection equipment [see 25 Feb]. A budget document describes BIDS as an interim system “that can be rapidly fielded to the Army beginning in 1996. This program will integrate existing biological measuring instrumentation into an M789 shelter mounted in an M1097 Heavy High Mobility Multi-Wheeled Vehicle”. The instrumentation, all off-the-shelf items, will include an aerosol-particle counter/sizer, a bioluminescence analyzer, a liquid-particle counter/sizer, a particle sampler and a manual antibody-based detector. Other types of equipment may be incorporated later. Among the agents which BIDS is required to detect and identify are anthrax and plague bacteria, botulinal toxin A and staphylococcal enterotoxin B. {ITA 12 Apr}

29 March St Lucia signs the Chemical Weapons Convention.

29 March The UN Security Council decides against relaxing the regime of sanctions and other measures imposed on Iraq through ceasefire resolution 687 (1991), having completed its latest 60-day review of the situation, including consultations on 23 and 29 March [see also 22 and 24 Mar], and having concluded that Iraq has still not fulfilled all its obligations under the resolution. {S/25480}

30 March US Defense Secretary Les Aspin, testifying before the House Armed Services Committee on his department's 1994 budget [see 27 Mar], states that more than 20 Third World nations are attempting to develop weapons of mass destruction, including nuclear, chemical, biological and ballistic-missile programmes. His budget request includes \$40 million in new funds to “intensify efforts to halt proliferation” [see also 17 Aug 92]. Officials say that the funds will be used, among other things, to tighten export controls on sensitive technologies that could be diverted to a covert weapon program. {DN 5 Apr} This initial funding for Defense Department counterproliferation measures is expected to increase significantly in next year's budget. {JDW 29 May}

30 March From Washington, the Committee on Scientific Freedom and Responsibility of the American Association for the Advancement of Science addresses a strongly worded letter to President Yeltsin on behalf of Dr Vil Mirzayanov [see 15 Mar]. The AAAS has 134,000 individual members and is the largest organization of natural and social scientists in the United States.

31 March In Brussels the due-date passes for the projected EC regulation controlling export of dual-use technologies [see 21 Dec 92]. The regulation is now not expected before the change of EC presidency at the end of June. {*Trust and Verify* no 36}

1-2 April In Sydney, the Australian government hosts the fifth international seminar of its Chemical Weapons Regional Initiative [see 21-23 Jun 92] to discuss the procedures for implementation of the CWC. The seminar is attended by 20 other South-East Asian and South Pacific states: Brunei Darussalam, Cook Islands, Fiji, Indonesia, Kiribati, Laos, Malaysia, Marshall Islands, Micronesia, Myanmar, Nauru, New Zealand, Papua New Guinea, Philippines, Singapore, Solomon Islands, Thailand, Tonga, Viet Nam and Western Samoa. There are observers from Japan and South Korea, as well as representatives from regional industry. The closing statement, adopted by all participants, calls for the earliest possible entry into force of the CWC. Further, it states that the participating countries “had no chemical weapons production facilities nor had they any intention of developing, stockpiling, deploying or using such weapons nor of allowing their introduction into the South Pacific or South East Asian regions”.

The seminar also considers the question of controlling the trans-shipment through the region of chemicals covered by the CWC. And it discusses as well how best to deal with old and abandoned chemical weapons that may exist on the territory of some participants. {Australia DFAT news release 2 Apr; Radio Australia 2 Apr in BBC-SWB 5 Apr}

1 April In Iran, President Hashemi-Rafsanjani says in a broadcast interview that reports of Iran seeking to acquire nuclear and chemical weapons [see 24 Feb] are “baseless and incorrect”, adding that the country's military system had been designed on a “defensive and not offensive” basis. {Voice of the Islamic Republic of Iran 1 Apr in BBC-SWB 2 Apr}

1 April From The Hague, the Provisional Technical Secretariat for the OPCW publishes the first issue of its newsletter, *OPCW Synthesis*. The newsletter describes what the PTS has been doing since the first plenary session of the OPCW Preparatory Commission [see 8-12 Feb].

In response to an appeal by the Executive Secretary, loan staff have been made available by several governments pending further staff appointments: René Haug of Switzerland as Acting Information Systems Manager to set up a network of personal computers; Axel Angély of France to work on the 1993 forward work programme; Vladimir Iossifov of Russia as Acting Conference Service Manager to organize facilities for the Experts' Groups and the second PrepCom plenary; Johan Rautenbach of South Africa as Acting Legal Adviser; Paul Ryan of the UK as Chief of Staff; Shirley van der Steen of The Netherlands in a key secretarial role; and Ron Nelson of the USA for “the main planning function”.

In addition to the loan staff, local temporary staff have also been taken on, some of whom are transferring to fulltime Gen-

eral Service staff. And two recently retired UN officials are serving as short-term consultants: Ernest Pokorny of Austria as Finance Adviser, and Rosa Convers of Argentina as Personnel Adviser.

1 April In Washington, a nongovernmental nonprofit organization, the Center for Public Integrity, releases a documented study of the US Army's Biological Defense Research Program [see 27 Mar]. The study is supportive of the need for biological defence efforts, but is fiercely critical of the way this need is currently being satisfied. CPI Executive Director Charles Lewis states that the BRDP "has dismally failed to uphold the public trust". He also says that "despite the Army's claims that [the] research is open and unclassified, we discovered substantial secrecy and obsessive bureaucratic obfuscation". {CPI press statement 1 Apr; WP 29 and 1 Apr}

One of the conclusions of the study reads as follows: "The BRDP's problems — misdirected resources, poor-quality science, muddled goals, secrecy, and allegations of malfeasance — reflect the central contradiction of the BRDP: Because a credible medical defense for biological warfare defies scientific logic in the age of genetic engineering, the program offers a false sense of security. Meanwhile, the emphasis on exotic diseases not recognized as threats [see 11 Feb 92] suggests to adversaries of the United States that the BRDP's motives may be suspect — encouraging adversaries or potential adversaries to doubt the unequivocal US policy prohibiting the development or production of an offensive biological weapons capability. Those adversaries may well be encouraged to increase their own efforts pertaining to biological warfare. Indeed, in recent years US intelligence agencies have continually upgraded the number of nations estimated to have active biological weapons research programs." The study proposes a thorough reassessment of the continuation of the BRDP and advocates a redirection of BW defence efforts away from medical protection into greater emphasis on physical and chemical protection, possibly on an international basis.

3-4 April Presidents Clinton and Yeltsin meet for Russo-US summit talks in Vancouver, Canada. The joint communiqué from the meeting, the Vancouver Declaration, includes the following: "The presidents...welcomed the progress made in preparing the protocols necessary to submit the Agreement on Destruction and Non-Production of Chemical Weapons of 1st June 1990 for approval by the legislative bodies of the Russian Federation and the United States. They also welcomed progress achieved in developing agreement on the preparation and implementation of the second phase of the Wyoming memorandum of understanding of 23rd September 1989 regarding a bilateral verification experiment related to prohibition of chemical weapons." {ITAR-TASS 5 Apr in BBC-SWB 6 Apr} [See also 26 Mar]

8 April Iran is close to concluding a deal with North Korea for purchase of Nodong I ballistic missiles, according to unidentified US officials reported in the *New York Times* [see also 11 Feb]. {NYT 8 Apr} The Nodong I, still under development, is believed to have a range of 1000 km and can, according to both US and Russian intelligence officials (so the *Times* says), carry chemical weapons. A few days previously a similar report had been published by an Italian newspaper with attribution to defence sources in the United Arab Emirates. This earlier report stated that the missile could carry an 800 kg chemical warhead, and that Libya as well as Iran had been funding some of its

development. {*Jerusalem Post* 3 Apr} According to Mojahedin-e Khalq, the Iranian opposition movement, a delegation of Iranian ballistic missile experts has been in North Korea since 28 March, the fifth such mission this year, to discuss an accelerated delivery schedule. {*Mednews* 19 Apr; NYT 8 Apr}

8 April In Russia, the Ministry of Security interviews the Moscow correspondent of the *Baltimore Sun*, Will Englund, summoned to Lefortovo prison to answer questions in connection with the case being brought against Dr Vil Mirzayanov [see 30 Mar], whose whistleblowing on Soviet and Russian CW weapons programmes the *Sun* had publicized [see 23 Jan], just as it was continuing to do for other such whistleblowers [see 19 Mar]. Englund is interrogated for several hours, but only as a witness; no charges are brought against him. {BG and NYT 8 Apr; AP in IHT 9 Apr; BG 9 Apr}

8-15 April In Iraq, a 14-strong team of UN inspectors led by Igor Mitrokhin of the Russian Foreign Ministry conducts the tenth UNSCOM chemical-weapons inspection, UNSCOM 55. {WT 16 Apr}

9 April In the United States, an audit of Army, Navy and Air Force CBW protective systems by the Inspector General of the Defense Department has just been published, reports *Inside the Air Force*. The Air Force has accepted the recommendation that its planned buy of Protective Integrated Hood Masks be somewhat reduced, given projected force reductions. The audit had been stimulated by a planned Navy urgent sole-source procurement of the British AR-5 aircrew respiratory system. {ITAF 9 Apr}

16 April Libyan leader Colonel Moammar Gadhafi explains in an interview published in the *International Herald Tribune* why Libya has chosen not to sign the Chemical Weapons Convention: out of solidarity with Egypt, which has refused to do so, he says, until Israel opens its doors to international inspection of its nuclear facilities. {IHT 16 Apr} [See also 15 Feb]

Forthcoming Events

- The third Workshop on Verification of Arms Reduction will be held in Geneva, under the auspices of UNIDIR and GIPRI, during 23-26 August. Panels on both biological and chemical weapons are scheduled. Enquiries to J P Stroot, GIPRI, telephone Switzerland (022) 320 4962, fax (022) 781 6260.
- The fourth Wilton Park arms control seminar (Wiston House, England, 24-26 September) will be on Controlling Biological Weapons. Enquiries about participation to Elizabeth Harris, Wilton Park Conferences, telephone UK (0903) 815020, fax (0903) 815931.
- The fourth session of the group of governmental experts studying potential BWC verification measures (VEREX IV) will be held during 13-24 September, in Geneva.
- The fourth plenary session of the OPCW Preparatory Commission is now scheduled for 27 September through 1 October, in The Hague.

18 April In Viet Nam, President Le Duc Anh has sent a letter of praise to cadres and workers of the Chemical Warfare Corps on the occasion of the 35th anniversary of its founding. {Voice of Vietnam 18 Apr in BBC-SWB 1 May}

19 April Iran's chemical-weapons programmes [see 15 Dec 92, 24 Feb, 1 Apr and 8 Apr] are the subject of a detailed article in *Middle East Defense News*. The article, which also addresses Iranian BW research [see 24 Feb], somewhat amplifies an earlier *Mednews* publication [see 3 Aug 92], but again the new information is mostly unattributed. {*Mednews* 19 Apr}

19 April In Waco, Texas, the 51-day siege at the Branch Davidian compound ends in conflagration and the death of more than 70 men, women and children. Federal agents, after warning the cult leadership of what they were about to do, had pumped irritant agent CS into the buildings from Army Combat Engineer Vehicles (modified battle tanks) used to breach the walls; but the expected flight from the effects of the chemical by at least mothers with their children does not happen; fires are started, take hold and spread. {WP 20 Apr} The CS, said by the Defense Department not to be from military stocks, had reportedly been disseminated from the armoured vehicles by means of compressed-air aerosol generators. {NYT 20 Apr; WT 23 Apr} The cultists reportedly had an ample supply of adult-sized gas masks. {WT 22 Apr; AP in WT 23 Apr}

19 April The US Army will shortly be notifying Congress that the estimated total cost of the chemdemil programme [see 23 Feb] has now risen by another \$700 million to \$8600 million, so *Defense Week* reports, saying that the increase reflects the cost of postponing the programme to allow for the study of alternative chemdemil technologies ordered by the Congress [see 1 Oct 92]. *Defense Week* reports also on possible further setbacks to the programme, including difficulties in securing the requisite state approvals and strong public opposition. "That opposition has become so strong that Kentucky, Indiana, Maryland and Colorado have all passed or considered legislation that could delay or prevent construction of more incinerators." {DW 19 Apr}

19 April Finland, in a paper on the training of future OPCW inspectors submitted to the OPCW Preparatory Commission, summarizes the replies it has so far received to a questionnaire sent out to other governments asking about current and planned training courses relevant for such inspectors. Austria, Finland, France, Germany, Mexico, the Netherlands, Poland, Romania, South Africa, Sweden, Switzerland and the UK, some of which have already run such courses, had stated that they planned to offer relevant courses in the future, giving particulars. The Finnish paper also proposes a training curriculum.

Bulgaria later submits a paper on the professional qualifications and experience that should be expected of OPCW inspectors and of applicants for training courses. The Netherlands, Switzerland and the United Kingdom submit a joint proposal for a training scheme for members of OPCW inspection teams, worked out in substantial detail. France announces further particulars of its CWC-verification training courses [see 4 Feb], which are to be run by CEFFIAC, the newly created French Training Centre for the Prohibition of Chemical Weapons.

19-22 April In The Hague, the OPCW Preparatory Commission convenes for its second plenary session. Participating are 89 of the 142 states that have thus far signed the CWC. The

proceedings are closed to all but accredited representatives of the participating governments. [For an account see the review article on pages 5-9.]

In the course of his formal report to the PrepCom on work done during the period between the first two plenaries, the Executive Secretary announces acceptance of an offer by the Monterey Institute of International Studies to establish an internship in the PTS: "The intern will work on topics set by the Executive Secretary at no cost to the Commission. The first intern, Mr Vos, will join the PTS in May."

19 April The UN Secretary-General submits to the Security Council his third half-yearly report on implementation of the UNSCOM plan for the ongoing monitoring and verification of Iraq's continuing compliance with the CBW and other disarmament provisions of ceasefire resolution 687 (1991) [see 28 Oct 92]. The report states that Iraq still refuses to accept its obligation under resolution 715 (1991) to comply with the plan. The report also says that UNSCOM is seeking to prepare itself so that the "initiation of full-scale monitoring" will not be unduly delayed once Iraq has committed itself to full compliance, and that a "key element of this process has been the recent initiation of the interim monitoring concept" [see 27 Mar]. {S/25620}

20 April In Russia, President Yeltsin issues a statement addressing public misgivings about the chemdemil programme [see 6 Mar]. The statement sets out the principles on which the state programme is being based and says that "destruction of chemical arms will start only after a positive conclusion of the state ecological examination on the whole program and each specific facility", an examination which will involve both specialists and public. The statement adds: "I call on the executive power bodies of Udmurtia, Chuvashiya and the Saratov region to actively join the elaboration of the program, establish the priorities and conditions of preparations for the destruction of chemical arms. This participation will help to turn this step, inevitable for Russia, into a powerful lever of social-economic development of many Russian regions and strict observation of guarantees of the population's safety. A considerable part of money to be allocated on the program will be used for regional health care, mother and child care, housing construction, building of cultural facilities, highways and other engineering infrastructure." {ITAR-TASS 20 Apr in FBIS-SOV 21 Apr}

The Russian government shortly afterwards announces that people in the armed services who are directly involved in carrying out work with chemical weapons are to get a 20 per cent pay increase, more still if they are conscripts. {Moscow Radio-1 22 Apr in BBC-SWB 24 Apr}

20 April In a US Army report to Congress, it is said that CW agents may have been buried in 190 of the 7000-odd Formerly Used Defense Sites across the country, and that, while 144 of them are military installations, "46 are located in areas where there may be public access" [see also 3 Feb]. None of the sites is deemed an imminent threat, however, and many are in isolated locations. {AP in BG 21 Apr} The report, by the Chemical Materiel Destruction Agency, is the interim survey and analysis report on non-stockpile chemical materiel called for in the 1993 Defense Authorization Act [see 1 Oct 92]; the final report is expected this autumn. {ITA 26 Apr}

21 April In The Hague, the International Center for the Support of the Chemical Weapons Convention — a non-governmental organization newly formed in the United States — hosts

a reception for OPCW PrepCom delegates during which it explains its projected industry-government go-between role. Invitations had been issued via the PrepCom conference secretariat, so the reception is well attended. PrepCom Executive Secretary Ian Kenyon, in a speech at the reception, commends the ISC and welcomes "the initiative taken by a group of nongovernmental organisations, chemical industry leaders and arms control experts to channel industry interest in support of the CWC". {*OPCW Synthesis* 1 Jun}

21-23 April The US Army Chemical School [see 12 Mar] hosts its World Wide Chemical Conference at Fort McClellan, Alabama. The conference is described as providing a forum for government personnel to discuss, review and disseminate information on CBW-related activities of the past year. {*CBIAC Newsletter* Spring}

22 April Turkey, in the OPCW Preparatory Commission, introduces a paper jointly prepared by the Geneva-based delegations of Austria, South Korea, South Africa and Turkey entitled *Quick Reference Guide to the Basic Rights and Obligations of a State Party to the Chemical Weapons Convention*. The paper is derived from an earlier working paper by the Japanese CD delegation [see 2 Dec 92].

29 April An Iranian parliamentary delegation in Germany reaffirms the denial by President Hashemi-Rafsanjani [see 1 Apr] of Western reports of a buildup of mass-destruction weapons by Iran [see 19 Apr]. With the delegation, Deputy Speaker Hassan Rohani advocates the creation in the Middle East of a zone free of such weapons. {DPA in CN 30 Apr}

29 April The UK Ministry of Defence informs Parliament of the annual "key performance targets" that have been set for the chief executive of the Chemical and Biological Defence Establishment for the year 1993-94 [see also 16 Jul 92]. One of the targets is to "sustain the CB research programme and the capability of CBDE to respond effectively to operational emergencies by maintaining scientific and technical staff to at least 70 percent of the total planned manpower". {HansC 29 Apr}

29 April In Washington, it is announced that the UK Defence Ministry Chemical & Biological Defence Establishment at Porton Down has detected CW-agent residues in samples collected in June 1992 from bomb craters in Birjinni, Iraqi Kurdistan, associated with a reported CW attack in August 1988 [see 20 Aug and 28 Aug-3 Sep 88]. The announcement is made at a press conference convened by the two nongovernmental nonprofit organizations, Physicians for Human Rights and the Arms Project of Human Rights Watch, that had dispatched the forensic team which gathered the samples. The team, which had also gathered samples from associated human burial sites, had been led by Dr Clyde Snow of the University of Oklahoma. {PHR/HRW press release 29 Apr; Reuter in WP 30 Apr; *New Scientist* 1 May}

Analysts at CBDE Porton Down had used gas-chromatography/mass-spectrometry to identify traces of mustard gas and of degradation products of mustard gas in soil samples from one of the bomb craters. They were also able to identify traces of degradation products of sarin nerve gas in soil samples from two other craters; and in metal fragments retrieved from one of those two craters they found traces of actual sarin. {CBDE press release 29 Apr}

30 April-3 May In the United States, delegates from grassroots organizations active in communities across the country where there are plans to build chemdemil incinerators assemble in Annapolis, Maryland, for a training workshop organized by the Chemical Weapons Working Group. Plenary-session topics include community empowerment, education and alternative technologies, and strategic planning, with delegates "learning to apply these techniques in their own communities". {*Common Sense* [a newsletter of Common Ground, funded by the Kentucky Environmental Foundation] Apr}

1 May In Bosnia-Herzegovina, Deputy Defence Minister Munib Basic complains in a letter to the UN Protection Force of Serbian use of poison gases in attacks on Visegrad [see also 18 Mar], even as negotiations are under way in Athens. {RBH 1 May in BBC-SWB 3 May}

3 May In the United States, the Congress is lobbied by environmental activists from across the country seeking to block the Army's use of incineration in the chemical-weapons stockpile destruction programme [see 19 Apr]. {AP in CN 4 May}

4 May In London, the inquiry headed by Lord Justice Scott into UK arms exports to Iraq [see 10 Nov 92] begins public hearings. {FT and NYT 5 May}

4 May In the US Senate, the acting director of the US Defense Department's Strategic Defense Initiative Organization (being renamed Ballistic Missile Defense Organization), Major-General Malcolm O'Neill, argues before the Defense Appropriations Subcommittee that, despite the ending of the Cold War, the country needs a limited missile defence system, the continuing development of which would require \$6000 million in the year ahead: "More than 25 countries, many of them hostile to the United States, may possess or be developing" missiles that could be armed with chemical, biological and possibly nuclear warheads. President Clinton had reduced the FY 1994 SDI budget request to \$3800 million, 40 percent less than President Bush would have asked for, scaling back the "star wars" programme to focus on theatre defence systems for US troops. {Reuter in WT 5 May}

5 May In Estonia, the Riigikogu ratifies law on joining the Chemical Weapons Convention. {Estonian Radio 5 May in BBC-SWB 8 May}

6 May Latvia signs the Chemical Weapons Convention.

7 May In The Hague, the Experts' Groups working under OPCW PrepCom Working Group A complete their work for the current intersessional period. The *PTS Staff Regulations* [see 24 Mar] are now complete. Nearing completion are the *PTS Financial Regulations* [see 24 Mar] and the *Host State Agreement on Privileges and Immunities* [see 5 Mar]. Further progress by the Experts' Group on OPCW Building [see 26 Mar] now depends on the outcome of other studies. {*OPCW Synthesis* 1 Jun}

7 May Iran has expressed readiness to rid itself of plants manufacturing weapons of mass destruction built in prerevolutionary times under the Shah, so *Krasnaya Zvezda* reports from Moscow, attributing ITAR-TASS. Quoted in the newspaper is the general director of the Iranian Foreign Ministry for relations with Europe, Hamid Reza Asefi, saying that Iran wants to see

the Near and Middle East region free from nuclear, chemical and biological weapons [see also 29 Apr] and that Iran, to this end, is ready to cooperate with any state or states and also with international organizations; Western technical aid could ease the conversion of certain Iranian military plants. {ITAR-TASS in KZ 7 May in FBIS-SOV 11 May}

Iranian advocacy of the weapon-free-zone concept is later expressed by other senior Foreign Ministry officials, one on 10 May while visiting Canberra, another two days later in Tehran during preparations for the impending visit of a German parliamentary delegation. Both officials deny reports of an Iranian CW armament programme, one of them saying: "At present, none of Iran's industrial or military installations nor any of its research centres is capable of producing such weapons, and for this reason Iran has not hesitated in signing the related conventions". {IRNA 11 and 12 May in BBC-SWB 13 May}

10 May Jordanian Foreign Minister Kamel Abu-Jaber, in an interview published in *Defense News*, speaks as follows about the stance of his country towards the Chemical Weapons Convention: "We have never said we would not sign it. In accordance with an Arab League provision, we have repeatedly said that we would sign it if Israel will sign the nuclear Non-Proliferation Treaty. I do not understand how the world has a double standard on this. I hope we will sign it when the time is right, when the same standards are applied to the Israelis." {DN 10 May}

10 May In The Hague, the Preparatory Commission for the OPCW commences work on substantive, as opposed to administrative, issues involved in making ready for implementation of the Chemical Weapons Convention. Groups of Experts convened under Working Group B begin developing recommendations for detailed verification procedures.

One combined group of experts meets in the morning to study verification-related tasks requiring chemical-engineering expertise. Another combined group meets in the afternoon to start work on a health and safety policy document. This pattern of morning/afternoon work continues over the next ten days, culminating on 21 May in agreed reports for review in capitals.

During the subsequent week, further combined groups convene to consider inspection-team composition and technical cooperation and assistance. The former group adopts its report on 28 May.

10-14 May In New York, the Preparatory Committee for the 1995 Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons convenes for the first of what will probably be four plenary sessions. The Non-Aligned Movement proposes that a paper be prepared for the 1995 Conference on "the link between the NPT and other weapons of mass destruction, particularly the CWC". Australia raises the question of whether "relevant elements of the...CWC verification regime could be applied to IAEA safeguards".

11 May In Moscow, a joint working group of the Russian and Japanese governments meets to consider the ocean-dumping of nuclear waste in the Sea of Japan by the former USSR. The working group reportedly also discusses what the head of a Russian governmental committee investigating marine pollution by the former USSR, Tenghis Borisov, had just disclosed to the Japanese newspaper *Asahi Shimbun*, namely that during the late 1940s the USSR had dumped into the Sea of Japan, and into the sea "north of Siberia", more than 30,000 tons of

mustard gas in artillery shell and metal containers. {Reuter in CN 11 May; WT 12 May; Kyodo 11 May in BBC-SWB 17 May}

At a news conference in Tokyo, Japanese International Trade Minister Yoshiro Mori says that his government is seeking an explanation of the *Asahi Shimbun* report from Russia. {ITAR-TASS in *Rossiyskaya Gazeta* 12 May in BBC-SWB 17 May}

12 May Laos [see 13 Jan] signs the CWC.

12 May In Britain, questions are asked in Parliament about Defence Ministry work on genetically modified organisms. The responses provided by the chief executive of the Chemical and Biological Defence Establishment state that such work has been in progress at the establishment for the past nine years. "As part of the research programme to counter the threat from biological warfare it is necessary to use genetic methods of modifying organisms. This research work generates small quantities of genetically modified organisms using processes that are both time consuming and costly. It is for this reason that small samples of each genetically modified organism are stored in secure conditions that meet the requirements of the Health and Safety Executive so that they can be re-evaluated at a later stage should the need arise. Genetically modified organisms that do not exhibit properties of value to the CBDE research programme are destroyed." Such disposals of evaluated GMOs, by high-temperature steam autoclaving, "can be as frequent as daily". The responses state further: "The purpose of the research is to assess the biological warfare threat ["to the United Kingdom Armed Forces"] from genetically manipulated organisms and to produce effective protective measures including medical countermeasures against their use. The results of this work [are] usually published in the scientific literature." {HansC 17 and 20 May}

12 May The US Air Force releases an unclassified summary of the *Gulf War Air Power Study* prepared over the previous two years by a team headed by Eliot Cohen of Johns Hopkins University. The study reportedly concludes that the allied air war against Iraq had been largely ineffective against Scud missiles and mobile launchers, and also against nuclear, chemical and biological weapon facilities [see 13 Jun 91]. {DN 17 May}

12-14 May In the United States, the Marine Corps II Marine Expeditionary Force hosts the American Defense Preparedness Association's 1993 Nuclear, Biological and Chemical Operations Symposium at Camp Lejeune, North Carolina. The theme is joint CB defence in power projection operations. {ADPA publicity leaflet}

13 May In Bosnia-Herzegovina, as fighting intensifies in the Maglaj area, a new wave of reports of Serbian use of poison gas there starts to be heard from Sarajevo. {RBH 13, 16 and 23 May in BBC-SWB 17, 18 and 25 May} [See also 1 May]

14 May In Prague, where the head of the Russian Intelligence Service, Yevgeniy Primakov, is half-way through a four-day visit, a Czech Interior Ministry spokesman announces that the Russian and Czech intelligence services have agreed on certain concrete measures concerning the sharing of information. He also announces that Russia and the Czech Republic will cooperate to block the spread of weapons technology and the illegal shipment of nuclear components as well as combatting

the sale or transfer of biological and chemical weapons. {CTK 14 May in BBC-SWB 20 May}

17 May Rwanda signs the Chemical Weapons Convention, becoming the 145th state to do so.

19-21 May The First Moscow Conference on Chemical and biological Disarmament, Demilitarization and Convention is held in Moscow. It is sponsored by the Russian presidential Commission on CBW Convention Problems, the Russian Academy of Sciences and, from the USA, the Chemical and Biological Arms Control Institute, EAI Corporation, the International Center for Disarmament and Conversion, Molten Metal Technology Inc, and the University of Georgia Center for East-West Trade. The preliminary list of attendees names 181 participants, 79 of them from outside Russia.

24 May In Geneva, the Ad Hoc Group of Governmental Experts established by the Third BWC Review Conference convenes for its third session, 'VEREX III', to explore possible verification measures for the treaty [see 4 Dec 92]. Experts from 42 countries and the World Health Organization participate. Ambassador Tibor Tóth of Hungary continues in the chair. The session is due to end on 4 June.

29 May From Washington it is reported that the administration is seeking a further \$400 million in Nunn-Lugar funds, additional to the \$800 million already authorized and allocated, for assisting the destruction of former Soviet nuclear and chemical weapons [see 5 Jan]. The Defense Department is establishing a new post on Nunn-Lugar assistance in the office of the nominated Assistant Secretary for Nuclear Security and Counterproliferation, Ashton Carter. {JDW 29 May}

CWC Non-Signatory States as of 26 May 1993

African states

Angola
Botswana
Chad
Djibouti
Egypt
Lesotho
Libya
Mozambique
Sao Tome & Principe
Somalia
Sudan
Swaziland
Tanzania

Asian states

Bhutan
Iraq
Jordan
Korea, North
Lebanon
Maldives
Solomon Islands
Syria
Taiwan
Vanuatu

Eastern European and former Soviet states

Bosnia & Hercegovina
Macedonia, FYR of
Turkmenistan
Uzbekistan
Yugoslavia

Latin American and Caribbean states

Antigua & Barbuda
Bahamas
Barbados
Belize
Dominica
Grenada
Guyana
Jamaica
Panama
St Christopher & Nevis
St Vincent & Grenadines
Suriname
Trinidad & Tobago

Western European and other states

Liechtenstein

Recent Publications

Bernauer, Thomas. "The end of chemical warfare", *Security Dialogue*, March 1993, pp 97-110

Brin, Jay. "Ending the scourge of chemical weapons", *Technology Review*, April 1993, pp 33-40.

Bretlich, Nancy Runci, Mary Francis Tracy and Thomas R Dashiell, for CBIAC. *Worldwide NBC Mask Handbook*, Edgewood, MD: Battelle Edgewood Operations, 1993, 433 pp.

Brown, Mark. *Public Trust and Technology: Chemical Weapons Destruction in the United States*, Washington, DC: The Committee for National Security, Project on Chemical and Biological Weapons Control, April 1993, 12 pp.

Cancio, Captain Leopoldo C. "Chemical casualty decontamination by medical platoons in the 82d Airborne Division", *Military Medicine*, vol 158 no 1 (January 1993) pp 1-5.

Davey, Brian J. "The 'steppage gait' patients in Angola: chemical warfare?", *ASA Newsletter* no 36 (10 Jun 93) pp 1 & 13-16.

Einsel, Major-General David (ret). "CW deterrent remains vital: small chemical arsenal must back up any treaty", *Defense News*, vol 8 no 10 (15 March 1993), p 20.

Findlay, Trevor. "Peace through chemistry: the new Chemical Weapons Convention", *Pacific Research*, February 1993, pp 3-7.

Fowler, William. "Defence against the NBC threat", *Defence*, April 1993, pp 13-17.

Garrett, Benjamin C (editor). "Commentary on Russian reaction to chemical weapons stockpile destruction, I: Russian press reports, 1992 - March 1993", CBACI Special Report No 93-01, Alexandria, VA: Chemical & Biological Arms Control Institute, April 1993.

Germany, Bundesamt für Seeschifffahrt und Hydrographie. Bericht der Bund/Länder-Arbeitsgruppe 'Chemische Kampfstoffe in der Ostsee', *Chemische Kampfstoffmunition in der südlichen und westlichen Ostsee: Bestandsaufnahme, Bewertung und Empfehlungen*, Hamburg, 1993, 65 pp.

Grigoriev, S G (editor). "Problems of chemical-weapons disposal": 26 articles by Russian authors in a special issue of *Russian Chemical Journal: Journal of the Mendeleev Society*, vol 37 no 3 pp 3-113 (in Russian)

Hewish, Mark. "New technology spurs NBC defense", *International Defense Review*, vol 26 (1993) no 5 pp 385-7.

Lohs, Karlheinz, and Wolfgang Spyra. *Chemische Kampfstoffe als Rüstungsalternativen: ein Überblick*, Neuruppin: EF-Verlag für Energie- und Umwelttechnik GmbH, 1993, 314 pp.

McFate, Patricia Bliss, Sidney N Graybeal, George Lindsey and D Marc Kilgour. *Constraining proliferation: the contribution of verification synergies*, Ottawa: External Affairs and International Trade Canada, Nonproliferation, Arms Control and Disarmament Division, Arms Control Verification Studies no 5, March 1993, 70 pp.

Meselson, Matthew. "New evidence on the 1979 Soviet anthrax epidemic", *ASA Newsletter* no 35 (8 April 1993) pp 1 & 5

Nixdorff, Kathryn. "Biotechnologie und vorbeugende Rüstungskontrolle: Zivil-militärische Verwendung von biologischer Forschung", *Wissenschaft und Frieden*, vol 11 no 1 (March 1993), pp 12-17

Pengelly, Rupert. "A hedge against uncertainty: South Africa introduces CW defense equipment", *International Defense Review*, vol 26 (1993) no 5 pp 388-9.

Richter, Donald. *Chemical Soldiers: British gas warfare in World War I*, Lawrence: Kansas University Press, 1992, 382 pp

Roberts, Brad. "Controlling chemical weapons", *Transnational Law & Contemporary Problems* (University of Iowa College of Law), vol 2 no 2 (Fall 1992), pp 435-452

Shulman, Seth. *Biohazard: how the Pentagon's biological warfare research program defeats its own goals*, Washington, DC: The Center for Public Integrity, 1993, 67 pp.

Smithson, Amy. "Chemical destruction: the work begins", *Bulletin of the Atomic Scientists*, April 1993, pp 38-43

Smithson, Amy, with Celes A Eckerman (editors). *Administering the Chemical Weapons Convention: Lessons from the IAEA*, Washington, DC: The Henry L Stimson Center, Occasional Paper no 14, March 1993, 31 pp.

Trevar, Tim. "UNSCOM faces entirely new verification challenges in Iraq", *Arms Control Today*, April 1993, pp 11-15.

UK Foreign & Commonwealth Office, Arms Control and Disarmament Research Unit. "Banning chemical weapons: the road to the Chemical Weapons Convention -- and beyond", in *Notes on Security and Arms Control: the Vital Issues* series, March 1993, 7 pp.

US Army Chemical Materiel Destruction Agency. *Non-Stockpile Chemical Materiel Program: Interim Survey and Analysis Report*, April 1993

US House of Representatives, Committee on Armed Services. Special Inquiry report, *Countering the Chemical and Biological Weapons Threat in the Post-Soviet World*, committee print, 23 February 1993, 70 pp.

US House of Representatives, Committee on Foreign Affairs. *Nonproliferation regimes: policies to control the spread of nuclear, chemical and biological weapons and missiles*, committee print, Washington, DC: US Government Printing Office, March 1993

US National Research Council. *Alternative Technologies for the Destruction of Chemical Agents and Munitions*, Washington DC: National Academy Press, 1993, 323 pp.

Wöhrle, Dieter. "Die neue Chemie-Waffen-Konvention", *Wissenschaft und Frieden*, vol 11 no 1 (March 1993), pp 33-38

Wöhrle, Dieter. "Die neue Chemie-Waffen-Konvention", *Nachrichten aus Chemie, Technik und Laboratorium*, vol 41 (1993) no 3, pp 291-296.

Wright, Susan. "Prospects for biological disarmament in the 1990s", *Transnational Law & Contemporary Problems* (University of Iowa College of Law), vol 2 no 2 (Fall 1992), pp 453-485.

The *Chemical Weapons Convention Bulletin* (ISSN 1060-8095) is edited and published quarterly by the Harvard Sussex Program on CBW Armament and Arms Limitation. The goal is to provide information and analysis towards an effective multilateral treaty regime which will eliminate chemical and biological weapons and help prevent the exploitation of biomedical technologies for hostile purposes. The Harvard Sussex Program is supported by American and British charitable foundations, including the John D and Catherine T MacArthur Foundation, the Rockefeller Foundation, the Carnegie Corporation and the Joseph Rowntree Charitable Trust.

Editors:
Matthew Meselson
Department of Biochemistry and Molecular Biology
Harvard University
7 Divinity Avenue
Cambridge, Massachusetts, 02138
United States of America
[Tel: 617-495-2264. Fax: 617-495-8308]

Julian Perry Robinson
Science Policy Research Unit
University of Sussex
Brighton, BN1 9RF
England
[Tel: 0273-678177. Fax: 0273-685865]

Advisory Committee:
Dr Will Carpenter, USA
Ambassador Jonathon Dean, USA
Ambassador Charles Flowerree, USA
Dr Shirley Freeman, Australia
Ambassador James Leonard, USA
Dr A J J Ooms, The Netherlands

Producer:
Richard Guthrie
University of Sussex

Distributors:
John Parachini and Joanna Bayliss
Committee for National Security

The *Bulletin* is available from the Committee for National Security (a division of the Lawyers Alliance for World Security), Suite 600, 1601 Connecticut Avenue NW, Washington, DC 20009, United States of America [telephone: 202-745-2450, fax: 202-667-0444], to which inquiries about subscriptions should be addressed.