Part II. Volunteers
Overview

Throughout most of its history Porton has sought volunteers to participate in human studies. Generally, volunteers were members of the UK Armed Forces although, occasionally, members of staff at Porton volunteered to take part in experiments. Chapter 5 describes the types of volunteers who participated in studies at Porton and the efforts made at various times to increase the supply of volunteers. Details of the ways in which volunteers were recruited and the information given to them does not appear here but is included in Part VIII of the report, which also discusses the nature of the ‘genuine volunteer’.

Many Porton volunteers believe, or recollect being told, that they went to Porton to take part in studies relating to common cold research. Some people recall seeing recruitment notices calling for volunteers for common cold and influenza research. Despite extensive searches by the Wiltshire Police and the Ministry of Defence, no document has been found which supports the claim that volunteers were recruited to Porton on the basis that they would be participating in common cold research. However, the Medical Research Council’s Common Cold Research Unit (CCRU), about 8 miles from Porton at Harnham Down on the west side of Salisbury, did carry out such work. Furthermore, the Microbiological Research Establishment (MRE), very near the Porton site but independent from Porton and its parent organisation and committees, did conduct some research connected with influenza. Against this background, Chapter 6 covers human studies relating to the common cold and influenza, separated into three elements:

- an outline of the work conducted by the CCRU and an explanation of how the unit recruited volunteers for studies at Harnham Down;
- examples of influenza studies in which Service personnel participated;
- studies conducted by MRE involving Service personnel.

In 1998 the MOD set up the Porton Volunteers Helpline. Many former volunteers have telephoned the Helpline and been given access to the records held at Porton which relate to their time there. While many volunteers have been helped in this way there have been a few examples where, despite volunteers’ recollections of being at Porton, no records indicating they attended as volunteers have been found. One explanation of this discrepancy may be the fact that over the period covered by the survey some servicemen/women went to Porton as part of their chemical warfare training, rather than as volunteers for Porton’s research studies, and were thus not recorded in the volunteer records. Chapter 7, therefore, covers:

- a short account of the Services’ chemical warfare training and a description of the facilities at Porton used for chemical defence training;
- the links between Porton and the Defence Nuclear Biological and Chemical Defence Centre, responsible for chemical warfare training, located at Winterbourne Gunner about 3 miles from Porton.
Chapter 5. Porton Down Volunteers

5.1 The "observer scheme"

The history of volunteers being sought from the Services for human studies at Porton dates back to 1925. In 1922 Porton sought and obtained permission from the Army Council for human tests with mustard gas [1]. The tests from 1922 to 1925 involved volunteers from among the Porton staff and from nearby units. Formal arrangements were made in 1925 to recruit volunteers from the Army when it became apparent that more people were required for human studies. The War Office wrote to the Commander-in-Chief of the Army's Southern Command seeking volunteers and explaining the tests for which they were required [2]. All Army commands were brought into the scheme in 1927 [1]. Approval was also given for civilian laboratory assistants at Porton to volunteer for tests [1].

Despite these arrangements, not enough volunteers were coming forward and so in 1929 the War Office asked the Royal Navy and the Royal Air Force to provide volunteers [3,4]. Evidently, some naval volunteers had been used before [4]. 1929 also saw the introduction of the following recruitment procedure [1] for what is often referred to as the "observer scheme":

a. Porton informed the War Office how many volunteers they needed.

b. The War Office wrote to the Air Ministry (RAF) and Admiralty (RN) explaining how many volunteers were required from them and the dates when they were required.

c. Each Service Department then wrote to their own units calling for volunteers.

d. Each unit sought volunteers.

e. The names and numbers of volunteers were sent from the units to their Service Departments. This information was passed to Porton, who then made arrangements for the volunteers to attend [5].

This recruitment procedure was used until 1964, albeit with minor variations. For example, when Porton was transferred to the Ministry of Supply it informed that Ministry rather than the War Office of how many volunteers were required. To begin with, in 1929, this procedure was used to obtain volunteers for the subsequent month. In 1934 the procedure was changed to call for volunteers for the next six months and in 1938 changed again to seek volunteers for the ensuing year [5].

Up to 1964 the way in which volunteers were recruited at each unit was decided at the unit. During this period the recollections of volunteers suggest units occasionally used some form of written notice and sometimes recruited verbally during parades. In 1964 the procedure changed. Notices calling for volunteers appeared in the official administration instructions regularly issued by the Services and the MOD. Service departments, therefore, no longer wrote to their units nor did units have to decide how to advertise for volunteers: every Serviceman and Servicewoman had an opportunity to see the official administration instructions. More details of the recruitment procedure and the terms used in recruitment notices are given in Part VIII of this report.

When the observer scheme was introduced in 1929 volunteers were recruited for a week's stay at Porton and this remained the nominal length of stay until 1964. Occasionally, in the 1940s and 1950s, volunteers were retained at Porton for an extra week. By 1963 about half the volunteers were retained for a second week which Porton regarded as "dishonest and unfair to units who expected their men back after one week": much goodwill might be lost [6].

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1 It seems volunteers were referred to as "observers" because they observed the effects of chemical warfare compounds on themselves and described those effects to Porton scientists.
More volunteers were being kept for a second week because of the start of studies with psychological incapacitating agents. In these studies various intellectual and motor-control tasks were performed before and after exposure so that the degree of incapacity induced by the agent could be assessed. It took volunteers some time to learn these tasks and attain a steady level of performance [6]. Moreover, some effects of an incapacitating agent might not abate for a few days after exposure so volunteers needed to be monitored for longer [6]. As a result, in 1964, the recruitment scheme was changed with the nominal period of stay being raised to 2 weeks [7]. Even then, some men were retained for three or four weeks [7].

The observer scheme often failed to provide enough people for the studies which needed to be conducted at Porton because of external events:

- **Wars.** During World War II there was much work to be done. Although large numbers of volunteers attended Porton, they were insufficient and the programme of work at Porton was in "dire straits" [8]. The situation was exacerbated by acrimony between Porton and those units providing volunteers about the fitness of men returning from Porton after they had been testing dressings for mustard gas burns [5]. Later in the survey period, the Falklands conflict in 1982 naturally reduced the number of men from the Royal Navy who were able to volunteer [9].


- **End of National Service.** The shortage of volunteers experienced in the 1960s was "closely linked to the run down" of National Service which between 1947 and 1963 had provided around 30% of the volunteers used in experiments at Porton [18].

At about the same time that National Service ended, Porton started its own human studies with psychological incapacitating agents. Porton recognised when these studies started that volunteers with certain personality traits were not suitable to be exposed to these agents. Screening tests were devised to assess behaviour. Generally, these screening tests showed that only about one third of the volunteers reporting to Porton were suitable for studies with psychological incapacitating agents [18]. This exacerbated the shortage of volunteers resulting from the demise of National Service.

Efforts were made to publicise the observer scheme to the Services. Open days were arranged for staff officers to visit Porton in 1964 [7]. A film showing volunteers "at work and play" was prepared and shown to men attending training courses at the Defence Nuclear, Biological and Chemical Centre at Winterbourne Gunner [19]. The film was shown to Army units through the Army Kinema Corporation [19]. Service medical officers visited units and explained the scheme to officers and men in 1968 and 1969. Another recruitment film was shot by the MOD film unit in 1980 [21]: 13 volunteers spent their time at Porton employed solely in making the film [22].

Some of these efforts increased the number of volunteers but usually they had only a temporary effect. Attempts were then made, mainly in the 1960s and 1970s, to increase the number of Service volunteers by either expanding the observer scheme or augmenting it.
5.2. Expanding the Observer Scheme

5.2.1. Officers and Senior Non-Commissioned Officers (NCO)

Initially, men over the rank of Leading Aircraftman (or equivalent) were not sought as volunteers under the observer scheme [1] although in 1963 it was reported that corporals and sergeants had been accepted as volunteers for some time [23]. Porton attempted to encourage the Services to allow officers and senior NCOs to volunteer, and specifically targeted officers for:

- **Riot Control Trials.** Some studies with riot control agents in 1969 involved officers on the basis that Porton thought they would be better able to give a coherent account of their experiences during the experiment [24]. Officers were recruited from courses at the Defence NBC Centre and HMS Phoenix, the Royal Navy's NBC School. Officers and senior NCOs were recruited from courses at RMCS Shrivenham for other riot control studies in 1972.

- **Nerve Agent Trials.** Trials were conducted in 1972 to assess the effect of nerve agents on the performance of RAF aircrew, who were officers.

5.2.2. The British Army on the Rhine (BAOR) Scheme

Men serving in BAOR (a third of the British Army in 1966) were effectively excluded from volunteering [19] (they were not offered travel warrants, so they could attend Porton only when they were in the UK on leave) because they would be absent from their BAOR units for 4-5 weeks, too long for their commanders [19]. The Army had rejected the idea of giving BAOR men free leave-warrants [19] for trips to the UK.

The idea of BAOR providing men was raised at a high level in the Army in 1969 [29]. Conditions associated with volunteering were changed and the BAOR scheme was introduced. The first volunteers appear to have arrived at Porton in the summer of 1970 [30], although a paper on volunteers issued by Porton in 1974 [31] refers to the BAOR scheme being introduced in 1971. Despite the scheme, many servicemen were deterred from volunteering because they lost their local allowances when they were attached to the UK on short-term duties. These rules were eventually changed in July 1979 allowing volunteers from BAOR to continue to draw local allowances while at Porton [32].

5.2.3. Servicewomen

The observer scheme was, from the outset, limited to male volunteers. Three women from the ATS volunteered to participate in studies at Porton in 1943 but were rejected as unsuitable [5]. With such a high proportion of volunteers being deemed unsuitable for studies with psychological incapacitating agents, consideration was given in September 1963 to expanding the observer scheme to allow servicewomen to volunteer. The idea was rejected, although servicewomen were later allowed to volunteer for tests at Porton. Initially, they were allowed to volunteer as part of special intakes (which are described below). Servicewomen participated for the first time in physiological tests at Porton in 1972 [12]: RN nurses and Army nurses [31] took part in experiments with riot control agents in the spring [34] and winter [35].

Although this was the first time servicewomen had been allowed to volunteer, it was not the first time women had participated in human studies at Porton. Female members of the Porton staff had taken part at various times:

- **During World War II** many studies and field trials involved Porton staff members, and women participated in tests of respirators, patch tests, trials in which impregnated clothing was worn over long periods to find out if they irritated the skin, and H sensitivity tests [36].
Female members of staff took part in a study in the late 1960s of the ease with which tablets could be swallowed, depending on the size and shape of the tablets and whether water was available. The study, which formed part of the work to develop treatments for nerve agent poisoning, used glucose tablets and is described in more detail in the chapter dealing with these treatments.

Under the Himsworth enquiry into the safety of CS, studies were conducted to find out if people could easily discern that food had been contaminated with CS. The concern was to avoid ingesting CS. A tasting panel was set up in 1970 and members tasted, but did not swallow, various food (milk, bread, cheese, fruit among the examples) which had been contaminated with CS. The tasting panel, volunteers from Porton laboratory staff, included 8 women [37].

Returning to servicewomen, WRAC drivers were used in 1974 [38] to calibrate the instrumented car developed and used at Porton for studies of driving behaviour. The WRAC drivers were not exposed to any agents or drugs, nor used in measurements of physiology [38].

The observer scheme was expanded in December 1975 to allow servicewomen to volunteer [39]. Particular recruitment periods under the scheme were designated as women-only but many servicewomen wanted to volunteer for other dates. The observer scheme was changed again in 1979 so that servicewomen could volunteer for any recruitment period. However, it was usual to accept them only if there were at least 4 women who had volunteered for the same period [40, 32].

Having expanded the observer scheme to include servicewomen, Porton subsequently introduced certain restrictions. Porton became concerned, in January 1982, about exposing Servicewomen to therapeutic drugs. The worry centred on the possibility that women might be in the early stages of an undetected pregnancy [41]. For this reason, Guy's Hospital advised that dosing should be confined to the first 14 days of the menstrual cycle [42]. Porton decided later that year that Servicewomen should not be exposed to drugs which were in the early stages of evaluation [9]. Further consideration in 1986 resulted in the decision [43] that it was undesirable for women of child-bearing age to be exposed to drugs in human studies at Porton. However, they continued to be accepted in special intakes for clothing trials [43] and, in 1988, were employed in industrial hygiene studies [44]. Women continue to be involved in trials but their involvement will be conditional on the nature of the trial.

5.3. Augmenting the Observer Scheme

5.3.1. Field Trials

Field trials were held at Porton, sometimes to test the effect of agents on the military efficiency of a group of men working as a team. These trials were more realistic and instructive if the men were used to working together, or if the men who participated in them had similar military roles. However, the observer scheme yielded volunteers from different units and a variety of trades and so, for particular field trials, Porton augmented the scheme by recruiting volunteers from specific units.

There was nothing new about this. The War Committee recommended in 1940 [5] that the Army Councils should agree to the Commandant at Porton “making local arrangements with the Commandant at the Gas School at Winterbourne Gunner for the supply of additional observers as may be necessary, by calling for volunteers from the Chemical Companies training at the school without previous recourse to the War Office”. Men had been recruited from the Royal Welsh Fusiliers for a nerve agent field trial in 1945 [45]. More field trials, in the 1960s, used the practice of recruiting men from the same unit.

The way volunteers were recruited for these field trials differed from the recruitment procedure for the observer scheme.
Some were attracted by the open days arranged by Porton: the Plymouth Group of Royal Marines (RM) approached Porton after the open day in 1963 with an "offer in principle" to send a complete platoon [7]. Subsequently, men from a RM Commando unit took part in a field trial in 1964 with LSD [46].

Some volunteers were recruited from local units. The Wiltshire Regiment provided volunteers for a field trial in 1954 of the effects of nerve agent on the performance of military duties [47]. The demonstration battalion at the School of Infantry in Warminster provided volunteers for field trials with riot control agents in 1958 [48].

The idea of establishing a Field Trials Unit at Porton [49] manned by volunteers who would stay for 2-3 months [50] was considered in 1968. Although similar units had been set up successfully at other organisations, the idea was rejected as members of a field unit at Porton might be required to participate in a wide range of studies with different chemical agents [29].

5.3.2. Special intakes

Volunteers under the observer scheme did not volunteer for particular human studies. They effectively volunteered to go to Porton for a period of time, during which they might participate in many human studies. ‘Special intakes’ were recruited differently. Volunteers were sought for a specified human study.

The first time a special intake of volunteers was used seems to have been in 1960. The War Office agreed to recruit volunteers to test a proposed chemical warfare treatment, in the form of tablets, during an extended trial over 30 days [51]. After the first special intake in 1960, the next one appears in 1966 [52]. Special intakes were used regularly after 1966. By 1969 special intakes had been used for trials with other treatments, with protective clothing and in nerve agent studies [52].

The method of recruiting special intakes differed at first from the procedure used in the observer scheme. It was noted in 1971 that special intakes tended to come from units in the district surrounding Porton [53]. Porton documents mention appeals being made for special intakes [54]. The response to these appeals was deemed "adequate" if the appeals were made well in advance of the study for which volunteers were sought [55]. No document has been found which explains whether the appeals were written or verbal in the early years of the special intake arrangement. That so many special intakes were drawn from local units suggests Porton staff visited units to recruit verbally², at least in the 1960s and possibly into the 1970s. However, some special intakes in 1968 featured volunteers from different units [52], suggesting that written appeals may have been used.

Appeals seem to have been written rather than verbal from the 1970s onwards. One of the official administrative instructions used to advertise the observer scheme in 1978 refers to special trials [57]. After explaining that volunteers for the observer scheme are normally sought through regular articles in official administration instructions, the text refers to:

"Special trials. The Armed Services in the UK are also called upon to provide volunteers for specified special trials which can last from one day up to six weeks duration."

"[Potential] Volunteers are informed through their own Service channels: RN [through] HMS Centurion; Army [through] Headquarters UK Land Forces; RAF [through] RAF Innsworth - Personnel Management Centre."

² Special intakes are annotated as such in volunteer records.
³ This may have been the way that volunteers for field trials were recruited: a report of one field trial notes that Porton staff visited the unit and gave full details of the trial to the colonel of the regiment and explained the purpose of the trial to his men (the prospective volunteers) [56].
During a discussion of payments to volunteers at a COSHE meeting in 1979 [58], the way in which special intakes were recruited is mentioned:

"... because of the reluctance of the Service authorities to send out requests for special intakes unless a sum was quoted it had sometimes been necessary to do so."

On a request for a special intake of volunteers for a 5 week climate trial, "the signal dispatched by UKLF had quoted a sum of money (£140)."

The recruitment of special intakes was, by 1983, accomplished through sending signals. A joint Service official administration instruction [59] notes "additional special intakes are sometimes required who are notified by signal, giving as much notice as possible."

By the late 1980s Porton required volunteers predominantly for studies of treatments. These studies lasted longer than the 2 weeks for which volunteers were recruited under the observer scheme. Therefore, from the end of June 1988, all volunteers were recruited as special intakes [44]. By 1989 the "trend away from the observer scheme was complete": all volunteers were recruited for specific studies [60].

5.3.3. Trials at volunteers' units

Units did not like releasing their men. Porton had come to the view in 1965 that commanding officers were reluctant to release their men to volunteer for studies at Porton [19] as it interfered with the smooth running of their units. It would be convenient to all if human studies could be carried out at units; the men participating could then carry on with their normal duties. It had proved possible on one occasion before 1929 to arrange for tests to be carried out on naval volunteers at Portsmouth [4].

In January 1975 Porton started investigating the possibility of conducting some experiments at volunteers' home units [14]. Human studies involving chemical warfare agents or continuous physiological monitoring were deemed unsuitable, but it was concluded that trials of chemical warfare treatments could be carried out by men at their home stations while in the course of their normal duties [40].

Two pilot trials were conducted in 1979 [61]: one at HMS Collingwood with tablets [62] and one with a unit stationed at Perham Down testing an automatic injection device [63]. Testing treatments at volunteers' own units continued into the 1980s [64, 65]: Shrivenham and Bufford Camp (1980) and HMS Collingwood (1984) are three examples of units that hosted studies.

Similarly, some Porton studies with volunteers were conducted at institutions with specialist medical facilities. Thirty two volunteers took part in a study sponsored by Porton at the National Hospital for Nervous Diseases in 1983 [66], and the specialist eye examination facilities at the Institute for Aviation Medicine were also used in Porton studies [66].

5.4. Volunteers outside the Armed Services

As well as increasing the supply of Service volunteers by expanding and augmenting the observer scheme, from time to time the recruitment of volunteers outside the UK Armed Forces was contemplated. There are some isolated examples of success. Many volunteers for studies at Porton in 1942 were "being drawn" from the Pioneer Corps [5] and between August and November 1944 American forces in Europe contributed volunteers [67, 68]. However, the main source of consideration was the general civilian population.

Civilian volunteers were first considered, and abandoned, in July 1944 because their use "raises so many complicated questions of compensation, remuneration etc." [8] Recruiting civilian volunteers was explored in 1953/54 when nerve agent studies at Porton had been stopped. Conditions under which the studies might recommence were reviewed by senior officials in the Ministry of Supply. The Ministry of Supply explained in December 1953 [69]
that it would be happier if civilian volunteers were used as it was "sure the public dislike the idea of Service personnel being used for the experiments and are not comforted by the assurance that the men are volunteers". No objection was raised in principle to civilian volunteers [70] but the following practical difficulties counted against such a proposal, which was rejected finally in January 1954:

- ensuring a continuous flow of healthy young men of the right age group;
- excluding "publicity seekers and other undesirables who might be expected to come forward";
- ensuring security;
- the administration of messing and accommodation at Porton, and the payment of travelling expenses;
- offering a sufficiently high financial inducement so that the volunteers did not lose money while away from their normal work.

Recruiting civilian volunteers was considered again by senior officials from 1960 to 1962 while they were assessing proposals for new nerve agent studies. The proposals were considered by senior civil servants in the MOD and the Service Departments who met at the War Office in January 1960 [71]. Alternatives to using Service volunteers were raised. Some thought was given to using staff at Porton, even though that might be wasteful and interfere with their normal duties.

The use of civilian volunteers was further discussed in May 1960 [72], but by July it was deemed undesirable to seek civilian employees outside the Porton area because of the problems of accommodation and travel [73]. It was thought best to limit volunteers to staff from Porton, subject to unions being content [74].

These points were made in a paper submitted to the Secretary of State for Defence in May 1961 [75]. Although the idea of recruiting from the general public seemed a dead issue, the Secretary of State, at a meeting in July 1961, re-opened it, saying that civilian volunteers ought to be obtained from outside Porton [76]. Various options were re-visited:

- The Home Office was consulted about using "prison inmates (as in USA)" [76], who were in "plentiful supply. However, there would be no possibility of keeping it secret. Prisoners are great gossips and the full glare of publicity is on every unusual incident in prison" [77].

- Regional Civil Defence was thought in August to be a source more likely to yield "public-spirited men" who would accept the need not to talk about the work [78]. However, the Home Office did not think the Civil Defence Corps was a disciplined force and was worried about the political consequences of having to ask local authorities for volunteers from the Corps [79]: the Home Office had recently been "playing down biological and chemical warfare", so pleas for help would be likely to produce "awkward questions" [80].

- Gradually the options dwindled to using civil servants, a move that was opposed because of the need for trade unions to be consulted. The pay freeze recently imposed upon the unions was thought unlikely to engender a warm response [81].

The consideration of civilian volunteers ended when it was decided the new nerve agent studies were not required [82]. Civilian volunteers were considered briefly in later years. The police force was rejected as a source in 1966 [19] (because it was under-manned) and

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4 This is inferred to mean the "use of prisoners, as was the practice in America" rather than inmates from American prisons.
students were rejected for all manner of reasons. In commenting on the heavy volume of work on riot control agents in 1978, Porton noted that it would not be "inappropriate for volunteers to be provided by the Police or Home Office" [83] but no action seems to have been taken. Porton raised the possibility of recruiting volunteers from among MOD administrative staff in 1977 [84] but senior staff in MOD HQ were found to be "not enthusiastic" [85].

The documents consulted for the survey suggest that volunteers for Porton were not sought from the general population. As already noted, civilian volunteers did take part in human studies at Porton but they were drawn from the Porton staff. Often members of the Medical Division at Porton, who ran human studies, volunteered to expose themselves to chemical warfare agents, particularly nerve agents and incapacitating agents, before conducting studies with volunteers.

Sometimes staff at Porton volunteered because a particular study might need subjects of the type not generally provided by the Services, for example the CS tasting trial mentioned earlier. Another example arose when the Medical Committee was considering the safety of using CS in a water cannon in 1972. The independent members of the committee wanted tests conducted with subjects over the age of 50 [86]. The tests were carried out later in 1972 and probably used older members of Porton staff: only one Service volunteer aged over 50 attended Porton around the time the work was conducted.

The practice of seeking volunteers from Porton staff was ended by the MC in 1978. Over many years Porton recognised that self-experimentation among the medical staff might make them hypersensitive to chemical agents. Indeed, it is one of the reasons why the observer scheme was introduced in the 1920s and why recruiting volunteers from Porton staff ended in 1978. The other reason touches on the definition of a "genuine volunteer". Porton noted that "the dependency of possible volunteers [from Porton staff] to those prosecuting the investigations, their superiors, raises ethical questions" [88]. This issue of dependency, or vulnerability as it is sometimes referred to, is addressed in more detail in Part VIII of the report.

5.5. Payments to volunteers

Payments to Service volunteers taking part in Porton studies were instituted in 1924. The Treasury authorised payments of 1/- (one shilling) for each physiological or breathing test and 6d (half a shilling) for other tests [89], in addition to a Serviceman's standard Service pay. From the end of the Second World War the unit payment of 1/- was applied to the tests each volunteer was asked to undergo. "Tests" included the taking of blood samples, measuring pulse rate, as well as exposures to chemical agents [90]. Therefore, a study could involve many tests, for each of which the unit payment was made. This definition of tests was used throughout the period covered by the survey.

From 1947 payments to volunteers were taxable [90]. The unit payment was raised to 2/- per test in 1956 [18] and remained at that level until the introduction of decimal currency in February 1971, when it was set at 35p per test [85]. This unit payment was not selected arbitrarily:

- Porton were aware that ethical codes published before 1971 stated that potential volunteers should not be offered excessive inducements to take part in experiments and Porton staff noted "the difficulty was providing a reasonable acknowledgement of the discomfort, inconvenience and loss of dignity inherent in human experiments which would not be considered a bribe" [85].

- The unit payment of 35p was chosen because "on general grounds it seemed an acceptable but not excessive gratuity, would be about one week's extra pay for each week spent [by a volunteer taking part in studies] at Porton" [85].
The rate of 35p was chosen so that "an average young soldier" would receive a gratuity of that order [85].

Porton were sensitive to the issue of excessive inducement and, indeed, to whether volunteers should be paid at all: the MC noted in 1978 that the Medical Research Council did not favour the payment of volunteers [58]. However, payments continued: the unit payment remained frozen despite rapid inflation [55] until August 1980, when it was raised to 70p [22]. Further increases were made after 1980:

- 1981: 75p [64];
- 1984: 90p, to maintain the value of the gratuity in the face of inflation [65];
- 1986: £1.05, as a result of inflation rather than as an additional incentive [43];
- 1987: £1.10 to maintain value against inflation [44].

The use of a unit payment meant that volunteers attending Porton in the same period received different payments according to the studies in which they took part. Table 5.1 shows the average weekly payment made to volunteers at times during the years covered by the survey. In summary:

- The statistics are taken every three years from 1947 (when payments became taxable) and are based on the payments made to volunteers who attended Porton during the months of March, July and November.
- Payments made in 1947, March 1950 and part of July 1950 are taken from the alphabetical lists of volunteers [91]. Payments made from the second part of July 1950 to March 1962 are taken from summary books which record the studies in which each volunteer took part [52, 92]. The remaining payments are taken from the pay records kept from June 1962 [93].
- Payments made to volunteers from the observer scheme, in special intakes and field trials are included; payments made to volunteers who took part in trials at their own units are not, as these studies featured fewer ‘tests’ than normal.
- For comparison with the payments, the weekly pay of a newly recruited private (non-tradesman) is shown in Table 5-1, being calculated by dividing the gross annual pay by 52. Private’s pay is taken from the Annual Army Estimates. These figures are included because in 1970 the level of unit payment was set so that a young volunteer would earn about a week’s pay during his week’s attendance at Porton.

The same comparison for National Servicemen is shown in Table 5.2. Again, the pay of a new recruit without a trade is used. Recruitment of National Servicemen ceased in 1960, with the last National Servicemen completing their service in 1963. The weekly salary for 1962 which appears in Table 5.2 is that which a Serviceman who joined in 1960 would have been paid in 1962.
### Table 5.1. Comparison of Porton payments and Private's pay

<table>
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<th>Private's weekly pay (£)</th>
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<td>0.78</td>
<td>1.40</td>
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</tbody>
</table>

### Table 5.2. Comparison of Porton payments and National Servicemen's pay

The average weekly Porton payment reflects not only the unit payment but also the nature of studies conducted and the number of 'tests' they incorporate. The weekly payment is also affected by medical techniques which were available to Porton. Various techniques were used in the 1980s to measure physiology (EEG and ECG, are examples) which were not used in, say, the 1950s. Modern assay techniques used in the 1980s might allow a more thorough analysis of physiology but, by the same token, would require more samples (of blood, urine, sweat etc.) than would assay techniques in the 1950s. Therefore, the increases in average Porton weekly payments are not simply a result of the increases in unit payments for each test.

### 5.6. Porton volunteers: Statistics

The number of Service volunteers attending Porton each year is given in various documents. These statistics are shown in Table 5.3. and Table 5.4. Table 5.3. covers the period 1939 to 1965. From 1959 the number of volunteers attending Porton in a calendar year is shown [18, 94]. From 1945-6 until 1959, the statistics are for a 12 month period which does not coincide with a calendar year. The source for these statistics [5] does not make clear when each 12 month period starts. The source cites the number of volunteers exposed to nerve agents, the first study of which was conducted in April 1945. Therefore, it might be inferred that the statistics relate to a year from April.

The statistics covering the World War II years come from two sources. For 1940 until the 7 August 1945, the figures are drawn from an experimental record [36] which lists all volunteers attending Porton. In total, 7329 volunteers are recorded for this period. This differs from a summary written in the same document of the total number during World War II: the total is given as 6329 and purports to include those volunteers who attended from September to December 1939. It is not clear why this total appears in the summary, and it is ignored. The
number of volunteers attending in 1939 is estimated from the experimental records which
describe the tests conducted.

There may be some overlap between the figure for 1945 (which covers up to the 7 August)
and the figure for 1945/6 which appears to relate the 12 months beginning in April 1945.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Service volunteers</th>
<th>Year</th>
<th>Number of Service volunteers</th>
<th>Year</th>
<th>Number of Service volunteers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1939</td>
<td>650</td>
<td>1948-9</td>
<td>129</td>
<td>1957-8</td>
<td>624</td>
</tr>
<tr>
<td>1940</td>
<td>894</td>
<td>1949-50</td>
<td>326</td>
<td>1958-9</td>
<td>372</td>
</tr>
<tr>
<td>1941</td>
<td>1162</td>
<td>1950-1</td>
<td>637</td>
<td>1959</td>
<td>440</td>
</tr>
<tr>
<td>1942</td>
<td>2231</td>
<td>1951-2</td>
<td>789</td>
<td>1960</td>
<td>426</td>
</tr>
<tr>
<td>1943</td>
<td>1928</td>
<td>1952-3</td>
<td>836</td>
<td>1961</td>
<td>381</td>
</tr>
<tr>
<td>1944</td>
<td>655</td>
<td>1953-4</td>
<td>704</td>
<td>1962</td>
<td>313</td>
</tr>
<tr>
<td>1945</td>
<td>459</td>
<td>1954-5</td>
<td>724</td>
<td>1963</td>
<td>328</td>
</tr>
<tr>
<td>1945-6</td>
<td>297</td>
<td>1955-6</td>
<td>606</td>
<td>1964</td>
<td>188</td>
</tr>
<tr>
<td>1946-7</td>
<td>168</td>
<td>1956-7</td>
<td>536</td>
<td>1965</td>
<td>158</td>
</tr>
<tr>
<td>1947-8</td>
<td>118</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.3. Service Volunteers: 1939 to 1965

From 1969 the number of volunteers attending Porton is generally noted, for each calendar
year, in COSHE proceedings. Table 5.4. draws mainly on this source but draws also on MC
minutes, annual reports and volunteer records. The table shows the number of volunteers
recruited under the observer scheme and as special intakes. Women volunteers and
volunteers from BAOR are also shown.

The numbers of volunteers shown in Table 5.3. and Table 5.4. are not the total number of
people who attended Porton as volunteers. The numbers include those people who
volunteered more than once. Hundreds of volunteers have made multiple visits. One person
has attended as a volunteer six times.
<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Service volunteers</th>
<th>Recruited from observer scheme</th>
<th>Recruited as special intakes</th>
<th>Took part in studies at own unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966 [94, 52]</td>
<td>95</td>
<td>69</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>1967 [94, 52]</td>
<td>156</td>
<td>64</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>1968 [52]</td>
<td>244</td>
<td>140</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>1969 [95]</td>
<td>178</td>
<td>87</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>1970 [96]</td>
<td>277</td>
<td>120 (4 BAOR)</td>
<td>157 (1 BAOR)</td>
<td></td>
</tr>
<tr>
<td>1971 [31]</td>
<td>227</td>
<td>165 (44 BAOR)</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>1972 [12]</td>
<td>343</td>
<td>137 (23 BAOR)</td>
<td>206 (22 women)</td>
<td></td>
</tr>
<tr>
<td>1973 [31, 97]</td>
<td>261</td>
<td>172 (27 BAOR)</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>1974 [31, 97]</td>
<td>302</td>
<td>80 (25 BAOR)</td>
<td>222 (19 women)</td>
<td></td>
</tr>
<tr>
<td>1975 [97, 98]</td>
<td>210</td>
<td>100 (6 BAOR)</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>1976 [97, 99]</td>
<td>255</td>
<td>114 (29 BAOR, 9 women)</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>1977 [15, 97]</td>
<td>108</td>
<td>90 (14 BAOR, 6 women)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>1978 [17]</td>
<td>118</td>
<td>55 (4 BAOR, 6 women)</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>1979 [61]</td>
<td>152</td>
<td>74 (13 BAOR, 4 women)</td>
<td>27</td>
<td>51</td>
</tr>
<tr>
<td>1980 [22]</td>
<td>343</td>
<td>80 (5 BAOR, 4 women)</td>
<td>144 (3 BAOR, 21 women)</td>
<td>119</td>
</tr>
<tr>
<td>1981 [64]</td>
<td>290</td>
<td>114 (47 BAOR)</td>
<td>68</td>
<td>108</td>
</tr>
<tr>
<td>1982 [9]</td>
<td>176</td>
<td>105 (43 BAOR, 7 women)</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>1983 [52]</td>
<td>190</td>
<td>71</td>
<td>119 (1 BAOR)</td>
<td></td>
</tr>
<tr>
<td>1984 [100]</td>
<td>130</td>
<td>78 (14 BAOR)</td>
<td>42</td>
<td>10</td>
</tr>
<tr>
<td>1985 [101, 102]</td>
<td>175</td>
<td>117 (29 BAOR, 9 women)</td>
<td>58 (1 BAOR)</td>
<td></td>
</tr>
<tr>
<td>1986 [43]</td>
<td>90</td>
<td>46 (16 BAOR)</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>1987 [60, 102]</td>
<td>93</td>
<td>37 (8 BAOR, 2 women)</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>1988 [60, 102, 103]</td>
<td>125</td>
<td></td>
<td>125 (8 women)</td>
<td></td>
</tr>
<tr>
<td>1989 [103]</td>
<td>102</td>
<td></td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

Note: In 1988 some volunteers were recalled to take part in follow-up medical examinations. They are not included in the total of 125.

*Table 5.4. Service volunteers: 1966 to 1989*
Chapter 6. Human studies of the common cold and influenza

6.1. The Common Cold Research Unit

6.1.1. Background

The Common Cold Research Unit (CCRU), at Harvard Hospital in Harnham Down, Salisbury, was established in June 1946 under the direction of the Medical Research Council (MRC). The first volunteers arrived in July 1946 [1]. The CCRU closed in 1989, the last volunteers leaving in July [2].

During the first ten years or so, the CCRU did not test cold cures or vaccines as more fundamental work was required. The following are examples of early work with volunteers carried out at the CCRU [3]:

- investigations into the basics of viruses that caused colds;
- confirming if the common cold viruses being used for research at the National Institute for Medical Research in Hampstead were active;
- basic studies into how colds spread.

By 1959 many of the viruses which caused colds could be cultivated and recognised. The nature of human studies at the CCRU changed and addressed the following [4]:

- studies of viruses that could not be cultivated in the laboratory;
- investigations of the process of infection and how different viruses spread from person to person;
- the development of methods of vaccination;
- assessments of the effectiveness of anti-viral substances.

Initially the CCRU recruited students to attend as volunteers but, as not enough students volunteered (particularly during term-time), the CCRU decided to recruit from the general public [2]. The unit sought male and female volunteers aged between 18 and 40. Later the upper age limit was raised to 50 [5]. Between 1946 and 1989 about 20,000 volunteers attended the CCRU to take part in studies.

6.1.2. Advertising for CCRU volunteers in the open press

Volunteers were recruited primarily through journals and magazines. However, monetary constraints meant that requests for volunteers were often included in articles announcing advances in research into the common cold, rather than as advertisements.

Some examples of these types of articles are given on the next two pages. The first shows the information on how to volunteer which appeared in an article published in *The Times* on 10 September 1953. The article was based on a press release issued by the MRC and the Ministry of Health announcing work conducted at the CCRU in successfully growing the common cold virus in the laboratory [6]. The next two articles appeared in the *Daily Telegraph* and the *Guardian* on 21 January 1969. The last example is drawn from the colour magazine of the *Observer*, dated 4th October 1970. This was used for publicity and recruitment by the CCRU, hence the annotation at the bottom of the page.
"How to volunteer" from a MRC and Ministry of Health press release which appeared in The Times in 1953.

**HOW TO VOLUNTEER**

Since the unit began its work seven years ago 2496 volunteers have taken part in the trials. Exactly half of these are women. Married couples total 274. As many as 563 volunteers have paid two visits to the unit and 334 have taken part in three or more trials.

Volunteers are isolated, usually in pairs, for periods of ten days, and trained medical and nursing facilities are available at all times. Fares to and from Salisbury up to a maximum of £3 are paid, and volunteers are given 3/0d. a day pocket money. Anyone wishing to volunteer should be between 18 and 45 years of age and should write to the Medical Officer, Harvard Hospital, Salisbury.

MINISTRY OF HEALTH
SAVILE ROW, W1.

Daily Telegraph, 1969

**FREE FLU JABS ATTRACTION FEW VOLUNTEERS**

By Our Health Correspondent

Non-priority people can obtain free influenza vaccine, and a promising new compound which may prevent the disease, from the Common Cold Research Unit at Harvard Hospital, Salisbury. But the unit's research is in danger of coming to a halt because there are so few volunteer "guinea pigs."

Dr. David Tyrrell, head of the unit, said more volunteers were essential to test the new compound, a weakened live vaccine, given as nose drops or sprays.

The Department of Health said yesterday that only in the West Midlands had there been any evidence of spread of "flu. "But it is impossible to predict what influenza will or will not do."

Dr. Arthur Bane, director of London's emergency doctor service, said last night that British people, through recurrent flu epidemics, had developed a "certain amount of resistance." He was "not yet alarmed" by the situation.

Guardian, 1969
THE BEST PACKAGE HOLIDAY ANYWHERE!

HOOKED ON THE VIRUS HABIT

If you fancy 10 days away from it all, you may feel drawn to what many of the volunteers at the Common Cold Research Unit in Salisbury clearly regard as the best package holiday anywhere.

‘Where else can you have a 10-day holiday, with free board and lodging, your return travel paid for, in beautiful countryside, a spacious flat centrally heated in winter, badminton, croquet, a library - and a thorough on-the-spot medical examination, and 7s a day pocket money’. It was this volunteer’s third visit, and he and his wife were booking up for a fourth before they left.

In return, volunteers agree to allow the virologists to inoculate them with cold viruses, and to give them drugs, to test against colds. They also help with flu research. Half of a recent batch of volunteers were given the new live-virus flu vaccine. Happily for these 20 ‘guinea pigs’, no colds developed, and only one hint of a sniffle.

Among them were students, a man from the Admiralty and his wife, and a police sergeant and his wife. The unit is also popular with teachers desperate for peace and quiet. No one worried about the isolation. The rule is that people who share flats - never more than three - must not get within 30 paces of other flat inhabitants. Salisbury people get used to solitary groups walking and cycling on the Downs, and give them a wide berth.

Volunteers are inoculated shortly after they arrive, and visited each day by the virologists, and Dr. Tom Hall, the medical superintendent, for a check. A few weren’t too keen on the nasal inoculations, but “they wouldn’t put me off coming back”, said one.

With summer over, the unit is approaching its annual period when volunteers are in short supply. Not everyone’s idea of a winter holiday, but if you are tempted write to the Medical Superintendent, Common Cold Unit, Harford Hospital, Coombe Road, Salisbury, Wiltshire.

We reproduce the above by permission of, and with grateful acknowledgements to ’The Observer’ newspaper and Transworld Feature Syndicate Ltd. It appeared as a postscript to Miss Christine Doyle’s feature article ‘How to survive the winter’ in their Colour Magazine on 4th October, 1970.

Miss Doyle spent a long time at the Unit, as did The Observer’s photographer, Tony McGrath. They seem to have been impressed, and seem to be recommending you to come!
Other national publications which carried advertisements or articles for the CCRU include *Family Circle, Home* and *Country* (the magazine of the Women's Institute), *Woman, Petticoat, The Lady, Hospital Carer, Honey* and *Vogue* [7]. The first director of the CCRU suggested southern regional newspapers as suitable places for advertisements: *Reading Mercury, Evening News and Southern Daily Mail* (Portsmouth) and the *Bristol Evening Post* [8].

From time to time the CCRU produced posters seeking volunteers. These posters were intended to be circulated to chief librarians of the 32 Greater London boroughs and their Medical Officers of Health [9]. Two examples of these posters appear on this page and the next, both used in the 1970s.
have you a nose for a free holiday?

Would you like TEN DAYS FREE HOLIDAY with your travel expenses paid and pocket money too?

All you have to do is to help the research into the common cold and influenza at the Medical Research Centre set in the beautiful Wiltshire countryside near Salisbury.

Over 400 people come every year to relax and enjoy the facilities at the unit.

If you are between 18 and 50 and in good health, we provide comfortable accommodation for married or single people.

Write now for full details to:
Common Cold Unit, Salisbury, Wiltshire SP2 8BW
or telephone (0722) 22485 between 9 am and 5 pm
6.1.3. Advertising for CCRU volunteers in Service publications

From 1964 the MOD used regular official administration instructions to promulgate information and advice on a range of subjects; catalogues of the contents of these instructions post-1964 exist, although there is nothing in them to suggest the CCRU used this method of advertising for volunteers. Official notices for the period prior to 1964 are scarce but no notices have been found containing details of the CCRU or volunteers for common cold research.

The only link found between the Services and the CCRU appeared in an edition of the Families Bulletin produced at RAF Bridgnorth in September 1962. The Families Bulletin is an example of an unofficial newsletter of the type produced by unit family and welfare officers addressing issues of particular local interest to the families of the units where they were based. The article seeking volunteers for the CCRU, reproduced below, contains the phrase “the Air Ministry recognises the value of Centre's work and wishes to encourage volunteers among RAF personnel and their families”. The inclusion of this phrase makes it unlikely that someone at RAF Bridgnorth produced the bulletin at their own initiative as unit officers generally do not write in such terms without instruction. It is also unlikely that the instruction was taken from an administrative instruction as the article does not include an Air Ministry Order reference as others in the same publication do. The conclusion therefore is that the Air Ministry may have written to RAF units detailing the requirement for volunteers to attend the CCRU and perhaps suggesting a form of words to be used. It is stressed however that this is an assumption as no such letter has been found.

It is interesting to note that the RAF Bridgnorth Bulletin states clearly that applications from servicemen should be addressed directly to the CCRU and not through “official channels” and that, if volunteering, servicemen would be expected to spend a “period of leave at the CCRU” i.e. they would be off duty and not required to wear uniform.

Another article from the same bulletin appears below it (the reason for this will become clear).
The Common Cold Research Centre was established in Salisbury in 1946 by the Medical Research Council. Much of the work of the Centre depends upon a flow of volunteers who are prepared to take part in experiments designed to develop a test for the common cold virus.

Volunteers are refunded their fares to Salisbury, within limits, and are given free board and a little pocket money for their ten day stay at the Centre, during which they live in pairs in twelve isolation flats.

Several thousand volunteers have already been obtained through advertisements in the Press, supplemented by newspaper and magazine articles and talks on radio and television, and it is possible that some officers and airmen, and their wives, have taken part in these experiments on a voluntary basis while on leave. Although it is clearly impracticable to permit serving personnel to attend the Centre whilst on duty, the Air Ministry recognises the value of the Centre's work and wishes to encourage volunteers among R.A.F. personnel and their families.

Applications to spend a period of leave at the Common Cold Research Centre cannot be dealt with through official channels, but should be addressed to:

The Common Cold Research Centre,
Harvard Hospital,
Crombe Road,
SALISBURY, Wilts.

FURNITURE REMOVALS AT PUBLIC EXPENSE
COMPETITIVE TENDERS (AMO H.500)

The regulations for service personnel and civilian staff and employees require that where furniture and household effects are to be moved at public expense, three competitive tenders in writing must be obtained whenever possible.

In future these tenders are to be obtained from three separate removal contractors, each of whom may, if desired, be invited to quote for rail and for road movement if able to do so. Quotations for rail and road movement by the same contractor will count, however, as only one competitive tender. Tenders must be genuinely competitive and in no circumstances may the terms of a tender already obtained be communicated to another firm.
6.1.4. Arrangements for CCRU volunteers

As can be seen from the examples of advertisements for the CCRU, individuals applied to be volunteers by contacting the CCRU direct. Normally the CCRU sent a form for the applicant to complete [1]. An example is shown on the next page. Other information was sent to the applicant with the form, including an outline of the work of the CCRU and instructions detailing what to do if the applicant was successful. Applicants were rejected if they had suffered from chronic catarrh, asthma, hay fever, sinusitis or tuberculosis [1].

Volunteers (successful applicants) usually arrived at the CCRU on a Wednesday and left on the Saturday ten days later. Volunteers were housed in pairs sharing a lounge, bathroom and kitchen but with separate bedrooms. In later years volunteers could be housed in threes and fours [10]. Volunteers were strictly isolated from CCRU staff and anyone else (apart from the people sharing the accommodation). Meals were delivered in metal containers and left outside volunteers’ doors [11].

Volunteers were checked daily by CCRU staff protected by gowns and masks [12]. If the volunteers were found to be reasonably well and fit, they were allowed to go for walks on Salisbury Plain. However, as volunteers were prohibited from getting closer than 25-30 paces to anyone else, Salisbury city and residential areas were out of bounds [11].

Having left the CCRU, volunteers were sent a thank-you letter which also encouraged them to introduce their friends to the possibility of volunteering. The letter explained that volunteers could apply for another stint in six months’ time [13].

6.1.5. Summary

It is likely that Service personnel would have been aware of the CCRU, although it appears unlikely that a visit as a volunteer to the CCRU could be remembered erroneously as a visit to Porton. The recruitment schemes were different: Porton did not send out application forms to those who volunteered. Moreover, there are obvious differences in the arrangements of the two establishments:

- Porton Service volunteers were not isolated from staff, as they were at the CCRU, and were allowed to visit Salisbury (indeed, some visits were arranged for them);
- Porton Service volunteers usually arrived on a Saturday or Sunday, rather than a Wednesday;
- Volunteers at Porton were on duty, and so wore Service dress (albeit relaxed rigs), unlike CCRU where they were required to take annual leave and would not have worn uniform.

No connection has been found between Porton and the CCRU in the documents reviewed by the survey team. The only reference encountered which cites both relates to the time when accommodation at Harnham Down became dilapidated and a suggestion was made that the CCRU be moved to Porton, where there was a lot of space. This suggestion was resisted by the MRC as it felt that the CCRU would no longer be able to attract volunteers if it was associated with an MOD establishment [14].
VOLUNTEER'S APPLICATION FORM

Name (in full). Surname in Block Capitals.
Mr./Mrs./Miss

Home Address

Place of Work

Occupation

University and College (in case of students), and Faculty
(give degrees if any)

Date of Birth (Age limits 18—45 years)

Dates of previous visits (if any) to this Unit

Name of Partner (in full—see sheet C.1.)
(if none, state interests, for purpose of pairing)

Railway Station from which you will be coming *

Railway Station to which you will be returning *

* To enable travel warrants to be prepared
Have you ever been in Hospital?
If so, give brief particulars.

I understand the nature of the investigation proposed and offer my services as a volunteer in it.

Signed

Date

I am available for ten days between the following dates:
(Give as many dates as possible from the list attached)

Name and address of Next-of-kin

CONSENT OF PARENT OR GUARDIAN WHEN VOLUNTEER IS UNDER 21

I agree that my son/daughter/ward may take part in this trial.

Signed

Date
6.2. Examples of influenza studies involving Service personnel

6.2.1. Introduction

This section gives examples of the influenza studies conducted during the period covered by the survey in which Servicemen and women took part. The studies listed may not be exhaustive. They all concern the testing of influenza vaccines. The studies are separated into two sets. The first set was conducted by the MRC in conjunction with the Ministry of Health and the Armed Forces. The source of information on these studies is the file maintained by the Director of Hygiene in the Air Ministry. Equivalent files for the other two Services have not been found. The second set was carried out in the 1960s and involved RAF personnel. The details are taken from articles in the British Medical Journal.

The first set of studies was carried out in the early years of World War II and then after the War up to 1953. At that time influenza was regarded as an important infectious disease. The MRC report on Medical Research during the War [15] cited the grave problems caused by the influenza outbreak in 1918/19. This was the outbreak of Spanish Flu which killed millions of people worldwide: in one week in October 1918, 2,225 deaths from influenza were reported.

6.2.2. Studies during World War II and in the immediate post-war years

On 26th June 1940 a meeting was held under the aegis of the MRC to discuss influenza [16]; representatives of the three Services attended. A large influenza epidemic had been observed in South America and was expected to affect the UK around November or December 1940. The epidemic caused concern "in connexion with the present hostilities because if one side suffers more than the other from this disabling condition, it might materially alter the progress of the war" [16]. Accordingly, the meeting decided to conduct a study of a new vaccine developed in the Rockefeller Institute in the US:

- Samples of the vaccine were obtained for each of the three Services to conduct trials to assess the local and general reactions following inoculation. These trials were conducted and the reactions found to be negligible [16].
- Twenty five RAF volunteers were inoculated as part of the trial. Four took part in tests to find out if the vaccine affected pilot's performance [16].

Further studies of the reactions induced by the influenza vaccine were carried out in the spring of 1941. Volunteers from RAF Hednesford, Henlow, Hereford, Innsworth Lane, Locking, Yatesbury, Cosford, Compton Bassett, Kirkham, Melksham and Morecambe were inoculated and their reactions recorded [17].

Studies in the post-war years featured winter trials to establish how effective vaccines were against influenza. Generally, the method was to obtain volunteers from various UK locations so that, irrespective of where an influenza epidemic struck, there would be people who could be (or had been) inoculated with the vaccine. Despite this policy, the first post-war winter trial organised at an Influenza Conference in November 1945 [18] was unsuccessful. The Service representatives attending the conference thought that about 2000 people in each of the Services could be obtained for the trial. The trial went ahead in the winter of 1945/46 but was unsuccessful in providing information on the effectiveness of the vaccine [19]: no epidemic occurred in places where volunteers had been inoculated with the vaccine and, in places where volunteers were inoculated only after an epidemic broke out, medical officers were too slow in vaccinating volunteers.

Another winter trial was planned for 1946/47. The Army and RAF organised trials of a vaccine at Preliminary Training Centres. All men "as far as possible" of every other fortnightly intake from the 1 December 1946 to the 31 January 1947 were to be inoculated. The other intakes would serve as controls [19]. Instructions were sent out by the Air Ministry to RAF Padgate, Yatesbury, Wilmslow and Compton Bassett [20] and the trial went ahead as planned [21].
There were two small studies carried out in 1950 to test Influenza virus A vaccine and the PR8 virus vaccine. The studies were administered by staff at the Royal Hospital at Sheffield. As Service officers found it difficult to give the vaccine and take serum samples for antibody analysis [22], the trials were conducted at RAF stations close to Sheffield. RAF Helmswell provided volunteers for one of the studies [22].

Winter trials continued. The trial in the winter of 1950/51 used 2000 doses of vaccine obtained by the MRC from the State Serum Institute in Sweden. 1200 doses were used in trials with Army personnel, Caterham being one unit who provided volunteers [23]. Ninety-one men in Bomber Command had been inoculated with the vaccine in July 1950 [23]. The MRC established a committee on clinical trials of influenza vaccine in 1951, on which representatives of each of the Services served [24].

The winter of 1951/52 was deemed unlikely to bring epidemics of influenza, so trials were limited to testing methods and measuring antibody levels induced by the vaccine. Those trials were conducted with volunteers from hospitals and universities [25]. The Army and RN were asked to provide 100 volunteers each for a small trial in the summer of 1952 [26, 27]. This trial was inconclusive, but "an RAF station near Lincoln was prepared to co-operate in a [repeat] trial in October [1952]" [27].

A large winter trial was planned for 1952/53, originally to feature 40,000 volunteers of whom the Services would provide 7,000 (the other volunteers being drawn from nursing staff, industry and universities) [26]. In the event, the trial was scaled down and the Services asked to provide 2,500 volunteers [27]. The Director of Hygiene at the Air Ministry wrote to RAF Commands seeking volunteers. A quota was specified for each Command [28]: Bomber, Coastal and Transport were to provide 200 each; Fighter, Flying Training, Maintenance and Home, 600 each. Commands were left to approach units themselves. Replies from three Commands still exist which list the units which were to provide volunteers:

- Maintenance [29]: Bicester, Stafford, Boscombe Down, Aston Down, Martlesham Heath, Andover, West Freugh, Harpur Hill, Acaster Malbis, Newton, Honington, Ridgwell, Longparish, Great Orton, North Pickenham, Kidlington, Stoke Heath, Mount Batten, Hucknell and St Athan.
- Coastal [31]: Kinloss and Aldergrove.

Apparently the Air Ministry was reassured by the responses from Commands that the RAF would be able to provide 1000 volunteers and noted that the RN and Army "also, I believe, will provide 1000 volunteers each" [32]. Instructions for carrying out the trial and personal record cards were sent out by the Air Ministry to Commands in November 1952 [33]. Commands were left to distribute them to the units providing volunteers.

No other record of this trial or later winter trials has been found, but these examples show that Service personnel were involved in influenza studies. For the winter trial of 1952/53, it seems likely that RAF units received letters from their Commands calling for volunteers. These letters and any notices they may have prompted to be displayed at units have not been found. Earlier winter influenza trials may also have recruited volunteers through letters sent by Commands or the Air Ministry and it is likely that the other two Services used a similar means to recruit volunteers. All the trials outlined here were conducted at volunteers’ own units.

6.2.3. Studies in the 1960s

In 1960 and 1961 RAF personnel took part in two trials of influenza vaccine. The report of the trials in the British Medical Journal [34] cites authors from the Epidemiological Research Laboratory and the Virus Reference Laboratory, both at Colindale in London, and the CCRU. The trials sought to investigate the effects of a nasal instillation of an influenza vaccine. The Director General of the RAF Medical Services gave permission for the trials to be conducted.
The first trial involved volunteers from RAF Digby. The nature of the investigation was explained to members of the unit and volunteers were sought in September 1960 for inoculation with the vaccine the following month. Blood specimens were taken from 128 volunteers from RAF Digby for screening purposes. In all, 64 men were given vaccine during this trial.

The second trial was prompted by evidence of outbreaks of influenza at three RAF units (Bridgnorth, Wroughton Hospital and Northolt) in January 1961. In total 1026 Service personnel took part: half being inoculated with a vaccine and half with a control diluent in late January and early February 1961. At Bridgnorth 392 recruits took part; at Wroughton, 437 men and women; at Northolt 197 men and women. Each station was visited every 10 days until the end of March by the scientists.

No details are given in the report of why RAF Digby was chosen for the first trial, but the inference is that the station was chosen and then the people organising the trial visited to brief verbally. The stations involved in the second trial were selected because of the influenza outbreaks, although no details are given as to how people at those stations volunteered. In neither case does it seem likely that an advertisement calling for volunteers for the trials was sent to all RAF units.

RAF personnel took part in a further influenza vaccine trial in 1962. The report of the trial in the British Medical Journal [35] once again cites authors from the laboratories in Colindale and the CCRU. Volunteers from RAF Henlow took part, although it is not known how the station was selected for the trial. 764 RAF personnel and 71 civilians provided blood samples for screening purposes and 194 of these people took part in the trial. Volunteers received the vaccine by drops or spray into the nose at the end of October 1962.

6.3. Medical Research Establishment studies involving Service personnel

The Medical Research Department (later to be renamed the Medical Research Establishment (MRE)) was established at Porton Down in 1951. The MRE closed as a Ministry of Defence facility on 31 March 1979 and reopened the next day as the Centre for Applied Microbiology and Research (CAMR) within the Public Health Laboratory Service.

Although no connection between Porton and the CCRU has been uncovered, links existed between the MRE and the CCRU. Scientific seminars and discussions were held with scientists from the CCRU and MRE. This type of collaboration led to the setting up in 1952 of the South Wiltshire Virus Group (SWVG): a forum for virologists from both units to discuss their work. A brochure produced in 1971 outlining the work of the MRE notes: "A close relationship with the Medical Research Council and the Common Cold Research Unit at the Harvard Hospital is reflected in the South Wiltshire Virus Group which meets alternatively at the two establishments".

MRE conducted some work of relevance to influenza. In the early period of its work from 1945 to 1956, MRE dedicated some effort to techniques for mass immunization: an automatic hypodermic syringe and a high precision needle-less injector were developed [36]. These developments were associated with MRE's work on biological warfare defence.

The needle-less injector was tested in three trials with Service personnel. No description has been found of how these trials were explained to the participating volunteers, who may remember them as some form of influenza or cold study.

MRE conducted some work with influenza vaccines as part of its civil research programme. The unit conducted an investigation of an influenza virus, called PR8, in 1959 to find out the environmental conditions (humidity and temperature) in which it could exist [40]. Experiments with mice were conducted in the same year with an Asiatic influenza virus [40].
A Civil Programme Advisory Committee was established in 1971 with members from the DHSS and MRC to advise on the civil work conducted by the MRE [41]. One of the projects supported by the committee was the development of an influenza vaccine less toxic than those presently available. MRE, under contract to the DHSS produced such a vaccine by 1974 [42]. Human studies to compare this vaccine with others were conducted in 1975, with volunteers from the MRE staff [43].

Apart from the development and testing of the influenza vaccine in the mid-1970s, no documents have been found describing later work on influenza viruses and vaccines. Therefore, with the exception of the trials with the needle-less injector (which might be remembered by the participants as some kind of common cold or influenza trial), the MRE did not conduct influenza studies with Service personnel.
Chapter 7. Chemical Warfare Training and the Defence NBC Centre

7.1. Introduction

Over the period covered by the survey, Service personnel have received chemical warfare training in three types of environment: the gas chamber, the gas compound and exercise areas. Gas chambers were generally used to check that Service personnel could fit their respirators properly. Sometimes servicemen were given opportunities to experience the smell and effects of some chemical agents. Gas chambers used for training were often straightforward brick buildings with appropriate safety features (air-tight, but with ventilation systems to clear the atmosphere within the chamber safely, for example). The gas chambers used in training differ from those used at Porton for scientific trials: they did not need the gamut of recording instruments, decontamination facilities and detectors which Porton required for their chamber studies.

Gas compounds were small areas, typically 50 square yards, surrounded by barbed wire in which Service personnel received demonstrations of chemical agents. Gas compounds were set up at most military bases. They were used to give personnel an opportunity to appreciate how chemical agents affected military tasks. Larger exercise areas were set up in parts of established training ranges.

Some of this training was undertaken by service personnel at their own units and some at specialist gas training ranges. However, some training was carried out at the Defence Nuclear, Biological and Chemical Centre (DNBCC), as it is now known, at Winterbourne Gunner. The DNBCC has been training Service personnel and conducting trials in defensive aspects of chemical warfare since 1926, when it was established as the Chemical Warfare School. Since then, although the name of the centre has changed several times, it has continued with defensive training and trials. Some forms of training, particularly those requiring large areas such as exercises, have also been conducted at Winterbourne Gunner.

The chemical defence trials conducted by the DNBCC differ from the studies and trials carried out at Porton but the two establishments have co-operated over the conduct of trials (as will be explained in a later section). Porton has, at various times, assisted the DNBCC with its work: giving lectures to courses and advising on defensive procedures. Porton also provided support in setting up training exercises. From the mid-1970s, part of Porton’s ranges was used regularly for Service chemical defence training and may account for some servicemen’s recollections of attending Porton (Page 2 of this chapter refers).

7.2. Chemical warfare training

7.2.1. Gas chamber training

The use of the gas chamber to test if Service personnel could fit their respirators properly dates back to 1918 [1]. Servicemen fitted their respirators, entered the chamber and walked round for 5 minutes in an atmosphere of tear gas. After leaving the chamber, respirators were worn for a few more minutes to allow gas to dissipate from clothing. Special capsules of CAP, an early tear gas, were issued for this training [2]. This routine was augmented in 1935 [3]. After going through the procedure to check respirators had been fitted properly, each man briefly re-entered the chamber without protection as a demonstration of the protection afforded by the respirator.

By 1941 all Service personnel went through this respirator test and unprotected exposure every three months [4]. Personnel were also required to experience a nose gas, DM [5, 6], so that they might be able to recognise the gas and appreciate its delayed action effects [7]. Personnel were exposed to DM for two minutes: no-one was required to experience DM more than once [7]. These arrangements continued after World War II [8].

Throughout the survey report the terms DNBCC or Winterbourne Gunner are used.
The requirement to experience DM ceased in 1963 [9]. CAP, or CN as it was also called, remained in use as a riot control agent until the late 1950s, when it was replaced by CS. By 1964 CS was being used instead of CAP [10] in what became known as the "CS chamber" test [11]. Every member of the Armed Services was required to undergo the test. The test continued through the 1980s [12], by which time most permanent military stations and training camps had a CS chamber.

7.2.2. Gas compound training

Gas compounds were introduced as a form of training in 1939 [5] and were used to demonstrate real gases. Such compounds were to be established at all military stations. The DNBCC at Winterbourne Gunner had a gas compound, but no suggestion of a gas compound existing at Porton has been found. Compounds were to contain a gas chamber (for the test described above), a concrete surface, typical road surfaces and a mustard gas pit [7]. Agents to be available in the compound included phosgene, mustard, DM and CAP (for the chamber test) and a more persistent tear gas, BBC.

Examples of the type of demonstrations in the gas compound are given below [7]:

- Personnel were held upwind of a phosgene cylinder until a suitable quantity of the gas was produced. Personnel would then pass through the gas in single file.

- A small quantity of mustard gas was poured onto a concrete surface and personnel were to note the appearance and smell of the gas by passing downwind of the area. This demonstration was to be the forerunner of the "Sniff Test".

- The mustard gas "Confidence Test". A drop of mustard gas was placed on the bare forearm of each man, who would then apply the extant personal decontamination procedure (for example swabs and ointment) to gain confidence that the procedure worked.

The demonstration of phosgene in gas compounds ceased in 1963 [9]. The mustard confidence test continued. When the test was introduced in 1942, a "large drop of mustard gas was placed on the bare forearm of each man". More precise instructions were issued in 1957 [13]. In 1971 the size of the drop to be used was to be "no bigger than a small match head" [11]. The confidence test was removed from gas training in 1980 [14], partly on the advice of Porton.

The mustard gas sniff test first appears to be mentioned in 1971 [11]. A small quantity of mustard gas was poured into a container and warmed so that vapour was given off. Personnel taking part in the test wore respirators. They inserted two fingers between their respirator and their face and sniffed gently until they smelled the obvious odour of mustard [11]. The mustard gas sniff test continued to be used in training into the late 1970s [15].

7.2.3. Training in exercises

Tactical training exercises are a regular feature of Service life. Conducting some of these exercises in a chemical warfare environment was raised in 1935 [3], which appears to be the first time that non-toxic simulants to represent chemical agents are mentioned as being used in training. Training simulants were used in exercises by 1939 [5]. They continued to be used into the 1970s and 1980s. Different training simulants were used at various times and volunteers were involved in developing new training simulants. That work is described at Annex B. However, two real chemical agents have been used in specialist chemical defence training exercises: mustard gas and CS.

Instructions issued in 1943 [16] specified how mustard gas was to be used in specialist training exercises. Protected personnel traversed ground contaminated by mustard gas, seeking to avoid large concentrations of the mustard, contaminated weapons were handled...
and fired, and personnel remained in mustard gas vapour for 30 minutes while practising duties (handling weapons, digging trenches). Specialist troops practised their own operations in this environment: Royal Army Medical Corps personnel collected dummy casualties and practised decontamination and medical treatments on them at dressing stations. Mustard gas ceased to be used for training exercises of this type in 1957 [17]. It was replaced by the use of simulants [13]. These exercises with mustard gas from 1942 to 1957 were carried out at larger range areas and, possibly, larger gas compounds. Some were carried out at Winterbourne Gunner. No document has been found to suggest they were carried out on Porton ranges.

Staff of the DNBCC sought advice from Porton on the use of CS in training exercises in 1960 [18], in particular as a means of demonstrating the need to don respirators quickly. The School of Infantry asked Porton in 1964 [19] for assistance in establishing a procedure for CS to be used in tactical exercises on its ranges. Having established the procedure, the School intended to use CS in 3 or 4 exercises a year [19]. By 1971 [11] CS was to be used, if appropriate, in annual defence exercises for trained soldiers. CS continued to be used in some exercises into the 1980s, although restrictions were placed on where such exercises could be held [20, 21].

One of those places at which training exercises with CS could be conducted was Porton, on an area of the range known as the "Battle Run" [21]. The use of the Porton range as a chemical defence training area dates back to 1975, when it was reported as having "increased during the past year" [22]. The Porton range was used increasingly by Service units for exercises in simulated chemical environments in 1976 and 1977 [23, 24]. The arrangements were reviewed with the Army in 1977 and the Porton "Battle Run" was formally opened in January 1980 [25]. It was supervised by staff of the DNBCC with Porton range staff providing assistance. Units bid to use the Battle Run. Each run was limited to 36 hours (to preserve the ecology of the range) and 25 runs were planned each year, normally at fortnightly intervals [25]. During 1980 15 units used the Battle Run. For the rest of the 1980s, about the same number of units used the Battle Run each year.

7.3. The Defence Nuclear Biological and Chemical Centre (DNBCC) and Porton

It is not the intention to give a history of the DNBCC at Winterbourne Gunner but to describe the links between the DNBCC and Porton. Porton contributed to the DNBCC courses by providing displays, giving lectures and advising on decontamination procedures. This might be expected, as Porton were at the ‘cutting edge’ of an area in which the DNBCC instructed and trained Service personnel. Indeed, by 1960, courses of Service personnel at Winterbourne Gunner seem to have been visiting Porton to see laboratory prototypes of defensive equipment under development [26].

Perhaps of more interest is the co-operation between the DNBCC and Porton on trials. From the time of its establishment in 1926, the DNBCC carried out chemical defence trials. The DNBCC conducted "user trials", in which Service personnel established techniques to use new defensive equipment destined to be issued throughout the Services [27]. "Evaluation trials" were also conducted by the DNBCC to compare defensive equipment or drills in using it [27]. Finally, as might be expected, the DNBCC conducted "troop trials" in which Service personnel were trained in using defensive equipment and drills.

Examples of these DNBCC trials include:

- user trials of spectacles with respirators in 1966 [28];
- troop trials in 1968 to train members of the 15 Field Ambulance RAMC Tidworth in decontamination drills [27];
- an evaluation trial of three different ways of preparing a chemical defence shelter to protect troops in 1974: the resulting shelters being exposed to CS to test their integrity [29].
These trials were very different from the research and development trials/studies conducted at Porton. The DNBCC concentrated on equipment and drills which were mature and had been accepted by the Services for use throughout the Armed Forces. Sometimes these drills involved a well-investigated agent which had been accepted for Service use, such as CS. Nonetheless, as might be judged from the preceding three examples, the trials conducted by the two establishments featured aspects of mutual interest. The DNBCC sent Porton copies of its trial programmes, at least from 1965 onwards [27] and informal regular meetings were held in the 1970s between the DNBCC and Porton to identify areas of common interest and to examine the possibility of co-operation [30]. Co-operation took two main forms:

- Some DNBCC trials used Porton facilities. As examples, the troop trial involving 15 Field Ambulance in 1968 (mentioned above) used Porton chambers to test the fit of respirators in an atmosphere of CS on three different days [31]. The new chemical protective suit was tested in Porton climatic chambers in March 1965 [32]. A DNBCC trial to assess if facelets leaked in 1978 used Porton facilities [33].

- Some trials were conducted jointly by the DNBCC and Porton. The evaluation of different ways of preparing chemical defence shelters (mentioned above) was a joint trial in which 8 Service volunteers took part [29]. Exercise Hot Box in 1976 is another example of a joint DNBCC/Porton trial: Service volunteers took part in the exercise which sought to test procedures of handling casualties in a chemical environment [22].

Two instances of Porton using DNBCC for trials have been found. On the morning of 4 July 1968, 4 Service volunteers took part in a CS trial at Winterbourne Gunner [34]. On 19 March 1981 some volunteers were sent ‘on loan’ to DNBCC, for possible ‘officer demonstration training’, although the records are not definitive on this point. The records show a “?” against ‘officer demonstration training’ [35].

In summary, there are several reasons why Service personnel went to Porton but not as volunteers for human studies or trials associated with Porton’s research work:

- before 1960 it seems that courses from the DNBCC visited Porton to see prototype defensive equipment;
- from the 1960s some trials conducted by the DNBCC were carried out at Porton;
- from the mid-1970s, part of the Porton range was used for chemical defence training exercises by a variety of Service units.

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