Rescue of the Remnants: The British Emergency Medical Relief Operation in Belsen Camp 1945

E Trepman

ABSTRACT
The British Army liberated the German concentration camp at Belsen on April 15, 1945. The thousands of inmates (estimates range from 60,000 to 78,900 inmates), mostly Jews from eastern Europe, were dying at a rate of 500-600 per day from disease, and many more were being killed by the German guards and co-workers. Diseases prevalent included typhus, tuberculosis, nutritional and infective diarrhoea, severe malnutrition and starvation, and others. Despite huge obstacles including the ongoing war effort, shortages of supplies, and limited numbers of workers, a relief operation was rapidly organized to control the typhus epidemic and salvage as many inmates as possible. The 10,000 emaciated corpses which had been lying all over the camp were collected and buried in mass graves. Inmates were disinfected with D.D.T., scrubbed in a “human laundry,” and evacuated from the typhus-ridden Horror Camp (Camp 1) to a hospital organized in the barracks of the Panzer Training School (Camp 2). Feeding of the inmates was carefully regulated, and some basic medical treatment organized. The relief operation was performed by British Army units, detachments of the British Red Cross, British and Belgian medical students, and other volunteers including those from among the less debilitated inmates. Although 13,000 inmates died after the liberation despite the relief operation, thousands of others were rescued.

Key words:
Concentration camp, Typhus, Tuberculosis, Diarrhoea, Starvation, Genocide, Germany, World War II, Holocaust

The Liberation Of Belsen Camp
On April 12, 1945 two German messengers notified the oncoming British Army that there was a concentration camp at Belsen with 60,000 “political” prisoners, among which, they claimed, were 1500 cases of typhus (1, 2), 900 of typhoid fever, and others with various illnesses (1). However, when units of the British Army (14 Amphlet Unit of the Intelligence Corps, followed by 63 Anti-Tank Regiment, Royal Artillery) entered Belsen Camp on April 15 (3, 4), they found that the condition of the prisoners was far worse than what had been forewarned. In the part of Belsen known as Camp 1, a half square mile area (5) which the British liberators referred to as the “Horror Camp” (6), they found an estimated 22,000-28,185 women (1, 3, 7), 18,000 men, and 500 children packed into approximately 150 wooden huts (7, 8, 9) divided into five main compounds, three for men and two for women (1). The huts were approximately 110 feet by 30 feet in size, and each contained from 400 to 800 inmates (3, 5). In the brick buildings of Camp 2 (7, 8), which had been previously used as the Panzer Training School (10) and as housing for the Wehrmacht troops (1), an estimated 17,000-27,000 male prisoners were held (7, 8) including 15,000 who had been brought five days earlier from the V1 factory at Dorfen near Nordhausen (3). The large majority of prisoners in Camps 1 and 2 were Jews from Poland and the Soviet Union (including the Baltic countries, particularly Lithuania), transported to Germany from concentration camps such as Auschwitz, Majdanek, and Stutthof during the Soviet advance westward, as well as others from Czechoslovakia, Belgium, France, Italy, and Yugoslavia (7, 8).

Lieutenant Colonel JAD Johnston, RAMC of the 32 Casualty Clearing Station (CCS) (11), who was appointed Senior Medical Officer (SMO) of Belsen Camp (12, 13, 14), reported on April 18, one day after he entered the camp (7, 12, 13, 14):

“It is impossible to give an adequate description of the scene. Camp 1. - A dense mass of emaciated apathetic scrawny individuals huddled together in wooden huts without beds or blankets in many cases, without any clothing whatsoever in some cases. The females in worse condition than the men, their clothing generally, if they have any, only filthy rags. The dead lie all over the camp and in piles outside the blocks of huts which house the worst of the sick and are misused as hospices. Approximately (10,000) naked and emaciated corpses in various stages of decomposition are lying about the camp. Sanitation is non-existent. Pits without any in only a few instances, wooden perch rats are available in totally inadequate number, but the majority of inmates, from starvation,
apathy, and weakness, defaecate and urinate where they sit or lie, even inside the living huts. There is no running water or electricity. All water is being brought in by our water trucks.” (7).

The approximately 10,000 “dead lay in naked walls of bodies around the huts, many of which were filled, literally filled, with the dead and the dying” (3, 7). They lay crowded on bunks or on the floor, “in foul rags drenched in excreta, covered with lice” (7). Of the 40,000-69,000 prisoners in Camp I, 500-600 were dying daily from disease (over 1000 on one day in March 1945 (15)), and many more were being killed by the German guards (7, 16); on April 15 the death toll was 800 (3). There had been almost no water for a week prior to the liberation (7) because of “the Germans cutting the water-supply as a final gesture before they left” (8), and no food or water had been provided for four or five days before the British Army arrived (8).

**Organization Of The Relief Operation**

The British 11th Armoured Division entered Belsen Camp on April 15 at midday, and by 4 p.m. the medical relief work was begun by the Divisional Field Hygiene Section (17). The Divisional ADMS Col D Bluett immediately arranged for supplies of AL63 and disinfectant, and thus 15,000 inmates were deloused during the first three days after the liberation (17). The Deputy Director of Medical Services, Second Army, Brigadier HL Glyn Hughes, who personally inspected the camp on April 15 (3, 4), ordered five British medical units to Belsen which arrived on April 17 (1, 7), and several days later these were reinforced with three additional medical units, thus beginning “the colossal medical task of transforming a death-trap into a hospital” (7). This rescue operation required the diverting of these units from the ongoing military campaign (2), and although it “could not be regarded as a commitment which came strictly under the Army Medical Services... the dictates of humanity required quick action” (7). Even after the full establishment of the British Military Government, which assumed responsibility for the Displaced Persons in the concentration camps in

**Table 1. Belsen Camp: Urgent measures to be taken.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Bury dead.</td>
</tr>
<tr>
<td>b</td>
<td>Evacuate patients in Camp I to suitable clean buildings in Camp II, with plans for reception, delousing and cleaning.</td>
</tr>
<tr>
<td>c</td>
<td>Evacuate fit from Camp I to Camp II.</td>
</tr>
<tr>
<td>d</td>
<td>DDT all inmates.</td>
</tr>
<tr>
<td>e</td>
<td>Arrange suitable feeding for patients. Death-rate has increased since abundant food became available.</td>
</tr>
<tr>
<td>f</td>
<td>Pile and burn masses of rubbish, rags and human excreta which litter the camp.</td>
</tr>
</tbody>
</table>

*From report of Lieutenant Colonel JAD Johnston, RAMC, the Senior Medical Officer (SMO) of Belsen Camp, April 18, 1945 (13, 14).*

British-occupied Germany of which Belsen was the largest, the Army Medical Services continued to provide large-scale medical assistance because the Military Government had only a “skeleton staff” without adequate material resources, equipment, or personnel for the task (18).

Johnston’s report of April 18 included a list of proposed urgent measures, which became the plan of action for the first few weeks of the rescue operation (13, 14) (Table 1). On April 18 the British forced the German S.S. and Hungarian guards at gunpoint, assisted by trucks and bulldozers, to collect and bury the thousands of dead bodies in mass graves and to clean up the filth (4, 7, 19). Under the direction of Johnston, a hospital of 17,000 beds was set up in the barracks of Camp 7 including the Round House, a building which had been the S.S. officers’ mess hall (10, 16). All inmates from the typhus-ridden Horror Camp (Camp 1) were evacuated to the Camp 2 hospital, at a rate of 700-1500 per day (3, 4, 20, 21); the first 500 typhus cases were evacuated on April 18 (3).

The evacuation of Camp 1 consisted of four steps: calling the inmates out of their blocks, registration, bathing and disinfection, and embussing on lorries to Camp 2 (3). The 7,000 inmates were processed 20 at a time in the “human laundry” which was set up in a former horse stable near the entrance to Camp 2 (21). Here they were “placed on mats, scrubbed down to remove the caked dirt and faces of months and dusted with DDT,” (7, 8, 20, 21, 22) the newly developed insecticide which had recently been used successfully to kill mosquitoes and prevent malaria during the Italian campaign (23). The delousing of the entire population of 40,000 inmates with DDT (7) was completed by April 30, just two weeks after the liberation (8). Despite this, numerous healthier inmates waiting to be evacuated from Camp 1 contracted infections and died, including those who were helping in the relief effort (3). By May 18 the evacuation of Camp 1 was completed, and 13,834 patients had been admitted to the Camp 2 hospital (8). Although accurate numbers were impossible because of the enormity of the problem and the utter chaos present, it was estimated that a total of 78,900 inmates had been evacuated from Camp I, and that 23,000 dead had been buried, including the 10,000 corpses that were found unburned on April 15 and 13,000 that had died after the liberation because of disease and starvation (22). By the end of May, 30,000 living inmates remained in Belsen, including 11,200 to 13,000 in the main hospital area (3, 7).

The practical problem of organizing such a colossal rescue operation was enormous. It was necessary to find beds, bedclothes for medication, dressings, and other necessities which were scarce after the liberation (7).
Large supplies of drugs and dressings were captured from the Germans (1, 3). German military medical stores were collected into central dumps, such as the large dump at Celle near Belsen where nearly 2000 tons of medical equipment were concentrated, sorted, and issued to the Belsen hospital areas and other Allied ex-prisoners of war and German military hospitals (2). Captain Leslie Hardman, the Jewish Chaplain of 8 Corps, obtained tinned and fresh milk, porridge, peas, rice, and other foodstuffs from Red Cross parcels by requisitioning and appealing (3). The physician in charge of hospital stores at Belsen, Capt "Frosty" Winterbottom, RAMC, equipped 7000 beds in one week by “freezing” all he could lay hands upon in the district around Belsen (13). In addition, Winterbottom organized thousands of sets of clothing and footwear for the liberated prisoners, a hairdressing salon, a group of plumbers and carpenters for the hospital buildings, internee seamstresses who mass-produced the "standard Belsen nightie" for the sick, and a workshop for wirelesses and bicycles (13). He also organized a night club - "The Coconut Grove" - "chiefly for rehabilitating the patients" (10, 13). A former stable in Camp 2 was converted to an issue store for clothing requisitioned from German townspeople miles around Belsen, and was named "Harrod's" (3). However, by early May German medical supplies were short, and stocks of some essential items were exhausted because the medical resources of the British Army Medical Services were "fully stretched" in dealing with the heavy commitments at Belsen as well as to the inmates of other concentration camps, British troops, and Allied ex-prisoners of war (2, 18).

Approximately 3000 British troops were directly involved in the relief effort in Belsen (3). Nursing and domestic help was organized from liberated prisoners who were strong enough to work, and also from the German population (7). Furthermore, in response to an appeal from the military, six detachments of British Red Cross workers arrived on April 23 to help nurse the sick and evacuate them from Camp 1 via the "human laundry" to the Camp 2 hospital (4, 7). One week later, a group of 95-100 medical students arrived from London, who helped with the huge job of cleaning and feeding the weak inmates, and also provided medical help (3, 7, 16, 24, 25). The students took over the major job of feeding the starving inmates in Camp 1 (3, 7, 16, 26, 27). Forty tons of dried milk and protein hydrolysate were delivered (7). Within 10 days of arrival of the students, the daily death rate dropped from 300-500 per day in half (24), and subsequently to 60 per day in mid May (7). The British nursing services also had a major role in the transformation of Belsen during the weeks after the liberation (28).

As the evacuation of Camp 1 was nearing completion, the barracks were burned down to prevent further spread of the typhus epidemic. The last of the huts of Camp 1 was destroyed in a ceremony on May 21 (3, 4, 13, 19, 21, 22). Mid May in the Camp 2 hospital, there remained 11,200 patients in the main hospital area and 2300-3500 sick in another area (7). Each square of Camp 2 accommodated approximately 700 patients in five barracks under the direction of one medical officer from the RAMC and one of two British nurses; each of the barracks housed approximately 150 patients under the care of one Swiss internee, or German doctor, assisted by internee or German nurses (7). Acute surgical cases, both major and minor, were treated in the Camp 2 hospital area including the Round House hospital (5, 10). Anaesthesia with pentothal, open ether, or ethyl chloride was administered by the medical students (5).

Camp 3 at the village of Bergen (10) was a convalescent area of 20 barrack buildings (3) with 8000 inmates (7) who were not as critically ill as those in Camps 1 and 2, but who were weak and susceptible to disease. The typhus epidemic broke out in Camp 3 in mid May which necessitated the transfer of sick patients to the Camp 2 hospital (7, 13). A group of smaller barracks of former German officer quarters, known as Camp 4, was also used to house healthier surviving inmates (3).

The policy adopted by the British relief administration at the beginning of the rescue operation was to attempt to save the greatest number of prisoners using a program of triage. The prisoners who had a "reasonable chance of survival" were treated with suitable feeding and hygienic measures to prevent further infection, whereas the most sick were provided with bedrest and elementary nursing (8). One of the medical students who had requested that one of his patients be transferred, was advised by the administrative officer that "to treat these people individually is a great mistake... When an ambulance calls at your hut, the sick will be taken to hospital. Until then you must wait. It is folly to waste time on one patient" (29). This student was angered by the "continual sense of frustration" which is natural for a physician who is accustomed to giving the individual patient the utmost priority (29). Despite the administrative emphasis on mass treatment, which was dictated by the mammoth numbers of sick and starving, acuteness of the medical and epidemic emergency, and limited resources available, the experience of individual prisoners left a deep impression on the relief workers, especially the medical students (30).

However, some individual care was provided to critically ill inmates in the Horror Camp. As the evacuation of inmates from Camp 1 to the Camp 2 hospital was begun, an improvised emergency hospital
was organized in the former S.S. pharmacy inside Camp 1 within several days of the liberation to provide support for critically ill individuals until they could be evacuated (3). This Camp 1 hospital was organized by Captain Leslie Hardman (the Jewish Chaplain of 8 Corps), Stephen Green (British Red Cross), and two Polish prisoners, Dr. Natolski and Lieutenant Marian Tatarczuk (3). These workers assembled and distributed medication and special food, transported patients to and from the hospital block, and diagnosed and treated critically ill inmates. From mid April to mid May, 200 men and women were treated in the 12 bed inpatient unit of this hospital, and another 200 as outpatients (3). Furthermore, the British medical students organized another acute care hospital in one of the blocks inside Camp 1 for emergency treatment of inmates waiting to be evacuated (3, 16).

Even after the evacuation to the Camp 2 hospital, treatment of the starving inmates was a difficult task in primitive conditions (20, 31, 32):

"Hospital facilities (in Camp 2) were primitive. The authorities had taken over for use as a hospital a large well-built but incredibly dirty German barracks. All the furniture had been removed and the rooms were at best furnished with plank beds, straw palllasses and blankets. There were two cold water taps on each floor to serve about 75 patients. The water supply often gave out and then the hospital depended on a cart that might or might not come. Hot water we boiled up ourselves on a rather dilapidated primus stove. For a week there was no artificial light except candles in the investigation ward... Fourteen thousand severely ill people had to be treated under these conditions..." (20)

Diseases
It was not possible to keep systematic records, but attempts were made to describe and estimate the prevalence of the various diseases (8). When the British Army first entered Belsen, the prisoners were dying from starvation, typhus, tuberculosis, dysentery, and murder by the Germans (7, 16). During the first month after liberation, more than one quarter of the 60,000 surviving inmates died because of disease and starvation (3).

Typhus
Typhus was a difficult problem in the Belsen hospitals. The typhus epidemic in Belsen began in January (15) or February 1945 (33). At least two known incidents contributed to the epidemic. First, a large transport of prisoners was admitted to Belsen in October 1944 without being disinfected because of damage to the shower-bath machinery; some of these prisoners carried lice, which then spread throughout the camp (15). Second, a group of Hungarian prisoners had been incarcerated in cattle trucks for ten days prior to arrival in Belsen and many had developed typhus, failure to segregate these prisoners from others in Belsen, along with the crowding, poor nutrition and lack of sanitation, contributed to the outbreak of the typhus epidemic (14).

An estimated 10,000-20,000 cases of typhus were uncovered when Belsen was liberated on April 15 (22). After the liberation, 25% of patients admitted to the Belsen hospitals suffered from typhus and many others admitted during the incubation period developed it later (8). Weil-Felix testing supported the clinical impression that the majority of patients in Belsen had developed typhus (33). Even a large percentage of patients (9 [47%] of a sample of 19 patients) who denied having had typhus tested positive with the Weil-Felix reaction, demonstrating that they had had the infection (33)(Table 2).

Table 2. Typhus in Belsen Camp. *

<table>
<thead>
<tr>
<th></th>
<th>N**</th>
<th>Weil-Felix positive no.</th>
<th>positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1945</td>
<td>26</td>
<td>12 (46%)</td>
<td></td>
</tr>
<tr>
<td>June and early July 1945</td>
<td>22</td>
<td>9 (41%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>21 (44%)</td>
<td></td>
</tr>
<tr>
<td>Patients who denied typhus</td>
<td>19</td>
<td>9 (47%)</td>
<td></td>
</tr>
<tr>
<td>Patients who reported typhus</td>
<td>9</td>
<td>5 (56%)</td>
<td></td>
</tr>
</tbody>
</table>

* Data of Majors Griffin, Morris and Prior, reported by Molsen (33).
** Sample size from which percentage estimate was made.
† Positive result defined as titre of 150 or more.

The clinical symptoms and signs of typhus included high fever, violent headache, delirium, tinnitus, deafness, palpable spleen, and rash (13). Parotitis occurred in typhus patients, particularly those who were dehydrated, and sometimes required drainage (13). The mortality rate from typhus was estimated at 10-20% at age 20 yr and almost 100% at age 50 yr (13).

The typhus epidemic in Belsen continued to spread after the liberation (9), but the situation improved after the camp was cleaned and disinfected. The British were assisted by Capt WA Davis, a representative of the United States Typhus Control Commission (7, 8), who estimated that 95% of the lice were eliminated by the first delousing of the huts (14). The epidemic was eventually controlled by the delousing, evacuation and burning down of Camp Belsen, but not until many inmates had died. Those who suffered from typhus also had complications, including thrombophlebitis, gangrene, bronchopneumonia, meningitis and severe attacks of chest pain (7, 28). Several (10 according to
Diarrhoea
Almost all inmates of Belsen suffered from diarrhoea - 80% according to one estimate (37). The etiology of the severe, uncontrollable diarrhoea of Belsen was nutritional or infective (38).

The great majority of cases of diarrhoea was of nutritional or dietetic etiology, and improved with a controlled diet (8). Several drugs were used, including opium, Albucil, sulphiuralamine, sulphasphamide, "a German drug of unknown composition" (5), nicotine, and charcoal, and kaolin (10, 14). In a group of patients with pellagra-like vitamin deficiency, diarrhoea improved with nicotinic acid (28).

Nonetheless, the nutritional diarrhoea was generally difficult to control and the associated dehydration contributed to deaths (14).

Although dysentery was not diagnosed in Camp 1 during the first few days after liberation (7), it was felt to be present and was treated in the Camp 1 hospital with intravenous injections as well as a diet of biscuits and hot cocoa or milk (3). Bacillary dysentery was subsequently documented in 8-15% of patients with diarrhoea, primarily resulting from B. dysenteriae Flexner II (8). These patients responded to sulphasguanidine or sulphasphamide except when severe starvation was present (8).

Another study of rectal swabs revealed multiforme pathogenic organisms in 17% of 100 cases of diarrhoea, with Sonne bacilli demonstrated in 15% and Flexner bacilli in 2% (38). Infective diarrhoea was also caused by intestinal tuberculosis (28).

Starvation
Starvation was widespread in Belsen from at least January 1945 until the liberation (8, 33). Malnutrition from "plain lack of food and water" was evident in all patients, and 60% of inmates had starvation disease (8). The starvation cases were characterized by extreme emaciation, dehydration and apathy, and hunger edema was present in 6% (8).

The severe emaciation of the corpses showed that starvation was universal among them prior to death (8). Not only was starvation the primary cause of death among inmates in Belsen, but it also facilitated the spread of lethal infections.

The chronic food deprivation in the concentration camp became progressively worse during the four months before the liberation of Belsen. A Hungarian woman doctor reported that in January 1945 the prisoners received 300 g (one sixth of a loaf) of bread daily along with varying amounts of a thin, watery "soup" of mangel wurzel, a common beet used mainly as cattle feed (8, 33). Subsequently, there was a period when the "soup" was given only three nights a week and a small amount of margarine or jam on the other four nights (33). In March,

Table 3. Prevalence of tuberculosis (TB) in Belsen Camp.

<table>
<thead>
<tr>
<th>Population</th>
<th>N*</th>
<th>Patients with TB (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prisoners in Camp 1 **</td>
<td>-</td>
<td>(&gt;33%)</td>
<td>(14)</td>
</tr>
<tr>
<td>Patients in Camp 2†</td>
<td>331</td>
<td>(&gt;20%)</td>
<td>(8)</td>
</tr>
<tr>
<td>Patients in Camp 2‡</td>
<td>1575</td>
<td>(&gt;30%)</td>
<td>(28)</td>
</tr>
<tr>
<td>Starvation cases in Camp 2#</td>
<td>64</td>
<td>27(42%)</td>
<td>(33)</td>
</tr>
<tr>
<td>Deceased with known cause of death###</td>
<td>18</td>
<td>12(57%)</td>
<td>(33)</td>
</tr>
</tbody>
</table>

* Sample size from which percentage estimate was made.
** Clinical estimate of inmates prior to evacuation to Camp 2 hospital.
† Radiographic screening of miscellaneous patients in Camp 2 hospital selected at random; radiography deferred in those patients too ill to be screened radiographically.
‡ These workers estimated that 25% of all patients in Belsen had acute tuberculosis.
# Data from radiography, blood testing, and autopsy.
### Method not explicitly noted (33), but the context suggests that these were autopsy data; autopsy study cited elsewhere noted "active tuberculosis disease in the lungs of a very high proportion of cases of starvation" (8).
only one-twelfth of a loaf of bread was given for supper, and when there was no bread, mangel-wurzels were eaten (33). In April there was no bread distributed; the prisoners received a half litre of the thin ‘soup’ daily and nothing else (33). It was considered remarkable that some inmates had survived despite a diet of 400 calories or less for two to three months (38). The distribution of food had been arbitrary, and those who did not have the strength to stand in line had often missed the daily ration (8).

The British relief workers documented the extreme physical deterioration of the starving inmates, especially the ‘Muselmänner’ - inmates who were on the verge of death because of extreme starvation and exhaustion (33, 39). As noted by one of the medical student volunteers:

‘Physically, the most startling sight was the degree of emaciation to which the (inmates) had been reduced. ‘Skin and bone’ here was a literal description. Their heads were no more than parchment covered skulls, their thighs could be circled by finger and thumb and it was easy to grip the bodies of their vertebrae through their anterior abdominal walls. Their muscles were mere fibrous strands and the women’s breasts just wrinkled flaps of skin... many were too weak to move...’ (5)

The sick lay on their bunks, apathetic, indifferent to the deaths occurring around them, many leaving their food untouched, and incontinent of faeces (33). The faces were ‘appallingly thin’, ‘the eyes were sunken and the cheek-bones jutted out’, and the heads shaven (33). They were so thin that ‘the ribs stuck out, and it was difficult to use a diaphragm type of stethoscope because it simply bridged across two ribs and made no contact with the skin dipping down in between’ (33). In some cases their superficial bones had burst through the skin” (28). The feet and ankles were swollen, with the ‘leg as thin as a stick with a fat swollen foot on the end of it’ (33). The ‘muselmänner’ had large bed-sores on the buttocks and the lower back, and would cry out, ‘Scheisserei’, because of the severe diarrhoea (33).

In a group of 11 starving patients who were strong enough to stand upright on scales, the original body weight of 47.8 kg had decreased to 25.45 kg; the range of percent loss of original weight in this group was 29-56% (33). The weight loss was more extreme in the thinnest patients, who were too ill to be weighed, and they died earlier (33).

Hematologic studies in 75 starvation cases showed that almost all were anaemic, with average hematocrit in men 31%, women 29%, and children 30% (33). The anaemia was normochronic and normocytic, and bone marrow examination in several cases revealed normoblastic erythropoiesis, suggesting that the anaemia was a result of decreased production of red cells (28, 33).

The sedentation rate was elevated in patients with starvation, even when infection was not evident (33).

Circulating blood volume was decreased by 16-21%; average blood volume was 4.3 litres in a sample of 6 males and 3.7 litres in 10 females tested (33) (normal 5.1 litres in males and 4.0 litres in females (40)). Another report estimated the circulatory capacity to have been one third to one half normal (41). Autopsy studies showed that heart weights were an average of 40% less than normal (average heart weight, 186 gm (N=17) normal, 310 gm) (38, 41); ‘the adult heart had atrophied to about the size of the heart of a ten-year-old child, and the aorta was about the size of a pencil’ (28).

Other autopsy findings included almost complete absence (95% decrease) of normal body fat (38). Fatty change was noted on the liver. The large bowel was distended, thin, and transparent, with many ulcers, scars, bleeding points, and abscessation. The rectum often contained undigested food (38).

The relief workers had to determine the appropriate type of food for the chronically starving prisoners (19). The camp inmates had been adapted to subsistence on little food and water, and the gastrointestinal system was unable to digest a larger meal, especially one containing fatty food (8). In the first two days after liberation, when the British soldiers gave the starving inmates full army rations, the inmates developed abdominal pain, vomiting and diarrhoea, and an estimated 2000 died as a result, ‘many starving dead literally at the first mouthful’ (8, 27, 38).

Subsequently, the inmates were fed gruel, soup, tea, and a glucose-vitamin mixture with hot water (5, 16).

Food in Camp 1 was prepared in five cookhouses and delivered by Army truck to the individual barracks (5). In the early days and weeks breakfast consisted of tea or milk and biscuits, and lunch included vegetables, soup, potatoes and occasionally meat stew (5). Tea and biscuits were again distributed in the afternoon (5). This diet provided less than 1000 calories per day, dictated by the acute shortage of supplies (5). Repeated breakdowns in the water supply further complicated the feeding problem (5). The food supply gradually improved, but not until the third week of May was any butter or margarine available (5).

The importance of careful control of food intake, because of the diminishing circulatory capacity, was also recognized (8, 41). Therefore, a three-stage diet, high in protein, was devised which enabled gradual increase of daily caloric intake for the starving inmates. The first stage of 800 calories per day for 3-4 days was based primarily on skimmed, fresh, or powdered reconstituted milk with added sugar, salt, water and vitamins. This was followed by a second stage of 1700 calories for several days, and a third stage of 3000 calories (8).
Bengal Famine Mixture was tried, but was unsuccessful in Belsen because it was too sweet for the inmates, "loathed by all and sundry" (3, 21), and caused diarrhoea (3, 9, 10, 38). Other diets used, presumably for the healthier patients, included some potatoes, soup, a little meat and white bread if available (38). However, food shortages persisted beyond mid May, and even the relief workers found food supplies for themselves limited (16).

Strict supervision of the supply and distribution of food by British personnel was necessary to make certain that the very sick actually received the food, because stronger internees or German personnel would steal the food for themselves or their friends outside the hospital (8). Inmates with nutritional diarrhoea often refused to eat, and feedings had to be carefully supervised (38). The majority of the starving inmates were able to take food and water by mouth, and only less than 5% required intravenous therapy or an esophageal feeding tube (8). The use of an esophageal tube was limited both by the inmates' fear of torture (9, 10, 32) and the dried atrophic nasal mucosa which caused difficulty in passing a tube (32). In the Camp 1 hospital, patients with desperate weakness resulting from starvation were given injections of leptazol (Cardiazol) or coramin for their hearts and glucose for energy (3, 16).

Fourteen days after the liberation of Belsen, a small team from the Medical Research Council arrived to study the relative efficacy of skimmed milk, protein hydrolysate, and serum in the treatment of starvation (20, 31, 32). The protein hydrolysate, an acid hydrolysate of casein, was so nauseatingly unpalatable and also appeared to irritate the gastrointestinal tract that patients did not take it for more than a day (8, 16, 20, 28, 38). Some patients had vomiting, severe colic and watery diarrhoea - in one case, a half a bucket - after taking oral hydrolysate (32). Intravenous administration of protein hydrolysate was complicated by severe rigors and venous thrombosis (5). Thus, protein hydrolysate became suspected by the suffering inmates of being a "new form of torture," further contributing to the failure of this therapy (5, 42). Therefore, it was concluded by Dr. Janet Vaughan of the Medical Research Council group that overall efficacy of protein hydrolysate was poor and that use of protein hydrolysate was not practical under field conditions (20, 31, 32). As a result, 270 litres of the hydrolysate was destroyed - a paradox of waste in a situation of great need (27). Other disadvantages of the protein hydrolysate included the potential for tryptophan deficiency and volume overload (28, 43). Nonetheless, it was suggested that oral protein hydrolysate could be useful together with other foods because it appeared to stimulate the appetite of the starving inmates who were especially weak and anorectic (38). However, the most satisfactory method of feeding those who could swallow was the use of diluted unsweetened condensed milk or skim milk powder in water (28).

Hunger (edema) edema was generally managed with feeding, as well as transfusion of double strength plasma or blood (28). Some patients with persistent (edema) edema despite improved nutrition, a trial of saline (morsel) - a diuretic resulted in a reduction of edema and stimulation of appetite, with clinical improvement (28).

Pediatrie conditions

The liberated children of Belsen also suffered from starvation, marasmus, typhus, tuberculous and febrile syndromes (7, 36). A very high percentage of children in Belsen were infected with tuberculosis, with 80% of children (average age, 7.1 years) being positive (36). In Belsen it was "quite ordinary" that deliveries were done in women suffering from typhus and in mid May many babies were still dying of neonatal sepsis (7).

The complexity of the medical and social problems of these children was exemplified by the following case report:

"A boy, Z.Z., aged 5, was admitted to the children's hospital, Belsen, from the general hospital on the death of his mother. His mother, an Austrian Catholic, died at Belsen of typhus. The father, a Slovak Jew, had heard of in Sachsenhausen, was probably dead. A sister, aged 6, was alive and well in the camp. Two other children died in Ravensbruck lager. Nothing was known of the patient's past (medical) history.

On admission he was very emaciated. He lay rolled up in a ball under the bedclothes, moaning, and wouldn't eat or speak. Examination revealed plethora and an effusion on the right side and some inflammation in the right chest. The temperature was irregular, rising to 101°. Sedimentation rate, 101 mm. first hour (Westergren). Piriouet plus 10 c.c.m. of serous fluid was aspirated to exclude empyema.

The child was hand-fed with specially nutritious diets while being talked to in his own language. He was given a high-protein diet with an addition of vitamins and calcium and at first was kept in a warm room; later he was placed in the open air. After one week he began to talk; after two weeks he ate his parent's return; and after eight weeks the sedimentation rate was mm. 50. He was then evacuated to Sweden. The latest report states that he has put on 7 lb. (3.2 kg.) and is now almost well.

Comment...the final problem of the Belsen children...is a social one of the most profound complexity...What is to become of him? Is he to be brought up Jew or Catholic? Is he to be left in an orphanage? He has
found a temporary refuge in Sweden, but what of the future?" (36)

Psychological status
The medical officers observed that “many (of the inmates) are as tosted in mind as they are in body” (7). Nonetheless, it was concluded that psychosis and psychoneurosis, excluding that secondary to typhus (16) and other toxic infections, was less evident among the surviving inmates than in other communities, “possibly because only the more exorveys and robust psychological types had survived the ordeal of their captivity” (8). Patients with frank psychosis from schizophrenia or post-typhus mental derangement were treated in an asylum organized in Block 27 of the Camp 2 hospital (3).

The most notable psychological abnormality was anti-social behaviour and selfishness, proportional to the degree of malnutrition (8). It was evident to the British that the “mortal starvation conditioned all happenings in the camp” (3). With more advanced starvation, consideration for others became progressively limited to friends, immediate family and, finally, personal survival (5, 8). There was a “blunting of sensitivity to scenes of cruelty and death,” even among children who had grown up in concentration camps (8). Generalised apathy was observed, with inmates noted walking about the camp without clothing and eating meals from the same bowls used as bedpans (5). However, normal behaviour rapidly returned with improved bodily health, “leaving only a feeling akin to that of having experienced a bad dream” (8). The sick children were noted to have “terror symptoms” and apathy, but both improved with physical recovery (36).

The sick inmates of Belsen were dreadfully fearful of the British relief workers, undoubtedly because of their horrifying experiences with the German physicians during the war (6). The inmates recalled how the German doctors had given intravenous benzol, benzene, petrol, or cresote to paralyze their victims prior to sending them to the crematorium (6, 7, 10, 20). Therefore, when the British workers attempted to start an intravenous drip or use a syringe to collect a blood sample, the inmates shrieked, “Nichts krematorium!” (6, 7, 20, 21). They reacted similarly when the British attempted to segregate inmates for treatment or pass a nasal tube (9). This was compounded by difficulty in communication because there was no common language between the British workers and the inmates, who were mostly from eastern Europe (20, 28, 32, 37).

In the healthier inmates, such as those of Camp 3, a behaviour referred to as a form of “famine psychosis” was observed (3). Despite apparently adequate supplies of food, inmates complained of hunger, and “were impelled by an irresistible instinct to seize food, steal food, hoard food, just because, after all these years of terror, they were still unsure of their fate, still unsure that the day when once had dinner upon a piece of potato peel, at the risk of a bullet in one’s belly, might not return” (3).

By the middle of May 1945, the main factors aside from physical illness and weakness which prevented the convalescent inmates from having a normal interest in life in general included post-typhus mental derangement and anxiety about the fate of their relatives (3). However, by the end of May it was noted that “apathy had gone from them. Their sense of shame and decency had come back completely. Hope was rekindled within them and they thought of the future once more” (5). Nevertheless, the preoccupation with the fate of relatives dominated the lives of the majority of Belsen survivors throughout the summer (3).

Other conditions
Many other illnesses in Belsen were documented by the British medical team, including sepsis, pressure sores (including those of the emaciated, concave “Belsen buttock”), ischiorectal and other abscesses, rectal prolapse, piles, neglected wounds, gangrene, extensive scabies (6-40%), erysipelas, typhoid, diphtheria, acute nephritis, cancrum oris, parotitis, sore gums, gastric ulcers, malaria and the red, smooth “Belsen tongue” (5, 7, 8, 10, 16). Gangrene of the extremities was nutritional, post-typhus, or thrombotic, and femoral and iliac veins thromboses were common (5). Amenorrhoea was universal (5).

Surgical emergencies included acute appendicitis, bowel obstruction and urinary retention (5). Acute cholecystitis was not uncommon (28). Acute upper abdominal pain, attributed to alimentary atony, was observed in starving inmates after beginning the feeding program, but improved within a few days (28).

Several conditions were observed for which no satisfactory explanation could be determined, such as hepatosplenomegaly among inmates with normal hematologic studies (28). Another curiosity was termed “Belsen Fever,” a self-limited febrile illness of 2-3 weeks duration associated with splenomegaly and leukopenia, but without rash. Investigation showed negative Widal test and no abnormal organisms in blood, urine, or stool (28).

The British Medical Students
In the first week of April 1945 the 21st Army Group appealed to the British Red Cross for supply medical assistance for thousands of starving people in Holland (44). The Red Cross did not have enough workers for that effort, and therefore, 100 volunteers were solicited by the Red Cross (44) and the Ministry of Health (25) from among
Table 4. London medical schools which sent student volunteers to Belsen Camp.*

<table>
<thead>
<tr>
<th>Hospital Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Bartholomew's Hospital</td>
</tr>
<tr>
<td>Guy's Hospital</td>
</tr>
<tr>
<td>King's College Hospital</td>
</tr>
<tr>
<td>London Hospital</td>
</tr>
<tr>
<td>Middlesex Hospital</td>
</tr>
<tr>
<td>St. Mary's Hospital</td>
</tr>
<tr>
<td>St. Thomas' Hospital</td>
</tr>
<tr>
<td>University College Hospital</td>
</tr>
<tr>
<td>Westminster Hospital</td>
</tr>
</tbody>
</table>

* From (22, 25, 35). The names of 86 of the 96 students are listed in (22, 35). Photographs of the students are published in (4, 14, 22, 35, 72).

students in the final 18 months of study in the London medical schools (13, 14, 16, 44). However, the liberation of Holland was delayed and the students awaited orders (16, 44). In the meantime, Belsen was liberated, and the critical need for assistance was recognized. Therefore, instead of Holland, 96 students (24, 26) learned at short notice on April 28, 1945 (5, 16) that they were to depart for Belsen (5, 13, 14, 16, 44), under the auspices of the British Red Cross and St. John Ambulance (25). The first students arrived at Belsen Camp two days later on April 30, 1945 (26) and they remained until May 28-29, 1945 (16, 22, 45, 46) (Table 4).

The supervisor of the medical students was Dr. AP Meiklejohn, member of the Rockefeller Foundation Health Commission and the Nutrition Section of the European Regional Office of UNRRA (United Nations Relief and Rehabilitation Administration) (26, 42). The students immediately went to work in the Horror Camp, responsible primarily for food distribution for the starving inmates and improvement of living conditions (3, 5, 26, 44). In the days after the liberation the strongest inmates took whatever food they could get and became sick from overeating, whereas those too weak to leave the barracks died because they could not feed themselves (26). The students took over the responsibility for the barracks in the Horror Camp - two (24) or three students in each of the barracks, or occasionally, one student for one or more barracks (26). Each of the barracks contained 100-150 patients in addition to 200-300 inmates who were able to feed themselves (26). Therefore, some of the students had as many as 400-600 patients under their care (5).

The students had daily conferences with Meiklejohn and with the officers in charge of the kitchens to plan out the work (9). However, the students were required to use their own initiative and "improvisation was the order of the day" (14). There was a great shortage of help, especially after the healthier inmates who had provided some assistance were transferred to Camp 3 (3, 27). The students themselves washed the filthy barracks of Camp 1, disinfected the floors with cresote and DDT powder to kill the lice, organized the healthy inmate volunteers for work in the hospital and fed the weakest of the starving inmates individually (3, 5, 13, 24, 26, 27). Within two weeks of arrival the students had washed, disinfected and reclothed 1200 patients (26).

The students also organized an emergency hospital in the Horror Camp (3, 10), "emitted by their initiative... in which the worst cases that had to wait to the last (to be evacuated to Camp 2) were nursed and undoubtedly saved" (14, 46). This work was started by a team of two students on their second day in Belsen, who scrubbed, disinfected and stocked several of the evacuated barracks (5). By the end of the first afternoon they had bedded down over 100 patients and within twelve days the hospital area consisted of twelve barracks containing 1100 patients (5). In addition to nursing and feeding the sick and starving inmates, the students set up a dispensary and began medical treatment (9, 26). Medicines dispensed included aspirin, sulphathiazole, acriflavine, leptazol and penicillin (16, 110, 105, 110, 105, 110, 105, 110), Tannalbin, nicotinic acid, charcoal and sulphathiazole were used against diarrhoea (5). Mintigal, a German drug, was used to treat scabies (5). Bedsheets were undressed and abscesses were drained (5). Medical and nursing supplies were extremely lacking, with only three beds for one head in which there were over 80 patients with diarrhoea (10). Drugs were limited in supply especially during the first two weeks of May and the language barrier made evaluation and explanation of treatment difficult (3, 14). Nonetheless, by giving out a pill, even one of limited therapeutic value, the students noticed improved morale and reduced apathy in the inmates (9, 14, 26). On May 14, two field transfusion units were obtained which were used to administer blood, plasma, concentrated serum, and protein hydrolysate (5, 16, 28); however, intravenous therapy was complicated by poor venous access because of collapsed veins, venous thrombosis, severe rigors and volume overload resulting in pulmonary oedema, heart failure, ascites and death (5).

The immersion of the medical students in the realties of the Horror Camp also resulted in some of the clearest descriptions of the situation of individual inmates as well as the overall state of the camp (9, 10, 13, 14, 22, 29, 30, 38):

"We took a look round. There was faces all over the floor, the majority of people lying diagonally in the corners, passing a stool like a small black cat - there were thin cans and lumps of black bread all mixed up with it, and the place could not have been swept for years. I was standing rather aghast in the middle of all this filth, trying to get used to the smell, which was a mixture of post-mortem room, sewer, street, and foul pus, for none of the windows were open, when I heard a scratching on the floor. I looked down in the..."
half light and saw a woman crouching at my feet. She had black matted hair, well populated (with lice) and her ribs stood out as though there were nothing between them; her arms were so thin that they were horrible. She was defaecating, but she was so weak that she could not lift her buttocks from the floor and, as she had diarrhoea, the yellow liquid stools bubbled up over her thighs. Her feet were white and puffy from famine oedema and she had scabies. As she crouched, she scratched her genital parts, which were scabetic too. (The bunk) were all smeared with faeces, because the people with diarrhoea did not bother to get out of bed. The result was that urine and faeces dribbled through the wooden boards of the top two bunks on to the lowest one and as this last was the least comfortable, all the dying and weaker patients could be found there..." (10)

After the evacuation of Camp 1 was completed, the students worked in the hospitals of Camp 2 and 3, where there remained 12,000 sick (9, 10, 26). By now, there were more drugs, a minor operating theatre and radiography equipment (9). The students were now able to examine patients properly, make diagnoses and provide more appropriate drugs and treatment (9, 14).

The medical students also assisted in the social relief work for the inmates. One survivor, a German Jewish nurse who had learned English prior to the war, described how the students picked her up at her barracks daily so that she could serve as a translator in the collection of demographic information from the inmates; thus, lists of survivors were made to facilitate contact with relatives who had survived the war (47).

"...many hundred capable and well qualified people among the victims of Belsen... voluntarily and without payment helped the British in their formidable task... (They) formed an indispensable auxiliary staff (which) consisted of doctors, nurses, interpreters, cooks and, later, schoolteachers, librarians, entertainers and political helpers for the War Crimes Commission. Without the help of these hundreds of able, and often selfless, volunteers it would have been impossible to run either the hospital or the rest-camp." (3)

The Senior Medical Officer of the British Red Cross Commission for Civilian Relief in Belsen Camp, WRJ Collis (36), commented: "Nor must the gallant efforts of the interpreters, doctors and nurses be forgotten. Many were sick and weak themselves, but, forgetting their tired and wasted bodies, they have worked and fought beside our medical personnel to their utmost power." (7).

Rehabilitation

After the first two months following the liberation of Belsen, when the immediate danger to the lives of the remaining survivors had passed, the goals of the relief workers shifted from saving lives to rehabilitating individuals. As the last barracks of the Horro Camp were evacuated and burned down, activities were organized to entertain and raise the spirits of the survivors. In Camp 1, a library and recreation room was organized in mid May, within one week, by Derick Sington of the British Army and Mrs.
organized themselves in the spirit of self-help and community. The first issue of 

on May 27, 2021 by guest. Protected by copyright. http://militaryhealth.bmj.com/ J R Army Med Corps: first published as 10.1136/jramc-147-03-06 on 1 October 2001. Downloaded from

Montgomery and Miss Heard of the British Red Cross, complete with arm chairs, gramophones, pianos and two hundred volumes (3). English language classes were offered and within three days, 400 inmates registered (3). In July, linguaphone classes in English were started in Camp 4, supervised by Girl Guide Teams (3).

On May 21 the first of a series of open air dances took place (3). Three nights later, on May 24, an "International Cabaret" was given in Camp 3, with dances and songs performed by survivors (3). This was so successful that a more elaborate program was arranged beginning June 4 for four nights to a full house of 800 spectators in the tented theatre of the Panzer Training School (Camp 2) (3).

During June and July, the cabaret shows became a weekly event, and the open air dances were repeated every other week (3). In mid June, under the direction of Camp 4 director Major Bernery and Lady Abrahams of the British Red Cross, a community centre was organized in a block in Camp 4, complete with music room, card room, billiard room, library, news room, studio, barber and workshops (3).

Activities for the 300 child survivors remaining in Belsen in April, many of whom were sick, tubercular and without family, were also organized, including an elementary school initiated by Lieutenant Hodges, the Welfare Officer (3). Most of the teachers in this school were young women who had been inmates of Belsen (3).

In August 1945 UNRRA took over responsibility for the Glyn Hughes Hospital in Belsen, with 29 relief workers from 12 countries, in addition to DP workers (50). The work spirit was strong, despite the language difficulties (50). The Chief Welfare Officer of UNRRA in Belsen, Dr. Erika Fischova-Gachova from Czechoslavakia, taught and encouraged the patients of the Glyn Hughes Hospital to make all types of handiwork, including toys, bags, baskets, clothes, clothes and belts, and thus the sick were encouraged to move stiff joints and paralytic limbs (51). Self-respect and confidence came back slowly (51). An exhibition of their creations, including cartoons by a hospital patient, was held in the UNRRA offices in London from October 31 to November 7, 1945 (51). Individual relief workers took initiative in helping survivors learn new skills; for example, a Dutch physician taught my mother, recently recovered from typhus and starvation, how to drive a car (52). A post office was organized for the DP in Belsen by Mr. Whitehead of the British Red Cross to facilitate the search for surviving family members (49). Whitehead also obtained lists of survivors in twenty other camps which were published, circulated in Belsen and sent to other camps to facilitate the search for relatives (3).

As the survivors regained their health, they
In May 1946 the British authorities locked the gates of the DP camp at Belsen and did not allow the Jews to exit the camp (68). The Belsen Jews became active in the political protest against the British policy opposing Jewish immigration and statehood in Palestine (67, 69). Despite these conflicts with the British authorities, the surviving inmates recognized the extraordinary efforts made by the military and non-military medical relief workers long after they regained strength and departed from Belsen: “At this point should, with praise and thanks, be mentioned the detachments of the British army, which were the first to come to us, and especially the Medical Corps, the British Red Cross along with the military doctors and nurses, the young Belgian doctors and the hundreds of medical workers, who from a long list of countries volunteered, and with superhuman strength and unnatural perseverance brought help to those for whom merely a good word and a simple drop of water was even more important than bread in those horrible moments. Their names and images will until the end time remain engraved in the hearts and memory of the thousands of survivors.” (70)

Indeed, the expeditiously organized medical rescue operation in Belsen was one of the most important humanitarian events of the first few days and weeks after the liberation, thanks to which thousands of inmates were saved from a rapid and certain death. The operation will remain a landmark model for disaster relief (71).

Acknowledgements
Presented in part at the Ninth Annual Paul Treepman Memorial Lecture, Jewish Public Library and Montreal Holocaust Memorial Centre, Montreal, Canada, May 12, 1997. Translated by the author from the Yiddish article published in the Forverts (Yiddish Forward), 100th Anniversary Issue, Vol CT, No. 31132, Section three, pgs. 6 and 20-23, May 16, 1997. The author is grateful to Len Levin, M.S.L.I.S., for library assistance, and to Susan Date, Hilde Goldberg, Grete Munn, David Rosenthal, Mordechai Stiglerz”, and Babey Treepman for helpful discussion.

References
47. Murna G. Personal communication. 1997.
52. Trepmann BW. Personal communication. 1997.
63. B.S. Europäische konferenzen fun "Maccabi" (European conference of "Maccabi"). Jerusalem 1948;13(16):3.
64. Der farfons fun sport-yom-tov in yor-tog fun der barfeitung (The course of the sport-festival on the anniversary of the liberation). Unzer Sztyme 1946;10:23.
66. Brodetski Z. Der kongres (The congress). Unzer Sztyme 1945;4:24-
70. Trepmann P. Ha-atotses ha-yevoveh: ten years noch der barfeitung fun Bergen Belzen (The bones of... ten years after the liberation of Bergen Belsen). Keneder Odler (Canadian Jewish Eagle) 1955;49(83):2-4.
71. Cordell RF, Forsidick DH. Symposium in commemoration of the liberation of the Bergen Belsen Concentration Camp and medical management of disasters study period. JRAMC 1963;130:200.