

Cold War at Porton Down: Informed Consent in Britain's Biological and Chemical Warfare Experiments

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In 2004, the author was appointed historical expert to HM Coroner for Wiltshire and Swindon in the Inquest looking into the death of Ronald George Maddison. Unless stated otherwise, the material presented derives from the "Exhibits" that were supplied to the interested parties and from the Inquest "Transcript."

By the end of the Second World War the advancing allied forces discovered a new nerve gas in Germany. It was called Tabun. Codenamed GA, it was found to be extremely toxic. British experts were immediately dispatched to examine the agent. On arrival, they discovered that German scientists had also developed even more toxic nerve agents, including Sarin, known as GB.¹ The first organized testing of Sarin on humans began in October 1951 at Porton Down in Wiltshire, Britain's biochemical warfare establishment since the First World War. In February 1953, volunteer number 562 experienced the first recorded serious adverse reaction. Testing continued. Two months later, on April 27, six subjects were given 300 milligrams of Sarin. One of the volunteers, a man named Kelly, suffered serious ill effects, fell into a coma, but then recovered. Although asked by their superiors to reduce the amount tested to the "lowest range of dosage"—which would have been somewhere in the region of 10–15 milligrams—Porton's scientists continued their tests with a "lower" dosage, reducing it from 300 to 200 milligrams.²

On May 6, 1953, tests were carried out on a further six subjects. Number 745 was Leading Aircraftsman Ronald Maddison. All six men went into the chamber at around 10 a.m. All were wearing respirators. Each had two pieces of uniform, serge and flannel tied loosely over the forearm. Two hundred milligrams of pure Sarin were applied onto the layers of cloth, on the inside of the left forearm. Maddison was the fourth of the six to be contaminated at 10:17 a.m. Each was to remain in place for 30 minutes from the time of contamination. But at 10:40 a.m., he said he felt "pretty queer." Maddison was sweating and sent from the chamber. His respirator and the contaminated cloth were removed and he walked to a bench about 30 yards away, still sweating. After 2 minutes an ambulance was called, a minute later Maddison said he could not hear. He was given an injection of atropine sulphate intravenously,

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and then a further injection, intramuscularly. Maddison became unconscious shortly after he said he could not hear. At 10:47 a.m., he arrived at the Porton medical center. He was put to bed and given oxygen. But shortly afterward his respiration became irregular. He was gasping. Resuscitation attempts immediately began. At 11 a.m. his color had become ashen gray and no pulse could be found. Anacardone was injected and further dosages of atropine. As a last resort, he was given adrenaline, injected directly into his heart. At 1:30 p.m., Maddison was pronounced dead.³ Days later, the Coroner received a telephone call from the Home Office: "Home Secretary says essential inquest should be held in-camera on grounds of national security. Must not be published."⁴ And the Secretary of the Coroner's Society told the Coroner: "At the present moment, the motto seems to be least said, soonest mended."⁵ Now, 52 years later, records have been made publicly available that can clarify what really happened at Porton Down.

My aim is to provide a historical analysis of the ethical, political, and legal dimensions of Britain's biochemical warfare program in the early stages of the Cold War. So far the debate on nontherapeutic human experiments carried out at Porton in the 1950s and 1960s has been characterized by a lack of historical focus and a medical ethics context. A number of basic questions are central to understanding the events: Did the subjects give voluntary consent? How was consent obtained? Were the risks explained to the subjects? What safeguards were taken? The paper examines the nature of Britain's Cold War research on humans at Porton in order to come to a better understanding about the extent to which medical ethics standards, including the Nuremberg Code, formulated in 1947 in response to Nazi medical atrocities, were communicated and introduced, as well as ignored, by the British authorities and the research community. I argue that Maddison's case study, and other human experiments at Porton from that period, can highlight some of the central dilemmas of human experimentation, especially regarding the issue of informed consent. I will address the tension that existed during the Cold War, and indeed thereafter, between the use of warfare agents as part of national defense policies, on the one hand, and the principles of human research ethics on the other. I first examine how the concept of informed consent developed and was understood in the United Kingdom before and after the promulgation of the Nuremberg Code. What, for example, was the level of consent that was generally required in experimental research and within the specific and secretive military milieu at Porton? Second, I look at the role that consent played in the experimental program at Porton Down (a full analysis of the discrepancy between the expectation of informed consent as it was understood in principle and research practice in the United Kingdom lies outside the purview of this paper). Finally, I look at Maddison's legacy and assess the extent to which the history of Porton may influence the way in which Britain is beginning to face up to her Cold War past.

Porton's biochemical warfare program, in which Maddison died, can only be understood in the context of the Cold War. Recently declassified material seems to suggest that in some cases Britain's national security interests overrode individual human rights and accepted standards of research ethics. Over the past decade, a similar picture has emerged for the United States' human radiation experiments.⁶ The Cold War was, above all, a period of substantial rearmament, arms development, and weapons testing. As the world began to learn the destructive potential of nuclear weapons systems, chemical warfare

agents were seen as “outmoded” and generally ineffective for military use. However, given the experience of the Second World War, the British authorities were acutely aware that chemical weapons could cause substantial damage and panic among the population. Britain’s threat of retaliation may have prevented Nazi Germany from using chemical weapons. Yet, the scale of the German chemical warfare program only became apparent after German scientists had been interrogated and chemical weapons arsenals were discovered. Germany produced 12,000 tons of the nerve agent Tabun during the war. The advantage of the “G” agents (Tabun [GA], Sarin [GB], Soman [GD], Ethyl Sarin [GE], and Cyclo Sarin [GF]) lay in the fact that they were significantly more toxic than earlier chemical agents, could cause death quickly, and could be disseminated more easily. Research to explore the full potentialities of the agents in the 1950s and 1960s was not only influenced by the perceived threat that the Soviet Union might use these weapons, but also by the experience of the Second World War. The war had changed the degree of risk scientists were willing to take when conducting experiments on humans. The Cold War and its perceived urgency provided Porton and other Allied research establishments with the strategic and moral justification for the testing of radiological, chemical, and biological substances on humans.⁷

Porton’s nerve agent experiments were unique in several respects. They were by far one of the largest nerve agent trials ever performed, involving more than 1,500 subjects.⁸ The specific group that was exposed to Sarin, and to which Maddison belonged, included almost 400 subjects.⁹ The Porton experiments were also unusual in the magnitude of the risks. An increasing number of subjects were exposed to an increasingly high dosage of the nerve agent Sarin,¹⁰ which was known by the principal investigators to be highly toxic and potentially lethal in minute concentrations.¹¹ Porton’s investigators knew the great risks involved in the exposure of human subjects to nerve agents.¹² They were also reminded of this fact by the adverse reactions some of the servicemen had to Sarin exposure.¹³ Porton’s scientists appear to have carried out a series of dangerous experiments on Maddison and other subjects that demanded, given the nature of the experiments, that the highest degree of safety and the most rigorous standards of research ethics known at the time should have applied. In summary, Maddison’s death was an accident waiting to happen that resulted from an inadequate level of disclosure and an understatement of risks, despite the fact that there was widespread consensus in the United Kingdom that the principles of the Nuremberg Code should govern these types of experiments. The material presented also shows that the principle of informed consent was in place in U.K. legal doctrine and medical practice from at least 1933 onward, long before the promulgation of the Nuremberg Code.

Informed Consent in the United Kingdom

Consent and discussions about the issue of consent in experimental, non-therapeutic research played a considerable role in the United Kingdom and abroad throughout the 19th and the first half of the 20th centuries.¹⁴ Not all experiments on humans, whether therapeutic or nontherapeutic, required the informed consent of the subject. But most scientists accepted the need for volunteers (and their informed consent), particularly when there was a possibility of harm. Since 1830, English law was understood to require that a

physician had to obtain the informed consent of the research subject, even if the experiment was for therapeutic purposes. Doctors failing to do so risked litigation.¹⁵

In the United Kingdom, discussions on the ethics of human experimentation in the 1930s led to the formulation of a legal position by the Treasury Solicitor. Indeed, the position of the current U.K. government is largely based on the advice given at the time. In June 1933, the British Medical Research Council (MRC) asked the Treasury Solicitor for advice on experimental research into the causation of influenza. On June 21, 1933, the Treasury Solicitor, after consulting the Director of Public Prosecution, advised the MRC on the subject:

As regards civil liability I am of opinion that the consent of the person on whom the experiment is made would afford a complete answer to any claim for damages either by himself or by his dependents. I assume, of course, that the nature of the risk which the person in question was being invited to incur would be explained to him, and that the experiment itself would be conducted with all due care and that all precautions suggested by medical science would be taken.¹⁶

The Treasury Solicitor also told the MRC that the risk of a criminal charge against the MRC was so remote as to be negligible if the patient had given his full consent and if all the risks of the experiment had been explained.¹⁷ Although few documented cases involve informed consent, contemporary judicial practice in the United Kingdom reaffirms the position of the Treasury Solicitor.¹⁸ Other contemporary documents show that the MRC took the Treasury Solicitor's position on board and advised researchers accordingly.¹⁹ While accepting that research subjects could be exposed to some risk for the benefit of society, the MRC advised scientists to produce evidence that would show that the experiment had been conducted with the "full consent of the patient, given after proper appreciation of the risks involved, and that it had been performed with all due care and skill."²⁰

More generally, scientists accepted that research on humans had to be ethical in order to be permissible long before the Nuremberg Code. This is not surprising, given that one of the universal principles of medical ethics demands that a physician-scientist should not do harm, either to a patient or to a research subject. Those investigators who wanted to search for new knowledge, which would not necessarily benefit the patient-subject, were required to inform the subject about the risks involved and obtain the subject's consent. Indeed, the advice of the MRC was to obtain confirmation of this in specific cases by using a written consent form as early as 1945.²¹

Following the Second World War, the Allies decided to prosecute a number of doctors who were involved in Nazi medical atrocities. As part of the judgment in the Nuremberg Doctors' Trial, the judges issued a 10-point medical ethics' code, which laid down the human rights of patient-subjects and the duties of physician-researchers for experiments on humans.²² The aim of the Code was to find a solution to one of the most fundamental conflicts in human experimentation: to balance the need for the advancement of medical science for the benefit of human society with the right of the individual to personal inviolability, autonomy, and self-determination. The decision to include the Code into the judgment meant that, for the first time, written guidelines for permissible research on humans were incorporated into the canon of inter-

national law. The Code established fundamental human rights in medicine and placed the welfare of the patients into the foreground of medical practice. In the Nuremberg Code, neither medicine nor science nor society nor any kind of collective or utilitarian ethics has priority over the protection of the individual to remain physically and psychologically unharmed. A persons' right to self-determination and inviolability cannot be calculated against the need for medical progress or any other claim that society and science may or may not have to trump the individual rights of its citizens.

Whatever the immediate effects of the Code, which for the first decade was mostly seen as "a good code for barbarians but an unnecessary code for ordinary physician-scientists," it had significant implications for contemporary medical ethics and ethics regulations.²³ The principles laid down in the Code were embodied, in one form or another, in various national and international conventions regulating the use of human subjects in biomedical research, for example, in Article 7 of the International Covenant on Civil and Political Rights.²⁴ Moreover, the Code helped to shape the four Geneva Conventions of 1949, providing basic protection against criminal human experiments in times of war. In 1953, the U.S. military confirmed the legal validity of the Nuremberg Code in a "top secret" memorandum.²⁵ Since then, the Code has served many times as a point of reference in civilian tort actions involving nontherapeutic experiments.²⁶ The Code also became a model for subsequent international agreements that placed human rights at the center of human experimentation.²⁷ Even though researchers ignored, and in some cases violated, the principles of the Code throughout the 1950s and 1960s, research institutions and medical scientists seem to have been aware of its legal and ethical implications.²⁸ Indeed, there is fresh evidence that British scientists and the MRC accepted the Code as the guiding principle in non-therapeutic research even at the time.²⁹

In the mid-1950s, U.K. scientists and editors of medical journals increasingly expressed concern about the ethics of human experimentation.³⁰ British researchers knew that the greater the potential risks to subjects, the more comprehensive the necessary disclosure for valid informed consent had to be. A February 1955 editorial, "Experiments on Human Beings," in the *British Medical Journal* discussed these issues.³¹ The editor asked "What safeguards should the medical profession erect to protect the public and to preserve its traditional *mores*?" The journal then stated that "Mr. B. Shimkin considers that the clearest rules for guidance were those laid down at the Nuremberg trials."³² Nine months later, in November 1955, the MRC came to the conclusion, after consulting key members of the British medical profession, that the Nuremberg Code should serve as the main point of reference in experimental research on humans in the United Kingdom.³³ The MRC had come to this conclusion after holding a conference in September 1955 to consider the "Conditions on which experiments can be conducted on man."³⁴ In the revised and agreed minutes of the meeting, the MRC and some of the leading representatives of the British medical community, stated:

It was axiomatic that full consent must always be obtained before an experiment was conducted on man, that the conditions drawn up by the Nuremberg Tribunal (copy attached) set out adequately the requirements which should be satisfied before the consent could be

termed full and also the other conditions which should regulate the conduct of the experiment.³⁵

The material shows that the British medical establishment recognized the principles of the Nuremberg Code prior to the formulation of the 1964 Declaration of Helsinki³⁶ by the World Medical Association (WMA) or the 1967 ethics guidelines from the Royal College of Physicians. Sections of the medical community, however, resisted the introduction of the Code, and experiments continued to be conducted that were open to professional criticism by men such as Henry K. Beecher in the United States or by Maurice H. Pappworth in the United Kingdom.³⁷

Porton Down and Human Experimentation

The United Kingdom was clearly no moral and ethical “wasteland” and U.K. government agencies were generally committed to uphold international standards of medical morality and individual justice. U.K. medical scientists were also aware of and committed to honoring the ethical principles of the Nuremberg Code at the time of the Porton experiments. Experiments that involved a significant risk and were nontherapeutic demanded the *highest* standards of research ethics, not the *lowest* or those that were *generally* applied in U.K. medical practice and research. In 1925, the War Office reassured the Commander-in-Chief, Southern Command, Salisbury, about servicemen under his command who were given the opportunity to volunteer for experiments involving the exposure to mustard gas at Porton, that the risk involved in the tests was negligible.³⁸

In November 1930, the War Office received a copy of the recently revised “regulations in force at Porton for the protection of observers who are submitted to gas test for experimental purposes.” The War Office was told that “the most scrupulous care is taken to ensure that tests are so conducted that not only no injury is incurred, but that only the minimum of discomfort is caused. Nobody but volunteers are submitted to these tests.”³⁹ One month later, in December 1930, the Secretary of State for War told Parliament that since January 1929 some 520 servicemen had taken part in experiments with mustard gas, and that all relevant precautions had been taken to ensure that the servicemen would not be harmed.⁴⁰ In January 1931, Colonel Look, Commandant at the Experimental Station, Porton, told the War Office that “the question of the experiments on volunteers from outside Unit’s should now be reopened.” Look specifically addressed the issue of “information” that was provided to the servicemen:

Great care is taken to ensure that observers from outside Units understand the object of each particular test, and it is considered that there is no risk of such observers getting a wrong impression as to the efficiency of their respirators or false ideas as to what is being done.⁴¹

Research that was considered harmful to the subjects was refused. In 1926, the Chief Superintendent from the Chemical Defence Research Department at the War Office declined to grant permission for breathing tests with toxic smoke at Porton, believing that “the proposal might prove very far reaching in

the long run and possibly result in difficulties as regards injury to health.”⁴² In 1932, research at Porton was again proposed in which servicemen would breathe in a small amount of toxic smoke. The Army Council, however, refused permission for the tests. Given that the U.K. government was about to ratify the “Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare,” which had been drawn up by the League of Nations in 1925, officials were reluctant to permit chemical warfare experiments that involved any risk. One official noted: “I consider that nothing of this kind, involving some risk, however small, should be carried out while the conference is sitting at Geneva.”⁴³

The outbreak of war in 1939 may have altered the situation. With the country at war, government officials were more likely to take greater risks in understanding the efficiency of certain agents the enemy might employ. On April 23, 1940, the War Committee produced a memorandum that stated that Porton had again asked to expose human subjects to toxic smoke and stressed the “difference between peace and war conditions and the increase in the importance of the experimental work being carried on sternutators.”⁴⁴ One official noted:

I do not consider there is any objection on medical grounds to the application put forward. These tests would be carried out under expert supervision and with adequate precautions. I therefore support the application.⁴⁵

In considering informed consent at Porton, we have to acknowledge that Britain’s discovery of large stocks of nerve gas in Germany in 1945 substantially changed the nature of the experiments at Porton. The existence and testing of nerve gas introduced a new and unknown risk to those servicemen who participated in the research, yet Porton does not seem to have modified its experimental procedure accordingly. In May 1945, a British military official noted that “our investigation of German chemical warfare has revealed the existence of large stocks of a novel type of poison gas that they were intending to use from air and ground weapons.”⁴⁶ The official felt that since the testing of the new substance

is simply an extension of the normal routine it should not involve any additional administrative problems. . . . Porton, of course, are responsible for seeing that the men are not exposed to any concentration of gas which would do them permanent harm.⁴⁷

Some British scientists, however, began to feel uneasy about human experiments. In October 1952 R.J.V. Pulvertaft, Professor of Clinical Pathology at the University of London, drew attention to the fact that U.K. servicemen might easily be encouraged into participating in potentially hazardous experiments without knowing the full risks involved:

Now that service is compulsory for all, they [the medical services of the Armed Forces] must be prepared to resist any tendency to find a useful reservoir of clinical experiments in this group of healthy young men—especially since, in a disciplined force, the “volunteer” can easily be encouraged by sanctions or privileges.⁴⁸

In January 1953, three-and-a-half months before Maddison’s death, American officials, seeking to carry out similar experiments at Edgewood Arsenal, Mary-

land, inquired of their British counterparts: "What advance information as to the nature of the tests is given to the men in their units before they are asked to volunteer?"⁴⁹ On February 11, 1953, S.A. Mumford, Chief Superintendent at Porton, replied:

No advance information as to the nature of the tests is given to the men in their Units before they are asked to volunteer beyond the attached Appendix A to W.O. memo 112/mix/580 AG1 (A) copy attached.⁵⁰

The Americans chose to ignore this advice as they went on to insist that the consent of volunteers had to be obtained in writing and according to the Nuremberg Code. The evidence suggests that throughout the 1930s and 1940s it was considered important to explain to the subjects at Porton what was meant by gas and inform the subjects of the nature of the tests. However, those responsible for the experiments in the early 1950s do not seem to have explained to volunteers the nature of the substances to which they would be exposed or to have fully informed them about the risks. Some of Porton's subjects seem to have been exposed to escalating doses of toxic, even lethal substances. The risks significantly increased with nerve gas testing, but the level of consent that was obtained from the subjects, and the information that was provided to them, seem instead to have generally decreased in the climate of the Cold War, or at best remained the same.

Contemporary correspondence about informed consent at the time of Madison's death includes witness statements for the Coroner's Inquest and the Court of Inquiry by the Ministry of Supply at the time. The Court of Inquiry wanted to know, for example, "what information" was provided to the subjects concerning the experiment. One witness stated that the subjects were "given a general idea" of the tests. They were told of "the possible effects" and that they could "withdraw" if they wanted to.⁵¹ Asked by the Court whether the subjects were "given" any "written questions," another witness stated that the subjects were "asked if they wanted to ask any questions."⁵² The answer suggests that the scientists shifted the responsibility of obtaining information about the experiment to the research subjects themselves. The subjects were then "told briefly" what the test would be.⁵³

The scientists appear to have misled the subjects by providing them with only a general idea about the experiments and by understating the dangers involved. The witness Stanley Mumford stated that research subjects were "given a broad idea and they are told by the Medical Officer *that there is no risk* [emphasis added]."⁵⁴ Internally, however, after one of the men had fallen into a coma, Porton conceded that there were hazards involved in the tests.⁵⁵ Porton officials seem to have been concerned that if they were to supply the subjects with more detailed information, some, if not many, might refuse to participate in the experiments. As one Porton scientist stated: "If you advertised for people to suffer agony you would not get them."⁵⁶ Given the known health risks, the information provided was misleading. The Court of Inquiry acknowledged this: "To say there is not the slightest danger is a mis-statement as you are in fact dealing with a dangerous substance."⁵⁷ The Court also felt that the subjects "should be told quite clearly what risks they are going to take" before they undertook the journey from the parent units, something that had apparently not been done.⁵⁸

In May 1953, H. Woodhouse, the Treasury Solicitor's representative, also came to the conclusion that the subjects had been misled at Porton, and that the government should accept responsibility for Maddison's death. Woodhouse realized that there was a significant discrepancy between the procedures that Porton was using in recruiting volunteers, including the information that was provided to them, and the level of actual risk to which the subjects were exposed:

[I]n dealing with a dangerous but largely unknown substance like G.B. [Sarin] it would be difficult to show that there had been no negligence (a very high degree of care being required in relation to dangerous substances), and partly because the terms of the information to be brought to the notice of personnel to encourage them to volunteer . . . terms indicating that there was not the slightest element of danger, have proved [to be] somewhat misleading.⁵⁹ (The author discovered this correspondence on October 17, 2003, in the headquarters of "Operation Antler" in Devizes, Wiltshire.)

With regard to future experiments on humans, Woodhouse suggested that the Minister should pay appropriate compensation and should not seek to adopt a system of indemnities or "blood chits" that would place the responsibility upon the person volunteering for the experiments. Given that the servicemen had received misleading information for experiments that included "a definite element of unknown danger," Woodhouse proposed to change the wording to recruit volunteers in the future:

(4) I suggest that the wording of the information to be brought to the attention of personnel to encourage them to volunteer ought to be altered. The sentence: "Tests are carefully planned to avoid the slightest chance of danger;" has proved misleading. Indeed it is difficult to see how it was ever possible to say truthfully that tests with lethal gases did not contain "the slightest chance of danger". The true position, I take it, is that the tests are arranged so as to eliminate all foreseeable danger, but that as the tests are designed for the purpose of obtaining further information about substances the properties and performance of which are to some extent unknown, there is always some possibility (even it be exceedingly remote) of a danger being discovered.⁶⁰

By July 1953, officials had followed the advice of the Treasury Solicitor. Instead of saying that "Tests are carefully planned to avoid the slightest chance of danger," the notice now read: "The physical discomfort resulting from tests is usually very slight. Tests are arranged so as to eliminate all foreseeable danger, and are under expert medical supervision."⁶¹ The change of wording occurred as a direct result of Maddison's death. Instead of providing the subjects with more information about the risks involved, officials decided to phrase the invitation in such a way as to provide even less information. The new statement may not have been misleading, at least not to the same extent, but it does not appear to have been a fair representation of the nature, purpose, and risk of experiments that were subsequently carried out on human volunteers at Porton.

On July 13, 1953, Woodhouse again took up the issue of human experiments at Porton. Maddison's death had clearly raised a number of important ethical

and legal issues. He noted that the Service Departments of the British military had at the time given their permission for the recruitment of volunteers for the testing of mustard gas, but not for the significantly more dangerous nerve agents:

It seems . . . [t]hat the arrangement for service volunteers at Porton were originally made at a time when the experiments related principally if not entirely to mustard gas and that these arrangements have continued over the years without any clear acceptance by Service Department of the fact that the present experiments involve the use of substances which are more lethal and more uncertain in operation than mustard gas.⁶² (This correspondence was discovered by the author on October 17, 2003, in the headquarters of "Operation Antler" in Devizes, Wiltshire.)

Woodhouse identified the main shortcoming in Porton's experimental procedures. His comments show that the procedures for recruiting volunteers, and for providing them with information about the nature and risk of the experiments and for obtaining their consent, effectively derived from a time when the Service Departments were concerned about the testing of mustard gas, that is, from after the First World War. In short, the procedures for recruiting research subjects at Porton, and for obtaining their consent, appear not to have been updated in order to take account of the higher degree of risk to which the subjects were exposed in the early 1950s.⁶³ Given this state of affairs, the Treasury Solicitor advised the Minister of Supply on August 1, 1953, that the Crown or the Minister was, in all likelihood, liable for Maddison's death, and that Section 10 of the Crown Proceedings Act from 1947 had no application.⁶⁴

Whereas civil servants and other officials acknowledged the legal and ethical problems that Maddison's death raised, politicians were given a somewhat different picture. On May 7, 1953, 24 hours after Maddison died, Duncan-Sandys, who was responsible for Porton Down as the Minister of Supply (1951–4), informed Prime Minister Churchill about the death of an R.A.F. serviceman at Porton. Duncan-Sandys told Churchill that "these tests are of an exceedingly mild type and are conducted under strict medical supervision."⁶⁵ The same information was given to the Home Secretary, Sir David Maxwell-Fyfe, who had been the Deputy Chief Prosecutor in the Nuremberg Trials (1945–6), to the Minister for Defence, and to the Secretary of State for Air. A draft statement about the "fatal accident" at Porton, prepared by the Ministry of Supply, noted: "In every case the nature of the test and the anticipated result was described to the volunteer prior to the test so that he could withdraw if he so wished."⁶⁶ It may well be, given what we know today, that Duncan-Sandys was rather economical with the truth on this occasion, something that was later reflected in the information provided to Parliament. In November 1953, the Parliamentary Secretary at the Ministry of Defence was asked whether he was satisfied that "when National Service men volunteer their offer of service should be accepted? Would he not agree that, since many of them are under age, their status is different from that of a man who is making the Services his career?" In his reply, the Parliamentary Secretary stated:

The men are volunteers and the nature of the experiment is clearly explained to them and they are then given a chance to withdraw. There has been only one fatal accident since 1922.⁶⁷

The official government position contrasted with the information that was given to the research subjects.⁶⁸ The existing witness statements obtained by "Operation Antler"⁶⁹ of former servicemen who attended Porton Down in the early 1950s confirm that subjects were not properly informed about the experiments.⁷⁰ Porton's scientists obtained consent only partially and in a generally "roundabout" way. Moreover, the information given to the subjects was inadequate to make an informed decision. The scientists knew that nerve gases were highly toxic in minute quantities, and that exposure entailed significant risk.⁷¹ They were knowingly increasing exposure to levels that were dangerous to the subjects.⁷² In 1952 and 1953, six experimental subjects were hospitalized as a result of exposure to nerve agents.⁷³ The Kelly incident in April 1953, in which one of the servicemen fell into a coma, was the clearest indication that the experiments posed a significant risk. It was a clear warning that from that moment onward, the most rigorous safeguards and standards of medical ethics needed to be applied if the scientists decided to continue with the experiments. It was a warning to pursue the experiment, if at all, only under extreme caution. The record suggests that more rigorous safeguards were not introduced and that more rigorous ethical standards were not applied. The Kelly incident was a warning flag and a chance to reassess the entire experimental program. This, we know, was not done.

After Maddison died, procedures came under scrutiny. As the Treasury Solicitor pointed out: "Misleading statements in an invitation of this sort, even if made in complete innocence, are always apt to give rise to criticism when anything has gone wrong."⁷⁴ And something had gone wrong indeed. According to a handwritten document from May 5, 1953,⁷⁵ and a typed version from May 8, 1953,⁷⁶ the object of the experiments was to "discover the dosage of GB [Sarin], GD [Soman] and GF [Cyclo Sarin] which when applied to the clothed or bare skin of men would cause incapacitation or death." A report about the experiments from 1954 repeated this objective.⁷⁷ None of the evidence that I have seen indicates that any of the experimental subjects, including Maddison, was ever informed about the specific objective of the experiments, and I believe it to be rather unlikely that any man in his right mind would have volunteered for such an experiment.⁷⁸ The consent, which may have been obtained from Maddison, would not have qualified as having been "informed." His consent, if it were obtained, was therefore invalid.

Maddison's Legacy

The Porton experiments were nontherapeutic and therefore qualitatively different from medical treatment research. By definition, none of the Porton nerve agent experiments was conducted to benefit the subjects or carried out in their best interest. Because the experiments were not intended to benefit the subjects, the subjects possessed the fundamental right to decide whether or not they were prepared to participate in the experiment. That is why the issue of consent is of such importance. Already in 1946, General Telford Taylor, the chief prosecutor in the Doctors' Trial, had stated in his opening address: "Whatever book or treatise on medical ethics we may examine, and whatever expert on forensic medicine we may question, will say that it is a fundamental and inescapable obligation of every physician under any known system of law not to perform a dangerous experiment without the subject's consent."⁷⁹

Research over the past decade, however, has shown that many Anglo-American medical scientists did not abide by the Nuremberg Code or its informed consent principle during the Cold War. This applied to therapeutic as well as to nontherapeutic experiments. According to Jay Katz, government officials and their advisers at best paid lip service to the principle of informed voluntary consent.⁸⁰ One former physician remarked that in the 1940s and 1950s “the doctor was king or queen. It never occurred to a doctor to ask for consent for anything.”⁸¹ Another doctor commented: “I am aware of no investigator (myself included) who was actively involved in research involving human subjects in the years before 1964 who recalls any attempts to secure ‘voluntary’ and informed consent according to Nuremberg’s standards.”⁸² In an environment dominated by a paternalistic doctor–patient relationship, it was often left to individual doctors to inform their patients about the nature and purpose of the experiment. Physicians, so it seems, were less concerned about the issue of informed consent in therapeutic research, both in the United States and United Kingdom, except, perhaps, where there was a significant level of risk involved.

For nontherapeutic experiments that involved the possibility of harm, informed consent was an essential requirement long before the Porton experiments. The principle of informed consent was recognized before the 1960s and certainly before any kind of bioethics movement was on the horizon. For the United Kingdom, in particular, the principle of informed consent was recognized among the legal and medical establishment from at least 1933 onward. The fact that scientists in the United Kingdom, and elsewhere, may have ignored this⁸³—including in the Porton Down experiments—does not change the fact that it was widely considered wrong if scientists had not obtained fully informed consent in nontherapeutic research.

Maddison was a member of the Armed Forces, and his death occurred at the hand of the state. In 2002, Judge Woolf, the High Court judge who quashed the original inquest, pointed out: “That death should occur in such a situation is a matter of real public concern. There can be no doubt in this case that the concerns which existed as to how Mr Maddison should have been put in a position where he was subject to an experiment which risked his life are still alive today and are still matters of public interest.”⁸⁴ In November 2004, after a 64-day trial, the Inquest jury ruled that Maddison was “unlawfully killed,” and that the cause of death was a chemical warfare agent used in a nontherapeutic experiment. Many lawyers and experts see this not only as a significant moment in legal history but also one that may have profound and long-term implications on hundreds of servicemen who were exposed to chemical agents over the years (including the Gulf War veterans). There have also been steps to call for a full public inquiry into the tests carried out at Porton Down.⁸⁵ No Coroner has ever been required to investigate a death that took place so long ago, and the investigation has faced significant problems. The ethical, legal, and indeed symbolic implications of the Inquest, however, are largely undisputed. Maddison’s death and the legacy of the recent Inquest are likely to become part of a gradual process by which Britain is beginning to face up to her Cold War past.

Notes

1. The following abbreviations apply: Maddison-Inquest-Exhibit = “Exhibit”, and Maddison-Inquest-Transcript = “Transcript”. The author also used the following report: Exhibit, MNJ/

- 20/1, Vol. 2A, pp. 84–142, Report of a Court of Inquiry. Reference AY. 1030. Chemical Defence Experimental Establishment, Porton, Wilts., May 1953 (in the following referred to as: Report of a Court of Inquiry 1953); for the discovery of German nerve agents see Exhibit MNJ/20/3, X1501, G. Brunskill, Attachment 10, Physiological Observers for Porton, May 28, 1945, p. 149.”
2. See note 1, Transcript, Day 1.
 3. See note 2.
 4. See note 2.
 5. See note 2.
 6. United States Advisory Committee on Human Radiation Experiments. Advisory Committee on Human Radiation Experiments Final Report, Washington, DC: Superintendent of Documents, U.S. Government Printing Office; 1996; Moreno JD. *Undue Risk. Secret Experiments on Humans*, New York: W.H. Freeman; 1999.
 7. For the United States see note 6, United States Advisory Committee on Human Radiation Experiments 1996; also Pechura CM, Rall DP. *Veterans at Risk: The Health Effects of Mustard Gas and Lewisite*, Washington, D.C.: National Academy Press; 1993; Lederer S. *Subjected to Science. Human Experimentation before the Second World War*. Baltimore: Johns Hopkins University Press; 1995; Vilensky JA. *Dew of Death. The Story of Lewisite, America's World War I Weapon of Mass Destruction*. Bloomington, IN: Indiana University Press; c2005. For the United Kingdom see Harris R, Paxman J. *A Higher Form of Killing. The Secret History of Gas and Germ Warfare*. New York: Chatto & Windus; 1982, rep. 2002; Carter GB. *Porton Down: 75 Years of Chemical and Biological Research*. London: HMSO; 1992; Goodwin B. *Keen as Mustard: Britain's Horrific Chemical Warfare Experiments in Australia*. St. Lucia, Old., Australia: University of Queensland Press; 1998; Bud R, Gummert P. *Cold War, Hot Science: Applied Research in Britain's Defence Laboratories, 1945–1990*. Amsterdam: Harwood Academic Publishers; 1999; Carter GB. *Chemical and Biological Defence at Porton Down, 1916–2000*, London: HMSO; 2000; Care A. Poisoned by their own people. *The Independent* 2000, Oct 3; Care A. The Porton Down human guinea pigs—gassed without consent. *Association of Personal Injury Lawyers* 2000;12(2); Evans R. *Gassed: British Chemical Warfare Experiments on Humans at Porton Down*. Thirsk: House of Stratus; 2000; Balmer B. *Britain and Biological Warfare: Expert Advice and Science Policy 1930–65*. Basingstoke: Palgrave; 2001; Hammond P, Carter GB. *From Biological Warfare to Healthcare. Porton Down 1940–2000*. Basingstoke: Palgrave; 2002.
 8. H. Cullumbine, Head of the Physiology Section at Porton, stated in May 1953 that “in all, some 1,726 subjects have been tested” with nerve gases. See Report of a Court of Inquiry 1953, p. 50. An internal Porton statistic, Note No. 119, on the “History of the Service Volunteer Observer Scheme at C.D.E.E.” gives the following figures: 34 (1945/46), 242 (1948/49), 159 (1949/50), 234 (1950/51), 384 (1951/52), and 531 (1952/53). This makes a total of 1584 subjects who were exposed to nerve gas.
 9. A total of 396 men were contaminated with varying doses of liquid GB; Exhibit MNJ/17, Porton Technical Paper 373; Exhibit MNJ/30, Porton Technical Paper 399.
 10. See note 1, Report of a Court of Inquiry 1953, p. 74.
 11. See note 1, Report of a Court of Inquiry 1953, p. 73.
 12. Ministry of Supply, Chief characteristics of nerve gas. *Lancet* 1952;6728:286; Ministry of Supply, Chief characteristics of nerve gas. *The British Medical Journal* 1952;4779:334–5.
 13. See note 1, Exhibit MNJ/17, p. 70.
 14. Sass H-M. Reichsrundschreiben 1931: Pre-Nuremberg German regulations concerning new therapy and human experimentation. *The Journal of Medicine and Philosophy* 1983;8:99–111. Grodin M. Historical origins of the Nuremberg Code. In: Annas GJ, Grodin MA, eds. *The Nazi Doctors and the Nuremberg Code. Human Rights in Human Experimentation*. New York: Oxford University Press; 1992:121–44. Vollmann J, Winau R. Informed consent in human experimentation before the Nuremberg Code. *British Medical Journal* 1996;313:1445–7. Hazelgrove J. The old faith and the new science: The Nuremberg Code and human experimentation ethics in Britain, 1946–73. *Social History of Medicine* 2002;15:109–35.
 15. Willcock JW. *The Laws Relating to the Medical Profession with an Account of the Rise and Progress of its Various Order*. London: J. and W.T. Clarke; 1830:109–10.
 16. The National Archives, TS27/398, Gwyer (Treasury Solicitor) to MRC, June 21, 1933. I am grateful to Talitha Bolton from the University of Kent for having brought the files TS27/398, FD1/428, and FD9/855 to my attention. She is currently working on her Ph.D. thesis on “Common Cold and Informed Consent: Britain's Experimental Research on Human Beings during the Cold War.”
 17. See note 16, NA 1933.

18. Kennedy I, Grubb A. *Medical Law: Text with Materials*. London: Butterworth; 1994:90f.
19. NA, FD1/428. MRC to Krebs, August 29, 1945. MRC to Eiringer, December 8, 1947. MRC to Davidson, December 14, 1951. MRC to Spiers, May 26, 1952.
20. NA, FD1/428, MRC to Erich Eiringer, Dec 8, 1947.
21. NA, FD1/428. MRC to Krebs, August 29, 1945. Issue of provision of consent by volunteers in human experiments. Appended draft of consent form; NA, TS27/398. MRC to Prendergast, Aug 29, 1945; Prendergast to MRC, Aug 30, 1945; Prendergast to MRC, Sep 5, 1945; Draft of consent form, Sep 7, 1945.
22. For the history and legacy of the Nuremberg Code, see Schmidt U. *Justice at Nuremberg. Leo Alexander and the Nazi Doctors' Trial*. Basingstoke: Palgrave; 2004.
23. Katz J. The Nuremberg Code and the Nuremberg Trial: A Reappraisal. *JAMA* 1996;276:1662–6.
24. Perley S, Fluss S, Bankowski Z, Simon F. The Nuremberg Code: An international overview. In: Annas GJ, Grodin MA, eds. *The Nazi Doctors and the Nuremberg Code. Human Rights in Human Experimentation*. New York: Oxford University Press; 1992:149–73 at p. 153.
25. Annas GJ, Grodin MA, eds. *The Nazi Doctors and the Nuremberg Code. Human Rights in Human Experimentation*, New York: Oxford University Press; 1992:343–5.
26. Proctor RN. Expert witnesses take the stand. Historians of science can play an important role in US public health litigation. *Nature* 2000;407:15–6.
27. Arnold P, Sprumont D. The “Nuremberg Code”: Rules of public international law. In: Tröhler U, Reiter-Theil S. eds. *Ethics Codes in Medicine*. Aldershot: Ashgate; 1998:84–96.
28. See note 22, Schmidt 2004:264–97.
29. NA, FD9/855, Draft—Council memorandum “Experiments on Man: Conditions for Conduct,” including statement on the “Condition on which experiments can be conducted on man,” Jan 2, 1956.
30. Experiments on human beings [editorial]. *British Medical Journal* 1955:526–7.
31. See note 30, Experiments on human beings 1955:526–7.
32. See note 30, Experiments on human beings 1955:527; see also Shimkin M. The problem of experimentation on human beings: I. The research worker’s point of view. *Science* 1953;117:205–7.
33. NA, FD9/855, MRC minutes of “Meeting on 27.9.55 to consider ‘Conditions on which experiments can be conducted on man’”, Nov 18, 1955.
34. See note 33.
35. NA, FD9/855, Draft—Council memorandum “Experiments on Man: Conditions for Conduct,” including statement on the “Condition on which experiments can be conducted on man,” Jan 2, 1956.
36. See Lederer S. Research without borders: The origins of the Declaration of Helsinki. In: Roelcke V, Maio G, eds. *Twentieth Century Ethics of Human Subject Research. Historical Perspectives on Values, Practices, and Regulations*. Stuttgart: Steiner; 2004:199–217. See also Frewer A, Schmidt U, eds. *History and Theory of Human Experimentation. The Declaration of Helsinki and Modern Medical Ethics*. Stuttgart: Steiner; forthcoming.
37. See note 22, Schmidt 2004:284–7.
38. NA, WO286/11 (Police Ref. X61), H.J. Creedy (War Office) to the General Officer, Commanding-in-Chief, Southern Command, Salisbury, Jul 30, 1925.
39. Exhibit, MNJ/20/2, X1501, Expanded Statement (B), Nov 19, 1930, pp. 136–8.
40. NA, WO286/11 (Police Ref. X61), Parliamentary Question No. 170, Dec 18, 1930.
41. Exhibit, MNJ/20/2, X1501, Colonel R.F. Look, Commandant, Experimental Station Porton, to the Chief Superintendent, Chemical Defence Research Department, War Office, Jan 24, 1931, p. 142.
42. See note 41.
43. Exhibit, MNJ/20/2, X1501, Memorandum by the War Committee, “Employment of Observers from the Services on Physiological Tests Involving Exposure to Sternutators,” Apr 23, 1940, pp. 146–7.
44. See note 43.
45. See note 43.
46. Exhibit, MNJ/20/3, X1501, G. Brunskill, Attachment 10, Physiological Observers for Porton, May 28, 1945, p. 149.
47. See note 46.
48. Pulvertaft RJV. The individual and the group in modern medicine. *The Lancet* 1952;6740:839ff.
49. Exhibit, MNJ/20/3, X1502, D.C. Evans to S.A. Mumford, Jan 23, 1953, p. 300.
50. Exhibit, MNJ/20/3, X1502, S.A. Mumford to D.C. Evans, February 11, 1953, pp. 298–9. The Appendix “A” to War Office Memorandum 112/Misc/5860/AG1 (A) dated 6th November 1950

- stated: (1) The physical discomfort resulting from tests is usually very slight. Tests are carefully planned to avoid the slightest chance of danger, and are under expert medical supervision. (2) During their stay at Porton, volunteers do not undertake any military duties or fatigues, and are free every evening. (3) Extra pay is given which normally brings each volunteer some ten to fifteen shillings a week.
51. See note 1, Report of a Court of Inquiry File, p. 53.
 52. See note 1, Report of a Court of Inquiry File, p. 65.
 53. See note 1, Report of a Court of Inquiry File, p. 65.
 54. See note 1, Report of a Court of Inquiry File, p. 86, 93.
 55. See note 1, Report of a Court of Inquiry File, p. 84.
 56. See note 1, Report of a Court of Inquiry File, p. 86.
 57. See note 1, Report of a Court of Inquiry File, p. 87.
 58. See note 1, Report of a Court of Inquiry File, p. 88.
 59. NA, WO286/11 (Police Ref. X61), H. Woodhouse (for the Treasury Solicitor), to Legal 1 (Mr. Griffith-Jones), Ministry of Supply, May 15, 1953.
 60. See note 59.
 61. NA, WO286/11 (Police Ref. X61), Appendix 'A' to 86/Chemical/899(SW1), dated 9th July, 1953.
 62. NA, WO286/11 (Police Ref. X61), H. Woodhouse (for the Treasury Solicitor), to Legal 1 (Mr. Griffith-Jones), Ministry of Supply, Jul 13, 1953.
 63. See note 1, Report of a Court of Inquiry File, p. 54.
 64. NA, WO286/11 (Police Ref. X61), H. Woodhouse (for the Treasury Solicitor), to Legal 1 (Mr. Griffith-Jones), Ministry of Supply, Aug 1, 1953. The author discovered this correspondence on October 17, 2003, in the headquarters of "Operation Antler" in Devizes, Wiltshire. As a result, the U.K. Ministry of Defence (MoD) has decided not to rely on Section 10(2) of the Crown Proceedings Act 1947 as a defense in cases involving nerve agents. MoD (Tracey Vennai) to Alan Care, Jan 27, 2005.
 65. Exhibit, MNJ/20/3, X1501, Duncan-Sandys to Churchill, May 7, 1953, pp. 226-7.
 66. Exhibit, MNJ/20/3, X1501, Fatal Accident at the Chemical Defence Experimental Establishment, Porton, Near Salisbury, on 6th May, 1953, Statement by the Ministry of Supply, Fifth Draft, pp. 196-7.
 67. NA, WO286/11 (Police Ref. X61), House of Commons, Official Report 17th November, 1953, Cols. 1567/8, Experimental Work (Service Volunteers).
 68. See note 1, Report of a Court of Inquiry File, pp. 86, 93.
 69. In July 1999, the Wiltshire Constabulary began to investigate allegations made by a former serviceman, who stated that during his National Service he took part in research into finding a cure for the Common Cold at Porton. As a result of this and other allegations the Force initiated a major enquiry, called "Operation Antler." The purpose of the investigation was to examine the role of the Service Volunteer Programme at Porton Down in relation to chemical and biological warfare experiments during the period 1939-1989.
 70. See also Lee HA, Gabriel R, Bale A, Welch D. Clinical findings in 111 ex-Porton Down volunteers. *Journal of the Royal Army Medical Corps* 2004;150:14-9, at p. 19.
 71. See Exhibit MNJ/39, Porton Memorandum No. 34 from Jun 30, 1949, and Exhibit MNJ/19, Porton Memorandum No. 39 from Aug 2, 1950.
 72. See note 1, Report of a Court of Inquiry File, p. 74.
 73. Exhibit MNJ/17, Porton Technical Paper 373, p. 70.
 74. See note 62.
 75. Exhibit CEB/16/2, seven-page handwritten document titled "The percutaneous toxicity of the G compounds," May 5, 1953.
 76. Exhibit JJH/187/5, The Percutaneous Toxicity of the G Compounds, May 8, 1953.
 77. Exhibit MNJ/30, Porton Technical Paper 399.
 78. See also Witness Statement of FJ Verillo, Mar 17, 2000.
 79. See note 22, Schmidt 2004:175.
 80. See note 6, United States Advisory Committee on Human Radiation Experiments 1996:544.
 81. See note 23, Katz 1996:1665.
 82. See note 23, Katz 1996:1665.
 83. See note 22, Schmidt 2004:264-97.
 84. See note 1, Transcript, Day 1.
 85. Hansard (Westminster Hall), February 22, 2005, Column 32WH, Porton Down. See also Care A. After the inquest: Porton Down revisited. *Association of Personal Injury Lawyers* 2005;15.