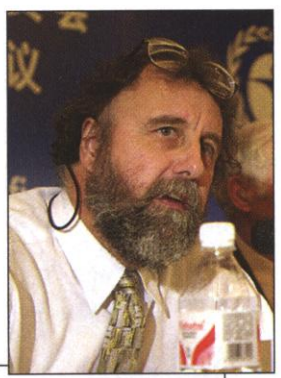
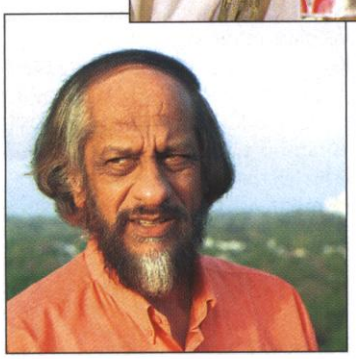
Politics and the IPCC

THE INTERGOVERNMENTAL PANEL ON Climate Change (IPCC) met for its 19th plenary session from 17 to 20 April in Geneva to conclude its work on the Third Assessment Report (TAR) and to set the stage for a fourth assessment to be completed by 2007. As past chair of the IPCC (1988–97), I was invited to the meeting, and I wish to give my views on what happened in Geneva.

The work on the TAR has been very successful under the chairship of Robert Watson of the United States. Without exception, delegates praised Watson for his leadership, unsparing devotion, and ability to engage leading scientists in both developed and developing countries. The participation by developing countries in the assessment work has increased significantly during Watson's tenure. The TAR describes present knowledge, but avoids dictating what needs to be done, as this is obviously a political issue. It acknowledges that there are still uncertainties about what the future may bring, but emphasizes the seriousness of the situation. Until the fourth assessment is available, the TAR will be a valuable document as countries try to reach agreements on appropriate measures to be taken within the aegis of the UN Framework Convention on Climate Change.





(Top) Robert Watson. (Bottom) Rajendra Pachauri.

It is thus surprising that the United States did not nominate Watson for reelection as chair, but rather supported the nomination by India of Rajendra Pachauri. Many scientists were taken aback, and Portugal, after consulting many European countries as well as New Zealand, protested by proposing Watson for reelection. Furthermore, the United Kingdom suggested the possibility of electing two cochairs, one from a developed and one from a developing country.

This was the situation when the session opened in Geneva. India, of course, welcomed the U.S. support of Pachauri, and some key oil- and gas-producing countries supported him as well. Brazil nominated a third candidate, Jose Goldenberg, a well-known energy expert and former minister for research and education, as well as for the environment, in Brazil.

There was insufficient consensus to alter a previous decision of the IPCC dictating that it should have a single chair in charge of its activities. A large majority of Asian and African countries backed the Indian nomination, partly as an expression of their desire to see a representative of a developing country lead the IPCC. In the final vote, Pachauri received 76 votes, Watson 49, and Goldenberg 7, making Pachauri the new chair of the IPCC.

It is now essential that any political controversy be eased so that we can have a truly scientific and unbiased fourth assessment. Close cooperation between developing and developed countries is also a necessity. These are the prime challenges for the new chair.

Pachauri is a world-renowned expert in the field of energy research and has shown great leadership in creating and building the Tata Energy Research Institute (TERI) in New Dehli. The most important task will be to retain the apolitical form of working that has characterized past activities and to get back to the scientific, technical, and socioeconomic analyses that must be the foundations for the next IPCC assessment. Participation by scientists and experts in developed countries, where much of the relevant basic research and technical development is carried out, must be secured. The cochairs of the three IPCC Working Groups and the Task Force for Greenhouse Gas Inventories will have a crucial role to play in this context.

In his concluding speech, Watson offered his services to the panel and expressed his sincere wish that a way for him to do so could be found. Pachauri expressed his willingness to find ways to achieve this. In my view, this is of the utmost importance for the IPCC not to lose Watson's experience and knowledge.

Let me emphasize again the need for a genuine spirit of cooperation between developed and developing countries to combat global climate change; I know that many scientific colleagues of mine from the developed world are anxious to do so. The required reductions of future global emissions of greenhouse gases will only be possible if the lead is taken by developed countries, as is clearly expressed in the Convention on Climate Change. This implies necessarily that the present very large differences in per capita emissions of carbon dioxide between countries must be reduced to secure sustainable development in developing countries [see figure 1 of (*1*)] and simultaneously to strive for reduction of global emissions. The key issue is how this can best be achieved. Better understanding of all facets of the climate change issue is required. The task for the IPCC is to provide this knowledge.

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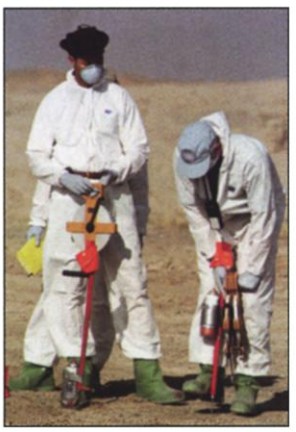
Biological Weapons, War Crimes, and WWI

AMBASSADOR THOMAS GRAHAM JR., IN HIS editorial "Biological weapons and international law" (29 March, p. 2325), proposes that Saddam Hussein could be charged with a war crime for the possession of biological weapons. What he does not add is that if this is the only war crime he is charged with in the trial, Hussein has a good chance of going free based on the criminal law principle of *nulla poena sine lege*.

Graham focuses predominately on the Geneva Convention and state practice to conclude that the possession of biological weapons constitutes a war crime. In reality, the Geneva Convention does not forbid the possession of biological weapons, nor is there

any state practice in place that treats the possession of biological weapons as a war crime.

The only international treaty that bans the possession of biological weapons is the Biological and Toxin Weapons Convention (BWC). However, the treaty has been weakened by numerous recent developments, e.g., the ongoing disagreements among parties on the future of the treaty, the lack of any compliance regime, or the fact that countries are carrying out research and pursuing projects that are contrary to the treaty's objective. Furthermore, numerous countries have been repeatedly accused of violating the treaty without any consequences, and many countries, such as Syria, North Korea, Egypt, and Israel, have not even joined the treaty. As the BWC is not universally accepted and its fundamentals are questioned, it is difficult to assume that by customary international law, a rule has evolved that bans the possession of biological weapons.



United Nations weapons inspectors searching for biological and chemical missle warheads in Iraq.

A further argument against this assumption can be taken from the Geneva Convention against the use of biological weapons in war. Although they have often been asked to withdraw their reservation, numerous countries are still maintaining their "second-use reservation" to this convention and thereby keeping open the option of responding in kind to a biological weapons attack. These countries obviously do not see the possession of biological weapons as a violation of international customary law.

Furthermore, Graham suggests that a violation of an international customary rule in connection with an armed conflict qualifies as a war crime. But only very specific and serious violations of international law in armed conflicts are considered to be war crimes. Although originally developed by customary law, war crimes have become codified in the Geneva Conventions and Protocols from 1949 and have repeatedly been specified in decisions from the United Nations Security Council (e.g., UNSCR 827/1993) or in compilations from UN institutions (*1*). In none of these decisions and compilations has the possession of biological weapons been seen as a war crime. So there is no indication of a general state practice that would qualify the possession of biological weapons as a war crime.

Looking to the future, it is of the utmost importance to strengthen the fight against biological weapons. The criminalization of biological weapons possession by international law might be one element in this fight. Therefore, one can hope that a universal judicial system in combination with a codified register of war crimes—which might include not only the use but also the possession of biological weapons—would be an efficient deterrent to the international biological weapons threat. A first step has been taken by bringing the International Criminal Court into existence on 11 April 2002; much work needs to follow to make sure that individuals pursuing a biological weapons program can be charged as war criminals on the basis of international law.

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Reference

1. See www.un.org/law/icc/statute/elements/elemfra.htm.

GRAHAM'S FINE REVIEW OF THE IMPACT OF the biological and chemical weapons agreement initiated with the Geneva Protocol of 1925 is marred by a small but significant mistake. He states "Unlike chemical weapons (which were used extensively in World War I) biological weapons have never been used in war in modern times." In fact, germ warfare was used in the United States by German spies in World War I in an effort to hurt the Allies. This illegal action was part of a campaign of sabotage orchestrated by officials of the German Embassy in Washington, D.C., aimed at destroying sources of munitions and other materials in the United States and blocking their transport to Europe.

A brief summary of this 20th-century wartime use of bacterial weapons is worth recounting. Anthrax and glanders cultures were brought over to the then-neutral United States from Germany in 1915 and 1916 by the U.S.-educated physician Anton Dilger and cultivated by him in a secret laboratory in Chevy Chase, Maryland. Dilger, the Brooklyn-born son of a German-American family, earned an M.D. degree before the war from Johns Hopkins University but soon became a wartime espionage agent for Germany. The experimental germ factory became known as "Tony's Lab," and the original bacterial cultures were codenamed "E and B cultures." These cultures of anthrax and glanders bacilli were grown specifically to produce deadly diseases in horses and mules that were destined for shipment to Great Britain and France. Dilger's brother, Carl, aided in the lab and in replenishing the cultures with fresh organisms from Germany. Other spies and a German merchant submarine, the *Deutschland*, also served as couriers of the deadly bacteria in trans-Atlantic voyages from Germany. Efforts by Dilger to establish a second bacterial warfare laboratory in the Midwest failed.

The bacterial warfare project was carried out with the support and cooperation of Frederick Hinsch, an underground agent, and Paul Hilken, an espionage paymaster. They arranged for the hiring of more than a dozen stevedore workers, who went around the country injecting virulent microorganisms into domestic animals. Animals were pricked with steel needles, embedded in corked glass vials of bacterial cultures. The fatal fluid was also spread on the fodder and in the animal's drinking water. One of the key domestic animal farms visited was Van Cortlandt Park in the Bronx. There is no evidence that, as part of the sabotage scheme, anthrax was deliberately transmitted to humans, nor were any accidental exposures recorded. After the United States entered the war in early 1917, Dilger fled to Mexico with other German spies and became a vital German intelligence agent there under an assumed name.

Documentation of this wartime application of biological warfare appears in the official records of the Mixed Claims Commission from 1922 to 1941 and in summaries appearing in various articles and books (*1*–*5*).

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Response

ALTHOUGH I AGREE WITH MUCH OF RATH'S serious and measured observations, we differ on some important issues. For example, I do not agree that the Biological Weapons Convention (BWC) has been "weakened" or its "fundamentals" questioned. There has been a long, unsuccessful effort to create a real verification regime for the BWC, but the Convention itself remains strongly supported by the international community. As for compliance, there have been accusations of noncompliance, but the only case that has been practically pursued within the Treaty context has

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been that of Russia, and it is considered to a degree resolved. Of course, the world community remains deeply concerned about the Iraqi program. Moreover, although the BWC does not enjoy universal membership, neither does any other treaty. The fact that some countries have not signed the BWC does not mean that its constraints cannot possibly have merged with customary international law.

Furthermore, I did not "conclude," as Rath suggests, that possession of biological weapons is a war crime. My editorial was simply intended to raise the issue as a possibility and to raise the question of whether the world community has the means at hand to further strengthen the BWC, an objective that all should support. Of course, I understand that there can be a difference of view as to whether such means actually exist, and on this point Rath and I simply disagree.

Finally, although there have not been review meetings of the Parties to the Geneva Protocol (the agreement does not provide for this), I have attended review meetings of other arms control agreements, and I do not recall any state ever being asked to withdraw its second-use reservation with respect to the Geneva Protocol. But, in effect, this was accomplished by the Chemical Weapons Convention and the BWC, which ban the possession and use of chemical and biological weapons.

With respect to the comments submitted by Kasten, I congratulate him on his scholarship and I appreciate his most interesting and informative comments. Although I am generally aware of references to the events set forth in his letter, I have not myself seen conclusive proof that they in fact occurred. Be that as it may, in saying that biological weapons have not been used in war in modern times, I was referring to use on the battlefield, not the use of such agents in war-related terrorist actions.

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*Ambassador Graham served as special representative of the president of the United States for arms control, nonproliferation, and disarmament from 1994 to 1997.

Another Unmet Public Health Need

INJURIES SHOULD BE ADDED TO THE LIST OF "Unmet needs in public health" (C. Ash and B. Jasny, Introduction: Issues in Public Health, 15 March, p. 2035). Throughout the world, injuries claim more years of productive life than any disease group. The Centers for Disease Control have identified unintentional injuries as the leading cause of years of potential life lost in the United States; violence (suicide/homicide) places third (*1*). In most countries, injuries are the leading cause of death for young adults and for children after the first year or two of life. Yet because infectious diseases claim the lives of so many infants, the prominence of injury deaths once children have survived the threats of contagious and waterborne diseases is often unrecognized.

Traffic injuries—to motorcyclists, bicyclists, pedestrians, and vehicle occupants—take the heaviest toll; they are projected to be the third leading cause of disability-adjusted life years worldwide by 2020 (*2*). Because the problem is often defined as "driver behavior" or as the responsibility of nonhealth agencies, traffic injuries lack the attention they merit (*3*).

"Hard" science enables us to design more protective vehicles and better roads, while "soft" science enables us to secure implementation of helmet laws and speed limits. We hope that *Science* will help to educate the broad scientific community about this huge unmet need in public health. The burden on the public—not whether something is contagious—should be the major criterion for prioritizing public health problems.

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Looking at a Renegade's Predecessors

THE DEVELOPMENT OF BASIC IDEAS IN SCIENCE, in simplified accounts at least, often appears as a struggle between clearly defined alternatives; scrutiny of historic sources usually gives a different impression. This applies to Michael Hagmann's recent homage to Günter Wächtershäuser's contribution to the origin-of-life debate ("Between a rock and a hard place," News Focus, 15 March, p. 2006), which has a complex history and a complex logical structure. The classical "primordial broth theory" was not dreamt up by a single hero, Ernst Haeckel, nor is Wächtershäuser, his admirable achievements notwithstanding, unique in claiming that surface chemistry holds the key to the "mother of all problems." His thought is embedded in the historic development of the idea—just turn back the pages of this journal to 1908 (*1*).

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WÄCHTERSHÄUSER'S WORK OVER THE PAST 20 years on surface chemistry and pyrite in the origins of life is interesting, as is Norman Pace's comment in the article that Wächtershäuser "added a breath of fresh air to the field." When Wächtershäuser was reading about the origins of life in 1972, what are the chances that he was also reading the work of William F. Neuman, who published a series of papers "On the possible role of crystals in the origins of life" during that period (*1–5*)? Although Wächtershäuser has shown no role for pyrite, Neuman, with whom I worked, showed experimentally that hydroxyapatite (bone mineral) could concentrate biological molecules and drive dehydration and phosphorylation reactions.

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CORRECTIONS AND CLARIFICATIONS

BOOK REVIEW: "Time, space, and us" by W. G. Unruh (1 March, p. 1649). The figure on page 1649 was incorrectly attributed. The credit should have read "Edward Harrison/From *Cosmology: The Science of the Universe* (Cambridge University Press)."

EDITORS' CHOICE: "Floating through a cluster" (15 Feb., p. 1197). The mention of free-floaters in the M22 cluster was incorrect; it should instead have referred to the Orion cluster, as described by M. R. Zapatero Osorio *et al.*, *Science* **290**, 103 (2000).

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted by e-mail (science_letters@aaas.org), the Web (www.letter2science.org), or regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.