
Chemical Weapons and Security in the Middle East

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Implications of the Kuwaiti Crisis for Chemical Weapons Proliferation and Arms Control

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The use of chemical weapons against U.S. forces would certainly add to their burdens. There are already many burdens a soldier faces. This would not be one of the greater burdens. High explosives and fragmentation weapons would remain the greatest threat, as they traditionally are in war. Chemical defense is a manageable, though not welcome, burden.

There are some misconceptions. One is that if there is a chemical conflict, soldiers have to remain encapsulated at all times in rubber suits. There is no rubber in the U.S. protective suit. It is made of fabric. Its weight is between that of my summer suit and my winter suit. The jacket and the trousers of the chemical protective suit weigh a little less than four pounds. It is, in effect, as though it were 10° Fahrenheit warmer outside when you put the suit on. It is a burden, but it is not an overwhelming burden.

More important, it is not the case that one would have to wear the suit at all times. By no means. Even in a chemical war, even when chemicals

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are being used, military forces would cycle in and out of maximum protection and spend relatively a small percentage of time in maximum protection. The unique thing about chemical weapons is that, unlike high-explosive fragmentation weapons and flame weapons, you can provide individual protective equipment to the soldier that provides a very high degree of protection without taking him out of combat. To do that with high-explosive weapons, you would need to enclose a person in such heavy armor that he would no longer function as a combat soldier. Against flame, there is a similar difficulty of providing a high level of protection. But not so with chemicals.

This unique feature of chemical weapons is an axiom from which not only military implications but also arms-control implications flow.

One of them is that chemical weapons, while devastating against people without protection, are relatively little threat against people with modern protective equipment. It is the mask, more than the suit, which is the key protective item.

In World War II, the German chemical warfare branch considered putting roughly a ton of nerve agent into the V-1 and V-2 missiles in use against British cities and concluded that the casualties produced by chemicals would be less than the casualties from an equal weight of high explosive. They knew that the British public had been given gas masks.

The idea that chemical weapons are the poor man's deterrent is wrong; they are not. If the poor man wants to deter someone with nuclear weapons, that someone is, by comparison at least, a rich man. Rich men can also afford gas masks.

Chemical weapons are not the poor man's deterrent; they are the killer of the poor man. This is coming to be understood even in the Middle East.

Now I want to shift gears and give you a status report on the talks in Geneva. There is an attempt there to complete a treaty that would make the possession of chemical weapons contrary to international law. Today it is not contrary to international law to have chemical weapons. The United States has them, the Soviet Union has them, Iraq has them, and a number of other countries are suspected of having them.

But there is no international basis on which to condemn or take action against countries who possess chemical weapons, nor any strong deterrent to embarking on a program to obtain such weapons. There even may be, with the present situation, a stimulus for that kind of program.

At the beginning of this year's session of the talks in Geneva, there was considerable optimism. For the moment, that has changed to gloom. I will illustrate this by reading some statements made last month during the closing days of the last session of the Conference on Disarmament in Geneva.

In the middle of August, the U.S. representative at the talks, said in a plenary address, "When I first arrived here in Geneva in January of this year, there seemed to me to be great optimism and enthusiasm that a chemical weapons ban was in sight." But he continued, saying, "Progress was not, however, what we had hoped for." And he ends up by saying, "We are likely to conclude this session of our conference, I regret to say, on a sour note."

The Australian Ambassador said more bluntly, "At the end of this session, any assessment would have to conclude that we have failed in our objective."

One of the key issues yet to be resolved in the negotiations that is of particular current concern is challenge inspection. This is the kind of inspection in which one state designates a place at which it believes there may be a violation of the treaty and, under the rules of the treaty, an international inspection team goes there and conducts an investigation of the suspected activity.

Another issue holding up agreement on the Convention is the question of whether there will be a provision whereby nations can retain some chemical weapons until late in the Convention without having yet made a decision as to whether they will eventually go to zero.

On the first question, challenge inspection, the Australian Ambassador recently said, "We are concerned about any approach to compliance which would give to the requested state a right simply to refuse an inspection team's access to a suspect site on the basis of the requested state's contention that the site was not relevant to the convention." This is generally the view of our Western allies. A paper presented to the CD in August states the French position: "France considers that challenge inspection anywhere at any time, without right of refusal, constitutes the keystone of the future Convention on the prohibition of chemical weapons." The Federal Republic of Germany is also strongly in favor of mandating challenge inspection.

This is an ironic situation. You may recall that in 1984, then-Vice President Bush took to Geneva the U.S. draft treaty for a chemical

disarmament, CD/500. It included a revolutionary proposal for anywhere, anytime challenge inspection with no rights of refusal. Our allies were cool to it, and the Soviets were strongly against it.

Since that time, the situation has reversed. The Soviet Union agreed to the concept in 1987, and our Western allies have become enthusiastic about it.

The British have been particularly active on this score. They have conducted six trial challenge inspections. Unlike ordinary trial inspections, conducted at chemical factories or sites that are not sensitive, the British have conducted trial inspections to find out whether, with precautions to protect sensitive information, such as shrouding of sensitive objects and random selective access, sensitive facilities can accommodate the kind of inspection needed to determine whether or not there are chemical weapons or other prohibited activities going on.

They have inspected Army and Navy ammunition sites, a nuclear weapons establishment, and a sensitive communications center.

Their conclusion is: "There are no United Kingdom sites so sensitive, from a national security viewpoint, that we could not allow some form of access within the site, appropriately managed, to an international inspection team." They go on to say, "The extent and thoroughness of inspection team activities achievable at even the largest UK sites, coupled with the degree of access even the most sensitive facilities have been able to provide, suggests that challenge inspections should be a powerful means both of assuring compliance and deterring contravention of the Convention."

In other words, what is happening is that many countries that had been skeptical of or actually opposed the concept of mandatory, anytime, anywhere challenge inspection have swung over to support it. Such countries have concluded that with workable safeguards, mandatory inspection at any site can be effective without compromising security.

Meanwhile, the U. S. position has changed. Our position now is that there ought to be a list of sites for which a challenge inspection would be mandatory, with no right of refusal. But if a country asks to go anywhere not on the list, there would be a right of refusal.

Another issue that is causing difficulty in general is the question of whether states that possess chemical weapons will pledge at the beginning of the treaty process to go to zero, or whether possessor states will delay that ultimate commitment until late in the treaty process. Until

recently the United States agreed with other nations that destruction should be complete by the end of the tenth year of the Treaty.

But now the U.S. position is that not until the eighth year of the Convention would the United States decide whether it will go to zero. So far, not a single nation has taken our position in this, not even the Soviets, who have only agreed to let the idea go forward and be discussed.

In order to resolve these and other issues, it has been suggested by France and the Soviet Union that next year there be a meeting of the CD at which states are represented by their foreign ministers. This would raise a consideration of the issues of the Convention to a higher level of authority than at present and might succeed in resolving the present differences.

The situation is that the United States has taken a long time to review its position on chemical disarmament. It recently finished that review. This has left it with two important positions which are shared by few, if any, other countries. How these issues are worked out will probably determine whether or not there is a chemical treaty.

Questions and Answers

Question: None of the commentators here today discussed the issue of export controls and the enforcement of those controls.

Meselson: Export controls can be helpful in slowing down the program of developing nations that want to have chemical weapons. But export controls are a temporary palliative. They cannot prevent nations from producing chemical weapons if they wish to have them.

One needs to recall that 70 years ago Germany was able to produce vast amounts of mustard, still today regarded as an effective chemical warfare agent. The process they used required only ethyl alcohol, sodium sulfide, and bleach.

It is useful to have these export controls, but these are costs. There is a cost to the chemical industry in the supplier nations. I wouldn't want to exaggerate their costs. There is another cost: proliferation controls have aroused some misplaced but nevertheless real feelings on the part of developing nations that they represent the rich wanting to constrain the activities of the poor. At some point we are going to need the poor to come along to get a treaty.

Question: We have been discussing here non-persistent chemical agents. Is there any evidence that persistent agents may be in the theater?

Meselson: Sarin is not very persistent. Tabun is more persistent than sarin. It will last for a few days in temperate weather on soil and still create a vapor hazard. It is not as persistent as VX, but it does represent

a persistent hazard. It is not as great a threat to the skin as VX is, though a gram of tabun on the skin left there will kill.

From the point of view of naval interests, clouds are not a big threat because men can still put on their gas masks. You don't need a citadel or any protective enclosure if all you are dealing with is a cloud of vapor.

But you have put your finger on what the problem would be for a ship: a liquid agent that gets spread on surfaces. Men move it around. Where is it? Where isn't it? How do you know? That becomes a problem on a ship, not the cloud.

Mustard and tabun are both persistent enough to cause that kind of problem on a ship. There would have to be a direct spray right over the ship. Our ships have defenses to reduce the likelihood of that, but not to zero. Detectors would be required, as would protective clothing and decontamination.

Question: Current physical safeguards for U.S. personnel protect down to three microns. How real and widespread are potential hazards smaller than three microns? You can create microspheres down to half of a micron.

Meselson: The mask provides good protection against aerosols. Your question is probably addressed to the suit. Hypothetically, if you could get three micron spheres of mustard in a wind high enough to force a suitable amount of that through the suit, you would be attacking a person's skin.

What happens to it once it gets inside the suit is a matter of some uncertainty. There is charcoal there, and that is more likely to grab hold of the three-micron particle and the vapor that comes off it than your skin is. Mere penetration of the suit may not be enough to cause casualties. The real question is whether the agent gets to your body, not just whether it gets into the suit.

This subject reaches back to World War II. It is called dusty mustard; the Germans worked on it. For our suit, I do not think it is a serious threat under ordinary conditions.

Question: How quickly can it be determined that an area is biologically or chemically safe if you are in an offensive situation and you are moving into the other guy's territory?

Meselson: Chemically, right away. Biologically, that is more difficult. I don't think there is any portable standardized equipment to detect biological agents. If there are warheads coming in that don't sound like conventional warheads, and you have reason to suspect that there is something chemical or biological coming out of them, it would be wise to put on your mask until you determine what has happened.

Question: Does the United States have the capability for remotely surveying an area to determine if the area is chemically or biologically safe to enter? Does the technology exist? Is it being developed? The life science probe in the NASA Mars shot in the 1980s displayed a small module that was emplaced on the surface of Mars to detect the presence of organic material. Could the same technology be applied?

Meselson: We certainly have the technology to detect large-scale contamination down-wind. Chemical detectors and biological sensors are exceedingly sensitive. Excellent chemical detectors already exist and are deployed. For detecting biological agents, there can be too much other organic material in the air to use a probe like the NASA life science probe. That was an approach some time ago, but now better, more specific kinds of detectors are available.

Question: In your view, is there a need for restructuring chemical and biological R&D?

Meselson: Biological weapons — not well-tested, reliable ones, but rudimentary ones — are sufficiently easy to have that the first line of defense has got to be to so arrange the world that people don't want to have them.

The first line of defense is to so conduct yourself and arrange the world so the people who want to do that are reduced to the absolute minimum. The United States does that in part by its renunciation of biological weapons and its support for the Biological Weapons Convention of 1972.

Biological defense is difficult because the area coverage capabilities make civilian populations more than soldiers the natural target for it. Even though there is a lot of talk and some money spent on defense — and I do advocate spending some money on it — it is not easy to do.

Question: How about manpower? Do we have the technical manpower to implement a defensive capability?

Meselson: There are certainly excellent people both in the biological and the chemical field at Edgewood, Fort Detrick and other places. They are concerned that their budgets will be cut, and that is natural.

One has to understand that chemical defense is an essential part of a Chemical Weapons Treaty. Once that is understood, both the Congress and the people who are worried about the cuts will feel better about the Treaty.

Chemical defense is essential to a treaty for a number of reasons, at least for a country like the United States. First, our forces are well-protected against chemical weapons. The size of a significant chemical attack would have to be much bigger than it would if there was no defense. Defense therefore makes verification easier, because you will be looking for something bigger.

Second, a good defense makes the incentive for cheating in the first place much less, because it greatly reduces the military effectiveness of chemical weapons. This is a very important point.

Finally, a good defense is a hedge against a breakdown of constraints because, if you do get attacked with chemicals. The damage is limited. For all three reasons, if you have a chemical disarmament treaty, you need to keep up your effort on the defensive side.

We have good personnel; we have excellent protective equipment. Nothing is perfect. The rifle is not perfect, but neither is the soldier, the general, or the President perfect.

Roberts: You may recall the appointment of a presidential commission under the chairmanship of Walter Stossel that met in the mid-1980s. It was, in part, a political exercise to secure congressional approval of the binary program. In its report, the commission stepped outside of its mandate at one point to make a recommendation in the area of biological weapons. It asserted that the United States had not done adequate defensive research under the Biological Weapons Convention and that more money should be spent.

Everyone would concur with Matt's description of the first line of defense in this area, which is establishing a world in which this kind of weapon is not a weapon of choice. But that second line of defense is important, and there has not been much public debate about what kind of research is necessary and prudent. That is an issue for congressional oversight in the years ahead.

I would like to underscore what Matt said about chemical defenses and arms control in the chemical area. They are not only consistent with one another, but one is a necessary ingredient of the other. There is a tendency for Congress not to fund safeguards programs under arms control agreements of whatever variety, and this is a real risk in the chemical area. It is very likely that if there is a Chemical Weapons Convention, even if there is merely a bilateral agreement, the Congress will lose the political will to provide funding for defenses. Yet it is clear that adequate defenses are fundamental to the utility of the regime.

Question: One possible compromise that has been put forward as a way of ending the crisis is an Iraqi withdrawal without reinstating the Sabah family, but allowing free and fair elections. Could you comment on whether that might be acceptable and what the outcome of such an election might be, especially given that Kuwait is "a family-run oil company"?

Helms: During the last four or five years in Kuwait, there has been increasing discontent with the ruling family. Parliament has several times been dissolved at the whim of the ruling family. There were inherent tensions between the merchants in Kuwait and the ruling family. Traditionally, in a lot of these states, it is believed that there has been a siphoning off of the cream of the oil wealth into ruling household allowances.

After the invasion of Kuwait, however, political factions moved closer together. It is only within the last week that we have seen the announcement Kuwaiti groups talking about freedom movements and independence, some stating they want freedom of Kuwait but don't want the ruling Sabah family. Only time will tell whether those elements will get stronger.

In Europe, this is a much more active issue of discussion than it is here in the United States. There is more consciousness of the historical antecedents to this crisis, and there is also more discussion about the linkage of UN resolutions concerning Israel to this crisis. Over the long haul, if Bush can keep the blockade going, this may be one of the elements that Western allies try to put on the table.

Question: Does Iraq have a better historical claim to some parts of Kuwaiti territory than others, or is it all or none?

Helms: The issue of having legitimate rights to these territories gets to be very dicey. Turkey, for example, could then also claim Iraq as part of its former empire during the Ottoman period.

The post-World War I period, when the colonial mandated powers divvied up Africa and the Middle East, is critical in understanding this. The African states essentially decided among themselves that they would recognize the boundaries. If they didn't, it would open up a nest of continual conflict, given that there were something like 2,000 or 3,000 tribes in Africa.

The Arab states never came to such an agreement. However, it was implicit within the Arab League — and there are now 21 members of the Arab League — that they would not interfere in the internal affairs of neighboring Arab states or be involved actively in seeking the overthrow of other Arab states. Within the last ten years, there have been two breaks in that rule. One is Syrian involvement in Lebanon and, of course, the recent invasion of Kuwait.

If you remember the early days of the Iran-Iraq invasion, the military was very angry at the civilian Baath leaders in Baghdad for restricting the invasion to just a few kilometers inside the border. Just as a matter of speculation, I would be curious to know whether the generals who were informed of this maneuver in advance also might have advised moving further into Kuwait and then negotiating back towards the border. It is clear that there was some discussion among the Arabs themselves about giving Iraq the two islands, which would give it greater access to the Gulf.

Iraq definitely feels a sense of strategic vulnerability. It is surrounded by six states, two of which are large non-Arab states (Turkey and Iran) and it has only about 13 or 15 kilometers fronting the Gulf.

In addition, it exported increasingly large amounts of its oil through the Gulf over the last two decades. So it feels a sense of vulnerability. The two islands were critical, too, to developing the southern port. American objectives have not changed. It would be interesting to know whether, over the long haul, the pressures of the blockade may cause some of these other issues to be debated more actively.

Question: Iraq used chemical weapons essentially as a defensive measure, as Iranians were counterattacking into Iraq, to prevent itself from being overwhelmed and to reduce its own casualties. Is there a parallel between this and the classic NATO-U.S. posture of threatening to use nuclear

weapons in the event of an overwhelming attack on the central front in Europe?

Roberts: Strategically, it is the same kind of argument. The interesting point about chemical weapons in the developing world is that there is no single motive driving the acquisition of these weapons. In some cases, it seems to be simply the further progress of ongoing research programs. In contrast, Iraq sought a chemical capability for what we would grudgingly have to accept for reasons of self-defense.

But there is an important footnote: Iraq started that war. Our sympathy for the strategic logic of defense has that halting point.

The problem with these capabilities is that, once acquired, perhaps for legitimate reasons, they take on other purposes.

The rumored Egyptian chemical capability has not been used for purposes of compellence. But it is very clear that Iraq has used chemical weapons for purposes of compellence and deterrence. Iraq successfully has deterred Israeli attacks on its military capabilities through the threat of retaliating with chemical weapons. Iraq has sought to use its chemical capability acquired for one purpose for a different purpose in its relationship with Israel and for yet a different purpose in this war. Let us not also forget that one of the major purposes was domestic. The Kurds were pressing the regime.

The motives driving Third World chemical programs are numerous. The Iraqi strategic context has changed so much. Their first use of chemical weapons was crude and desperate. Their use in later phases of the Gulf War was more calculated and sophisticated. They were able to use artillery-delivered chemical agent in two or three important battles to inflict reverses upon Iranian positions. Then they discovered a different strategic utility. I agree that these are not the poor man's atom bomb. On the other hand, they have strategic applications in the way that other weapons do not. The Iraqis discovered a strategic application — their threat to attack Iranian cities with chemically tipped missiles — not a threat that they could really make good on, but they didn't need to. That was a very important threat at the time because it had a political effect of breaking an already vulnerable morale, public and military, in Iran.

There has been a useful study of Iraqi military power that came out of the U.S. Army War College in June. It points out that at this stage the Iraqi military appears to be relatively well prepared to wage offensive chemical warfare. It has a segment of its officer corps that is trained in

and has the doctrine for the use of these weapons. But that is not the same thing as saying that they are prepared to wage massive chemical warfare and that the army as a whole is prepared for that kind of contingency.

Question: Why do you think that the Iraqis have not in fact developed or deployed chemical warheads for the missile force even as a threatening kind of thing?

Roberts: Not through lack of effort. It is technical constraints. I expect there is a contingent that would share the view that Matt reported: Don't waste your warhead space on chemicals; you are going to get a higher casualty rate out of high explosives. But developing accurate missiles is something that we, too, took a lot of time and money to do. It doesn't surprise me that they have had a hard time doing that.

Question: Mr. Roberts, you said that the Third World isn't ready to sign up to the Convention. Professor Meselson, you said that the Third World is ready to sign up if the United States would change its current position.

Why would Iraq sign up? What is the value of a treaty if the only countries that sign up are the ones uninterested in possessing the weapon?

Further, would you comment on the notion of possessing CW as a deterrent to avoid the asymmetrical burden of wearing the suits when the other guy doesn't have to? Even if the suits are a minor burden, they are a burden. How do you deal with that?

Roberts: It's a nuance in our presentations. I am not sure that Matt and I come out in different places, but there are different parts of this discussion.

The Conference on Disarmament negotiations consist of 40 states and approximately a score of observers. Those CD participants are divided roughly into a Western group, an Eastern group, and a non-aligned group. For a long time, the non-aligned states have professed an automatic commitment to the principle of disarmament. After all, none of them possess chemical weapons, or at least that is their diplomatic posture. If the superpowers do, in fact, make up their minds to get on with it, they are ready to sign the treaty. Indeed, when pressed, that is the decision that they stand by.

But a number of those states, particularly the important ones who might emerge as major chemical states — China, India, Egypt — would have a rather more complete and difficult debate if the United States and the Soviet Union went to 100 percent disarmament; many of these states have not thought the issues through entirely for themselves.

To go a step further, U.S. policy and the thinking of most CD participants has been for the position that you articulated: this is not going to be worth doing if it doesn't deal with the real problems. It is not enough to have the states which don't have chemical weapons anyway; you need the rest.

Policymakers then set a very high standard: that the treaty should be global before the United States signs onto it or gives up its own chemical weapons. The United States has fallen off of this position somewhat in what is called the two percent problem or the 98 percent solution, depending on your perspective, by which the United States would give up most of its chemical weapons immediately so long as the Soviets are on board this agreement, but hold a few in reserve until the end to give others an incentive to come on board.

The diplomatic process has not worked all the way through this yet. The United States has set a criterion that is too high; that was the implication of my remark. It is in our interest to sign a Chemical Weapons Convention that is not global in the early phases. The benefits that it would bring are numerous, particularly but not solely vis-a-vis the Soviet Union. We can be moderately optimistic that in the medium to long term the problem states will come within the purview of the treaty. Even if some do not, we would have a more effective tool in our hands for the management of the remaining states possessing chemical weapons, in the form of the Chemical Weapons Convention and the consensus and the mechanisms that it would create to police compliance, than would be the case with unilateral reliance on some limited retaliatory capability of our own (which, in any case, will not last for long — resumed production of chemical weapons in the United States is politically out of the question).

Meselson: What is the Third World attitude to the chemical treaty? Certainly the majority of the Third World countries are genuinely enthusiastic about it and would like to have it. Certainly they ought to. They face chemical threats from the developed world — at least they think they do or might in future — and from their neighbors. Third World countries have been very active participants at Geneva.

But the only way to really find out their attitudes is to confront them with a situation in which they have to sign on or not sign on. Right now the situation is far from that. They are in the luxurious situation in which they don't have to say what their real position is because the current argument is mainly over U.S. positions that are not supported by the large majority, whether Third World or not. The disagreement over positions the United States has put forward is keeping us from getting to the point where we can say, "Either sign or don't sign." Even within the Western group, the U.S. position on retaining an option to keep two percent of its chemical weapons indefinitely has gained no acceptance.

All the other arguments and fundamental positions find some nations on either side. It is only the United States which finds itself in the position of espousing a position that has no friends at all. That is no way to get a negotiation going. We will change some of our positions. Maybe some of them have been misread. But the situation has to change before we know what the Third World countries will really do.

What is the value of an incomplete treaty? Even an incomplete treaty allows you to put the screws on the people who are outside of it, which we cannot do now. There is nothing illegal about having chemical weapons. If the present world response to the invasion of Kuwait turns out to place concerted international action in a favorable light, then some of that favor will be shed onto the possibility that the international community will also be able to act as a whole to apply pressures to governments that stay outside the treaty. Governments change, but treaties have a ratcheting effect.

Take our own country. We stayed outside of the Geneva Protocol for 50 years, and then we ratified it. Now nobody is talking about abrogating the Geneva Protocol. It has a ratchet effect. It is harder to go back than it is forward.

On another subject that has been raised here, there is certainly something to the asymmetry argument for having chemical weapons. If there is already a chemical war going on, it is better, militarily, to be able to put the other side into the same protective posture that he has just put you in.

But the whole point of the treaty is to not have a chemical war going on in the first place. So it is a question of weighing the advantages and the disadvantages. Maintaining symmetry is important if your adversary is someone who might win and has worldwide ambitions. When the Soviet

Union was the main potential adversary, that was an interesting argument. Even then, there were important counter-arguments.

But now there is no adversary like that on the scene. Our having to put on suits is not going to decide who wins if we have a war with Iraq.

Question: When we get a treaty, Congress tends to deemphasize defensive measures. Is there any reason to disrupt or deemphasize chemical training now? Does our position in Geneva affect the decision to move our chemical school? Doesn't it undermine that position by implying that once we get the list of bases that are open to inspection, that we could afterwards move those facilities to a base which is not identified?

Meselson: It would hardly be noticed in Geneva. The question of locating the chemical school should be settled on the basis of the Army's needs: where is the best place to have it? Where do the most men get trained the best? If that is at Fort McClellan, it should be kept there. If it is better to collocate it with a larger infantry base, then it should be there.

Roberts: I agree, with the proviso that there is an expectation that the United States will get less serious about the problem of chemical warfare if it enters a disarmament regime.

That is not a problem for the negotiations, but it is a minor incentive for the possible proliferators.

Training is important, just as defenses are. It is not a problem that is going away, even in a disarmament regime. U.S. defenses, training, and overall capability to fight in a chemically contaminated environment affect the incentives and disincentives presented to states that might otherwise think about abandoning the regime or not being a part of it.

Question: What are the limitations on developing countries getting involved in biological weapons research? Can they develop credible BW agents and weapons?

Meselson: The key technical factor here is weight and its effect on the delivery means. The weight requirements for chemicals are a few tons per square kilometer of target — maybe a ton, maybe ten, depending on a number of factors, including atmospheric conditions and which chemicals you are talking about. For high explosive weapons it is not greatly different: tons per square kilometer.

But for biologicals, in theory — no one has ever done it — the weight requirements might be a thousand-fold less. To deliver tons per square kilometer takes a substantial effort. With biologicals, the necessary delivery effort might be much less. If a developing nation does not insist on reliability but is just interested in a rudimentary biological capability, they would have the capability.

We cannot create very effective trade barriers to acquisition of biological weapons.

The best way to deal with it is openness: to strengthen the Biological Weapons Convention; to create an ethic and expectation that only barbaric, or idiotic individuals would ever use it and that the punishment for doing it would be great.

There is a connection between the Chemical Weapons Convention and the Biological Weapons Convention. In 1991, there will be a Review Conference for the Biological Weapons Convention. At that time, the Soviet Union and the United States will probably bring serious proposals for on-site confidence-building verification provisions, perhaps in a separate protocol to the treaty. Unless there is already agreement on verification under the Chemical Convention, progress on BW will be difficult. The tail can hardly wag the dog. It is unlikely that in 1991 there will be an agreement on challenge verification of the BW Convention unless there has been prior agreement on such inspection for the Chemical Convention.

Question: Should we put more money into BW and defense research?

Meselson: We already spend well over a hundred million dollars a year in the biological weapons defense program. Actually, much of this is used for research and defense against disease that occurs naturally. We should keep that up.

Other nations have sometimes thought that we are preparing biological weapons, but we are not. Nevertheless, especially in the last administration, the statements of some middle-level officials could be construed that way. That is very much against our interest. Our interest is in discouraging interest in it.

Roberts: There is one other aspect of U.S. military programs that is relevant to thinking about the future vulnerability of the United States to biological weapons. One relates to the delivery systems. The threat of biological warfare to U.S. power projection forces and bases and friends

overseas is minimized if there is no system that can effectively deliver what might be a terrible weapon. A significant way to decrease the threat of chemical or biological vulnerability in the decade ahead is ballistic missile defense research.

Meselson: We are entering an era when technical measures are less relevant than political ones. If there are great numbers of people around the world who hate the United States and want to hurt us, then there is a serious risk to us. The techniques are there, or soon will be.

We have to try to minimize the number of people in the world who feel they have a very serious grievance against us or against other nations. It is not the scientists but the political leaders on whom the security of the world of the next century is going to be dependent. They are going to have to come up with something better than they have come up with in the past, because the means of mass destruction are such that they can be utilized by people with relatively limited assets in the next century.

Question: Can the United States endorse the proposal made by the Egyptian President in the United Nations one year ago for a treaty banning all weapons of mass destruction in the Middle East? Most observers in the Arab world attribute the spread of chemical weapons to the Israeli nuclear weapons.

An Egyptian journalist recently wrote that the Israeli Government cannot be more civilized than the American Government, which used nuclear weapons against Japan at a time when its survival was not at stake.

Professor Meselson's argument about inability of poor countries to afford masks for their population does not apply to Arab countries because they are willing to sacrifice ten million to kill 3,000 or 10,000 Israelis.

Roberts: I think it is the position of the U.S. Government that it cannot accept that proposal. The United States is not prepared at this point to accept the argument that Arab chemical weapons are tied to Israeli nuclear weapons. The current conflict is yet another demonstration of that fact. Chemical weapons in the Middle East have been used against targets other than Israel.

On the other hand, the countries of the Middle East are not going to go along with a chemical disarmament regime without some progress on the Israeli military capability.

Disarmament in the chemical area cannot wait for peace in the Middle East. That will be a long time coming. There will be some middle ground found here, but the U.S. Government is not prepared to endorse that Egyptian proposal.

Meselson: Egyptian diplomats have said that President Mubarak's proposal has been misunderstood. He is not saying that there has to be complete linkage, but rather that there ought to be the initiation of discussions about weapons of mass destruction among the states in the Middle East and progress toward their control and eventual elimination. That is not the same as saying that there cannot be any chemical treaty until there is a nuclear disarmament treaty.

There is increasing interest among middle-level Israeli officials in starting such discussions if they are direct discussions between the Israeli and Arab governments. There is a growing feeling that the likelihood of highly destructive weapons coming into the hands of other states in the region is increasing. In the long run, it will not be a stable situation with Israel possessing nuclear weapons and its neighbors not.

The Israelis themselves will have to provide the lead here. There has to be a discussion of these problems.

Question: Can we really put the Egyptian political system in the same basket as other authoritarian regimes in the region? We cannot ignore the role of Sadat in the fragmentation of power in the Egyptian society after Nasser. We cannot consider Mubarak's regime to be a continuation of the military society under Nasser.

During the first two weeks of the crisis in the Gulf, some Egyptian newspapers praised the Egyptian-American cooperation in the Gulf. However, other newspapers owned by the opposition parties denounced the American intervention in the Gulf and praised Saddam Hussein. This kind of media cannot exist in an authoritative government.

Helms: Are you saying that this present government in Egypt differs from the earlier governments? Certainly they have their different flavors, but the continuity of military influence in Egypt has been consistent since the time of Nasser. It has been strengthened under Mubarak, with the allocation of many major construction and development projects being handled by the military or people in the military. The economy is more heavily dependent on subsidies, and that has increased under Mubarak. There is a lack of ability to control the infrastructure. People who have gotten college educations have been guaranteed jobs in the Egyptian

bureaucracy, but there is a 60% absentee rate from government offices on a daily basis. Most importantly, one million people are being added to the population every eight months. Egypt faces enormous problems.

As to the freedom of the press, there probably isn't a free press anywhere in the Middle East. There aren't any Harris polls, either, so you cannot plumb the public conscience in the Middle East to get a reading of what is happening, nor can you read the newspapers and assume that you know. The press is heavily controlled in Egypt. We have seen weekly and monthly arrests of opposition members in Egypt, especially Islamic fundamentalists. Western reporting of events that happen in Egypt is not clear either. If you travel there, you get a broader idea of what the public might be thinking. Egypt will have enormous problems in the next decade. It is one of the most unstable countries in the Middle East.