

Another use of pentothal sodium in the medical division of the hospital was its administration to two patients suffering from meningococcal meningitis. Both patients were in a state of delirium which made lumbar puncture impossible. A few c.c. only, of the drug were used and the puncture performed satisfactorily. No ill-effects were noted in either patient.

Traumatic cases.—Traumatic cases are bound to occur in any active camp. These include gun-shot wounds, motorcycle accidents, motor transport accidents, and accidents occurring with armoured fighting vehicles.

It has been noted, in using pentothal in traumatic cases, that less of the drug is required than with elective procedures. These patients are not treated until any existing shock has been combated. Often they are not cases of shock *per se*, but rather cases that have experienced some shock and have recovered, or cases that have received injuries that may produce the state, but the clinical picture of true shock has never appeared.

If patients of this type receive pentothal, they also receive intranasal oxygen and intravenous blood, serum or saline.

An illustrative case is that of Trooper F. of the Canadian Armoured Corps. The patient, aged 23, was on manoeuvres in the training area when he was crushed between two tanks. A special crash ambulance was despatched from the hospital and he was transported immediately to the operating-room. Here, intravenous dried serum was prepared and administered. He had received morphia gr. $\frac{1}{4}$, at the scene of the accident.

The patient was found to be in a state of mild shock suffering from a badly-mangled right arm, fractured jaw and numerous facial wounds and abrasions.

Anæsthesia was begun about one-half hour after admission. The blood pressure was 120/80, and pulse 120. Intravenous serum was running into a vein in one ankle. A slow intravenous was running into the left arm. Two teams of surgeons worked separately; one team amputated the right arm, the other repaired the facial injuries. An orderly was stationed at the head, using the suction apparatus and lightly supporting the jaw. Intranasal oxygen was administered. Blood pressure was taken with the cuff over one ankle. Sodium pentothal was given in 5% solution intermittently into the intravenous saline tubing. The anæsthetist was free

to move to the foot for blood pressure readings, to the head to direct the orderly with the suction, and to observe the intranasal oxygen apparatus. The operation lasted one hour. One and three-quarter grams of pentothal were administered. The blood pressure varied only slightly, being 120/60 at the close of operation. The pulse remained constant at 120. The patient was pink throughout. There were no post-operative complications. At a later date the fractured jaw was secured with a Stader splint, under endotracheal ether anæsthesia.

SUMMARY

1. The use of pentothal sodium in a Canadian Army hospital has been discussed.
2. A simple technique of administration has been described.
3. A technique used in narcoanalysis is mentioned.
4. Pentothal is described as an ideal anæsthetic for the external fixation of certain uncomplicated fractures.
5. The use of pentothal sodium in traumatic cases is reported.

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EMOTIONAL REACTIONS IN SURVIVORS OF H.M.C.S. "VALLEYFIELD"

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H.M.C.S. *Valleyfield*, the first Royal Canadian Naval frigate to be lost, was torpedoed and sunk while on convoy escort duty in the North Atlantic. Though previous days had been exacting, the night of the disaster was calm and clear with a full moon. There was a slight swell. The usual number of men were on watch: 22 above deck, including 3 officers, and 8 below deck. The watch coming off was becoming tired; the one going on had been shaken once but the majority were probably asleep; a few of the crew were dressed preparatory to going on

watch, but were sleeping on lockers or in their hammocks.

The torpedo hit amidships on the port side. The explosion was unexpected and the force of it split the ship almost instantaneously. The ship buckled, the proximal ends settling first, and angulating with each other. The forward portion rolled to starboard, and then settled in 2 to 3 minutes, the midship area disappearing first with the bow pointing toward the sky. A few minutes later the aft end sank, the stern pointing up and disappearing last.

There were 38 survivors, including 2 officers, of a ship's complement of 163.

HOSPITAL PREPARATION

The survivors were disembarked from the rescue ship and admitted to a Royal Canadian Naval Hospital at a Newfoundland port. One ward in the hospital is set apart for the reception of casualties and preparations for emergencies are automatically made on receipt of the original signal. Hospital personnel not on duty (medical officers, nursing sisters, sick berth attendants, laboratory technicians and galley staff) is recalled. Each survivor is made to feel physically and psychologically as secure as possible. The usual equipment for the treatment of shock and hæmorrhage is readily available, including extra blood plasma. The operating room is set up; also an emergency laboratory for the cross-matching of blood. Special attention is paid to the degree of immersion of extremities and ice and fans are available for each case. Unless contraindicated, cigarettes, chocolate bars, coffee, milk and soup are distributed.

PSYCHIATRIC INVESTIGATION

Psychiatric investigation of the survivors was started the day of their admission and continued until the day of discharge. Questionnaires and personal interviews were utilized to determine the psychic and physical trauma to which the group had been subjected, and also to determine their emotional response during and after the incident. Their past history was investigated by the same methods. Each survivor was observed daily in order to assess his present emotional mental status. All cases who showed abnormal behaviour or required sedation were discussed with the medical and nursing staff. As soon as a survivor was an "up patient" a

modified Mira-psycho-myokinetic test was performed to determine abnormal conative trends. The fact that questionnaires were confidential and not a part of the official record was stressed with each survivor.

NAVAL BACKGROUND OF SURVIVORS

Thirty-four of the 38 survivors were under the age of 26 and 10 of these were under 21. None had ever been torpedoed before and only 7 had seen previous action. Sixteen had been at sea for over one year and 18 had 6 months or less of sea time. All except one were Royal Canadian Naval Volunteers: the exception was a Royal Naval rating. The rating groups included: seamen 12, stokers 8, communications 13, cooks and stewards 2, and miscellaneous 1. Sixteen of the survivors, including the two officers, were on watch and above deck. Twenty-one were off watch and below deck and of these, 14 were asleep or in their hammocks. One signalman was just coming off watch. Of those off watch, only 16% survived. Therefore all mess decks suffered proportionately and all survivors were equally subjected to severe psychic traumata. A considerable number of survivors below deck were not adequately dressed.

Thirty of the survivors reported they were not anticipating action at the time of the incident; 3 reported that they were: 4 reported "possibly" and one made no report.

There was no relationship between anticipation of action, state of dress and emotional reaction, nor between emotional reaction and specific mess decks.

EMOTIONAL RESPONSE AT THE TIME OF THE EXPLOSION

1. The feelings of the survivors, at the time of the explosion, were recorded as follows: (a) calm and with little emotional change, 22; (b) excited, nervous, tense, shocked, 8; (c) fearful, 1; (d) no report, 2; (e) miscellaneous, 5 ("Mad"; "Surprised"; "Calm and excited"; "Dazed but fairly calm"; "Stunned, disbelief, then calm".) That is, there were 16 who admitted to not being calm. Eight of these were on watch above deck; 6 were asleep in their hammocks; one was awake in his mess deck and the remaining one was the sole survivor from the aft mess deck. Of this group of 16, four developed symptoms of mild anxiety tension in the hospital; one is enuretic; and one stutters when excited.

2. The answers to the question "Was there any panic?" are summarized: (a) no, 22; (b) yes, 7; (c) some, 6; (d) don't know, 1; (e) no report, 2.

There were 15 survivors who reported there was some degree of panic or made no report. Six of these were asleep: 4 were awake in their mess deck and 5 were on duty. Of this group of 15, six had stated they were "tense and excited" at the time of the explosion and provided 3 of the 4 cases of anxiety tension already commented upon. One made no report to either question but showed no abnormal behaviour. Of the remaining eight, one developed a mild anxiety state in the hospital.

PHYSICAL AND MENTAL TRAUMATA FROM EXPLOSION TO RESCUE

At the time of the explosion only one Carley float was released but others were blown clear. The explosion of the ship's boilers was certain to have caused a number of casualties, and exploding ammunition aft killed at least 6 men. The temperature of the water was 33 degrees (F.), and the temperature of the air estimated to be 45 degrees (F.). The water was covered with oil, wreckage, floats and debris, but the oil did not catch fire.

Twenty-nine of the 38 survivors remembered jumping overboard. Two, who couldn't swim, "slid" into the water. One floated from a hatch. The remainder were washed overboard or swam off. Twenty-nine reported they could swim: 4 could swim "a little", 4 not at all and one made no report. Twenty-seven of the survivors had on life jackets when rescued. Sixteen of these were on watch and the remainder asleep or in their mess deck. The 11 who did not get their life jackets on were all off watch. Six were asleep; 2 were awake and in their mess deck and three were waiting to go on watch. Nine of this group could swim and one could swim "a little". Of the 8 non-swimmers who survived 7 had life jackets on and the remaining one could swim "a little".

After abandoning the ship, 30 swam more or less directly to, or reached a Carley float. One picked up a life jacket on his way. Six swam around for periods of 10 to 45 minutes and then reached a Carley float. One clung to wreckage for an hour and a half, and one swam around for an hour and they were then picked up. That is, the latter two never reached a float.

The survivors were in the water for periods of from 30 minutes to 2 hours; the average time being one and a half hours.

Twenty-two survivors saw one or more of their mess mates killed by the explosion, trapped, drown or die of exposure. Twenty-one did not lose consciousness at any time; seven were unconscious when rescued; two were unconscious intermittently; one "almost" unconscious; two lost consciousness as they were picked up and three later on the rescue ship. Two made no report.

THOUGHTS WHILE IN WATER AND AWAITING RESCUE

	Primary mention	Secondary mention	Total
1. Folks at home.....	11	1	12
2. Being rescued.....	11	1	12
3. Concern and curiosity over messmates.....	7	1	8
4. Fear of underwater ex- plosion or oil catch- ing fire.....	1	1	2
5. Keeping legs from get- ting numb.....	1	1	2
6. Miscellaneous group (1 of each) "praying", "don't remember", "cold and achy", "everything", "no time to think", "tot of rum".....	6		6
7. No report.....	1		1
	38	5	43

The three most frequent thoughts of the survivors while they were in the water, were, in order: (a) their own safety; (b) their folks at home; (c) concern and curiosity over mess mates.

The survivors were picked up by sea-boats, lines and scramble-nets.

FEELINGS WHILE ON RESCUE SHIP

1. Nervous, excited, tense, etc.....	11
2. Relief, grateful, etc.....	8
3. Cold, chills, etc.....	8
4. Unconscious or asleep.....	3
5. Not good.....	3
6. Fine.....	1
7. No report.....	4
	38

The largest group was nervous and tense; then followed 2 groups of equal incidence. One of these was grateful and relieved; the others merely described their feelings in various degrees of coldness. Only one survivor said he felt fine.

THOUGHTS WHILE ON RESCUE SHIP

	Primary mention	Secondary mention	Total
1. Concern and curiosity over mess mates	19	12	31
2. Personal concern (Concern over present situation; grateful, reviewing personal experiences, distaste of sea; leave; mail, etc.)	11	14	25
3. Folks at home	5	7	12
4. Working or asleep	3	1	4
5. Revenge on submarine	1	1
6. Miscellaneous	3	3
	38	38	76

It is interesting to contrast the thoughts of the survivors while awaiting rescue to their thoughts while on the rescue ship. In the former their thoughts were, in order: personal safety, folks at home and their mess mates. They were now rescued but still in considerable danger. Uppermost in their mind was concern and curiosity over mess mates; followed by personal concern and then by thoughts of the folks at home. Only one thought of revenge on the submarine and it was a secondary mention.

On the rescue ship the survivors were treated for shock and exposure and traumatic injuries. Twenty doses of morphine, gr. 1/4 and 9 doses of morphine gr. 1/3 were administered. Only 3 repeat doses were given. Morphine was given in any case showing excitement or restlessness, as well as for pain or shock.

ROYAL CANADIAN NAVAL HOSPITAL

On arrival at the hospital 18 of the 38 survivors felt relieved and thankful and concerned about their missing mess mates; 9 were relieved and thankful, and 5 were concerned about mess mates. Both officers felt "lucky" and four others made no report.

During the first night, 30 slept well, 7 "fair" and only one poorly. Thirty-four were able to eat their breakfast, 2 ate "a little" and only 2 refused their food.

One day after arrival in the hospital 25 reported themselves as feeling good; 5 felt "fair"; 3 were a "little nervous", 3 made no report and 2 recorded physical complaints.

Officially there were 16 cases of mild and 9 cases of moderate immersion extremities. Two of the survivors had minor injuries and 11 had no injuries of any type. On being questioned, however, 21 of the survivors had no physical

complaints: 6 mentioned exposure: 5 had minor complaints and 5 made no report.

Twenty-nine were anxious to get out of the hospital; 5 wanted a rest first; 2 were not anxious to leave and 2 were "not particular".

TWO SPECIFIC QUESTIONS WERE ASKED APPROXIMATELY ONE DAY AFTER ARRIVAL IN HOSPITAL

A. Are you anxious to return to sea after survivor-leave?

1. Yes	11	29.0%
2. Modified affirmative	5	13.0%
3. Indefinite	9	24.0%
4. No	7	17.0%
5. Modified negative	6	16.0%

B. Would you like to talk about your experiences or forget them?

1. Forget	22
2. Forget implied: "It's hard to forget"; "Forget if possible"; "Try to forget"; "Forget which isn't possible"; "Forget as hard as to believe"; "Sooner forgotten, the better"; "Talk only if useful as like this" (i.e. filling out questionnaire); "Talk just to folks at home" (i.e. forget for now)	8
3. Non-committal group: "Makes no difference" (2); "Don't mind talking"; "Yes" (?)	4
4. Talk	1
5. Talk if conditioned: "Talk and then forget it"; "Both"; "Yes, to some, no to others" . .	3

At the time only one survivor wanted to talk about his experiences.

It was observed on the ward that the survivors talked very little for the first three days. They were quite content to stay in bed resting. As soon as their physical condition permitted, they were allowed up and started to visit back and forth and reviewed their experiences.

ABNORMAL EMOTIONAL REACTIONS

The abnormal emotional reactions in the survivors of H.M.C.S. *Valleyfield* were relatively minor. Seven survivors suffered from restlessness and mild sleep disturbances and for purposes of classification these cases were diagnosed as simple fatigue and mild fear state. There were no psychotic reactions nor were any reactions sufficiently severe to be considered psychoneuroses or "combat fatigue states".

Cases 1 and 2 below are the officer survivors. Their personal experiences at the time of the incident had been very severe. Of necessity they had to assume responsibility from the instant of reaching the rescue ship. They both worked at identifying bodies, making up survivor lists and circulating through their crew. They were deeply concerned about the welfare of the other survivors and felt somewhat frustrated in the hospital at not being able to visit them.

CASE 1

This officer was restless, hyperactive and excitable during the first two days in hospital. He had suffered moderate immersion extremities and abrasions. The first day in hospital he was given morphine gr. $\frac{1}{4}$, nembutal gr. iii and codeine gr. i. His temperature, pulse and respiration were not normal until the fourth day after the incident.

CASE 2

The emotional reaction was similar to that of Case 1 but less severe. He suffered from moderate immersion extremities. The same sedation in equivalent doses was administered.

CASE 3

This rating suffered from extensive contusions, moderate immersion extremities and a laceration on his forehead. He manifested a degree of anxiety which was consciously directed toward his physical injuries but which seemed somewhat out of proportion to them. He required morphine and codeine in decreasing doses for a few days.

CASE 4

A leading stoker had a mild degree of immersion extremities. He was somewhat anxious and was given nembutal gr. iss on the second night. Some of his behaviour was unusually punctilious and his Mira test indicated the possibility of abnormal conation. Otherwise he seemed stable and well adjusted.

CASE 5

A 24-year old signalman suffered from moderate immersion extremities, a minor nose injury, and mild anxiety. His degree of anxiety did not warrant sedation. As a child this patient had stuttered. He had a somewhat introverted type of personality. He had a sibling who is always "nervous" and under the care of a doctor. A parent suffered from schizophrenia at one time.

CASE 6

This able seaman suffered from mild exposure but complained of severe pains in his feet. He insisted on taking bathroom privileges although he was a bed patient. He was obviously more active than could be considered normal. He was given morphine gr. $\frac{1}{4}$ three times during the first night in hospital. His history was that of a stable individual although the Mira test was more indicative of abnormal trends than that of any other survivor.

CASE 7

A 21-year old telegraphist suffered from a moderate degree of immersion feet. He received morphine gr. $\frac{1}{4}$ the first night in hospital. His complaints were out of proportion to the degree of immersion, and it was quite apparent that physical injury was aggravated by emotional components. His personal history was that of a stable individual but his family history was suggestive. He described one parent as "nervous" and as having to consult a neurologist some years ago but as having recovered. One sibling has always been "nervous" but has never been under the care of a physician.

Five of the above seven patients were late in leaving the hospital. Four of the seven reported that they were "excited and nervous" at the time of the explosion, and four recorded some degree of panic. There would seem to be considerable significance in subjective feelings at the time of the incident and the severity of the later reaction.

OTHER SURVIVORS REQUIRING SEDATIVES

CASE 8

This 19-year old stoker, suffered from mild immersion extremities. Because of his apparent stability, he was chosen to leave hospital on the second day to identify his shipmates' bodies. That night he had some difficulty in sleeping and was given nembutal gr. iss.

CASE 9

A 20-year old able seaman, because of moderate immersion extremities, required one dose of codeine his second night in hospital.

CASE 10

A 21-year old steward had moderate immersion extremities and other minor but painful injuries. He required morphine gr. $\frac{1}{4}$ twice the first night and codeine twice the second night.

EVIDENCE OF PREVIOUS EMOTIONAL INSTABILITY

Of the seven survivors who showed some symptoms of "anxiety tension", four had a healthy personal and family history. One rating (Case 5) demonstrated evidence of previous emotional instability and a suggestive family history. Another (Case 7) had a "nervous" parent and sibling and one (Case 4) had a rather unhealthy personality.

Three other survivors showed evidence of instability but were adequately adjusted to naval life. One had stuttered all his life when excited; another was a rather withdrawn individual who gave a history of stuttering in childhood and who described his mother as "nervous". The other had been enuretic, at intervals, all his life but less so since going to sea. There were no other indications of poor mental health in these three men.

Two survivors gave histories of siblings or parents suffering from various degrees of "nervousness" and another had a psychotic cousin.

Of the 38 survivors only one man could be considered as being severely handicapped by a psychogenic disturbance before entry to the service. His work record was not good. He is sensitive, prone to worry and subject to fits of depression accompanied by weeping. Reports from the other survivors credit him with acting courageously at the time of the incident. In the hospital he demonstrated no abnormal emotional reactions. In spite of his psychogenic disturbances he has been an active and useful member of the naval service and gives promise of continuing to be.

LATER EMOTIONAL REACTIONS

The attitude and subjective feelings of the survivors were investigated on the ninth to the eleventh hospital day. By this time, all except

five survivors were up patients and discharge from the hospital was imminent.

Thirty-six of the 38 survivors felt as well or better than they did the day after the incident. The two who did not feel as well had physical complaints.

Thirty-three of the survivors had no subjective feelings of anxiety nor tendencies to overreact to minor stimuli. Two ratings (Case 5 and the rating who had stuttered all his life) were "slightly jumpy". Two other ratings (one was the case of enuresis; the other didn't describe his reactions at the time of the explosion) were "slightly nervous". One (Case 10) was "nervous", apprehensive and "jumpy".

SUMMARY

1. The majority of the 38 survivors of H.M.C.S. *Valleyfield* were under 25 years of age. None had ever been torpedoed before. Approximately 60% had been at sea for less than one year. Very few had ever seen action before.

2. For the few hours following the explosion the survivors were subjected to severe mental and physical stress.

3. While in the water they thought of being rescued, their folks at home and their mess mates.

4. On the rescue ship the majority of the survivors felt nervous, thankful or felt cold. They were thinking about their mess mates, their personal safety and their folks at home.

5. A day after arrival in hospital about one-third were already anxious to return to sea.

6. Seven survivors developed "simple fatigue and mild fear states". These reactions were superficial and transitory. One of these had evidence of previous emotional instability and a suggestive family history; another showed some evidence of emotional instability and a third had a "nervous" parent and sibling.

7. Of the remaining 31 survivors, four had significant family histories and one also some evidence of personal maladjustment. Two others showed evidence of previous emotional instability. One had a relatively severe psychoneurotic syndrome but was carrying on successfully.

8. This group of survivors, most of whom were exceptionally stable, did not want to talk about their experiences until the third day. It is our opinion that immediate rest is the most important therapy for patients subjected to this type of experience. Adequate sedation is indicated and, if the condition progresses, psychotherapy may be necessary.

AIR TRANSPORT OF PATIENTS

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THE transportation of patients in aircraft has engaged the attention of the medical profession since the early days of flying. In 1910 two American officers, Rhoades and Gosman,¹ modified an aircraft for use in transporting patients. During World War I and in the interval before World War II patients were transported in emergencies and when other means of transport were not available. In Canada, the occasional "mercy flight" was undertaken by the Royal Canadian Air Force or by civilian operated aircraft to transport severely injured or ill patients from isolated parts of the country to medical centres. These flights were infrequent and were usually "front page" news.

The movement of large numbers of patients was reported by the Germans² in the evacuation of wounded from the Condor Legion in Spain to Germany. Aircraft of the JU 52 type carrying five to ten patients were used and the flights entailed flying over the Alps at 5,000 to 5,500 metres (15,000 to 16,500 ft.) for a total flying time of eight to ten hours. These flights required the administration of oxygen and the chief difficulties encountered were the results of cold in the unheated aircraft. Cases of pulmonary tuberculosis, severe heart disease and gunshot wounds with anæmia were reported to have borne this type of transport without any untoward effects. The proper administration of oxygen overcame the effects of altitude, and anoxia was not a problem.

In the Polish campaign³ the Germans moved 2,500 sick and wounded by air. In this theatre the maximum altitude was 1,000 metres (3,000 ft.). The value of this operation was considered to be the speed with which the severely wounded would be moved to a place where they would receive definitive treatment. Had there been field hospitals in the area capable of supplying such definitive treatment the necessity for air transport of the severely wounded would have been of less importance. Air sickness was of little significance in these flights and oxygen administration solved all of the problems of anoxia.

During the Russian campaign in Finland, 1939-40,⁴ air transport reduced the time of evacuation to divisional hospitals to three to