Restricted

NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Pneumonia, Bacteriology of: Statistics compiled in the Division of Preventive Medicine of the Bureau of Medicine and Surgery reveal that the Navy's pneumonia morbidity rate for the year 1942 was the highest on record since 1920. Reports from shore stations indicate an even higher rate for the year 1943. However, in spite of the rising curve of morbidity, the mortality from pneumonia has been remarkably low during the last few years, probably owing to the routine use of sulfonamide therapy.

The recent epidemic of influenza among Naval personnel has been followed by an expected but not disturbing increase in the number of cases of pneumonia. On the other hand, from the civilian population, an example which shows an

unusually sharp increase in the pneumonias is that of New York State where, during the week ending January 1, 1944, 982 cases of pneumonia were reported to the State Department of Health, In the corresponding week of the previous year, 397 cases were reported. The five-year average for a similar period was 358. (These figures do not include New York City.)

Information received by the Bureau from civilian sources indicates that (1) the relative incidence of staphylococcus and streptococcus hemolyticus pneumonia has increased; and (2) many of the pneumococcus pneumonias have been less responsive to sulfonamide therapy than previous experience had led us to expect. A relatively large number of cases have had positive blood cultures.

It is generally recommended that in severe cases of pneumonia, particularly those with bacteremia, where the response to sulfonamide therapy is not prompt, therapy with type-specific rabbit serum be employed in conjunction with chemotherapy.

Penicillin is now widely available and should be used whenever a pneumonia caused by the pneumococcus has not responded within a reasonable time (not more than 72 hours) to chemo-serotherapy or one caused by the streptococcus hemolyticus has not responded to chemotherapy. Penicillin is the drug of choice in staphylococcus pneumonia and should be used early.

Sputum should be obtained for bacteriological study if possible in every case of pneumonia prior to the institution of chemotherapy. In pneumococcus pneumonia, wherever facilities are available, the type of the organism should be determined. Improvement in our therapeutic weapons in pneumonia has increased rather than diminished the importance of bacteriological diagnosis.

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Duration of Potency of Yellow Fever Vaccine: Apparently the idea is widespread in the Navy that yellow fever vaccine should be discarded after one year, although no definite expiration date was ever fixed. Dr. Wilbur A. Sawyer of the International Health Division of the Rockefeller Foundation has written the Surgeon General that yellow fever vaccine which has been stored at ordinary icebox temperatures may be considered as potent and suitable for injection up to two years after the date of manufacture.

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Wound Infection: De Waal has recently completed a combined clinical and bacteriological investigation of over 700 wounds. Bacteriological specimens were taken as soon as possible after injury and thereafter at frequent intervals until healing was complete or the patients were discharged from the hospital. Specimens in all cases were taken by swabbing the area and adjacent skin prior

to, during, and after all manipulations, surgery and dressings. By microscopic examination of smears and by cultures on various media under aerobic and anaerobic conditions, the "bacteriological history" of cases could be followed from day to day and new organisms noted on any particular day; also, the more immediate effects of any antiseptic could be judged and compared with its delayed action.

Of all wounds on admission to the hospital 18.9 per cent contained staphylococci and 13.1 per cent hemolytic streptococci: other pathogens were found in much lower percentages. The organisms most frequently present on entry as well as during the hospital treatment belonged to the group of non-pathogenic staphylococci and to the diphtheroid group. Although 27 of 708 wounds contained Cl. welchii, and other clostridia were found in 31, only 3 patients developed symptoms of gas gangrene.

The number of organisms present in wounds on admission to the hospital was found to be directly related to the time following injury: up to 6 hours the number was small, but after 8 hours the number was much greater. These observations emphasize the desirability of treating wounds during the first 4 to 6 hours.

Hemolytic streptococci were more frequently found in wounds of the head, face, neck and forearm than in wounds of other regions. Non-hemolytic streptococci were common in wounds of the head, face and neck, and also in wounds of the groin, perineum and thigh. In injuries of the groin, perineum, thigh, buttock and lower abdomen coliform bacilli were present in nearly half the cases, and 13 per cent contained Cl. welchii. Proteus and B. pyocyaneus were also relatively frequent in wounds of these regions as compared with injuries in other parts.

In wounds which had been cleaned and dressed, infections were more frequent than in those which had been only dressed. Wounds which had been covered at an early stage with a sterile dressing arrived at the hospital in the least infected state, whereas wounds treated with unsterile dressings, especially soiled handkerchiefs, were the most contaminated.

Eighty-six per cent of all wounds and 67 per cent of burns became infected during treatment. The organisms were mostly of low pathogenicity, although in the 708 cases studied, 146 became infected with hemolytic streptococci and 231 with staphylococci. Hemolytic streptococci accounted for most of the severe complications, and in many patients whose wounds were infected with the latter organisms, positive blood cultures were obtained. On the whole, however, the staphylococci and Gram-negative bacilli were apparently responsible for the greatest retardation of healing.

De Waal points out that there are many possible sources of infection after the patients have arrived at the hospital. Among these are inspection and examination by unmasked attendants, further examinations by doctors and nurses upon

arrival in the ward, removal of the patient's clothes in the operating anteroom without strict aseptic precautions, washing wounds and their contamination by bacteria in the air. Bacterial contamination of air probably does not play an important role except when dressings are carried out immediately or soon after sweeping or bed-making. However, a mode of infection not commonly suspected is that which occurs when air currents, created by the movement of patients in bed, pass over wounds. During dressing all movement of the patient should be discouraged. Slipped dressings account for a number of wound infections as organisms distant from the wounds are carried into them mechanically. It has been shown experimentally that organisms like the Proteus and the B. pyocyaneus can pass through a half-inch thickness of serum-soaked plaster.

Although the experience of the author on the application of penicillin to wounds and burns has not been sufficient to enable its bacteriostatic effects to be fully appraised in such cases, of all the agents used to combat wound infection this substance appears to hold the greatest promise. (Edinburgh M. J., Oct. '43.)

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Syndrome of Hyperventilation: Carryer, in a recent paper, calls attention to the frequency with which the hyperventilation syndrome is found among military personnel.

Hyperventilation occurs when the rate or the depth of respiration is abnormally increased. It may develop under several conditions and may be produced experimentally by the simple expedient of breathing rapidly or deeply. Anxiety, fear and fatigue are responsible for its development in many nervous persons. It no doubt plays a major role in the acute "anxiety" attack of patients presenting an anxiety tension state. Stable persons will fall into the practice of hyperventilating under trying circumstances; for example, airplane pilots facing danger. Pain, cold, or heat may reflexly cause hyperventilation by way of the lower centers. Swimmers in cold water may be jeopardized, partly through this mechanism. Hyperventilation also develops through oxygen want. An increased oxygen demand, as on exercise, or a decreased supply, such as that occurring in a rarefied atmosphere, causes a person to breathe more deeply. Although sufficient oxygen may be obtained in this manner, an unfortunate side effect is the blowing off of carbon dioxide, at times more rapidly than it can accumulate.

Symptoms result from hyperventilation because alkalosis develops. This is brought about by loss of part of the alveolar carbon dioxide. With the decrease in alveolar carbon dioxide, certain changes appear in the chemical balance of the blood. The alkali reserve of the body increases and a state of alkalosis develops. The mechanism by which alkalosis produces tetany is obscure. There is little or no decrease in the level of calcium in the blood. It must be concluded, therefore, either that the utilizable or ionized portion of calcium is in some way decreased or that the sensitivity of the nervous system to the normal circulating calcium is increased by alkalosis.

Commonly, the earliest symptom to appear is a sensation of lightheadedness. This is followed by tingling of the fingers and toes, a sensation of constriction in the thorax, palpitation and frequently a feeling of suffocation. As the symptoms progress, panic often develops and the patient will ask that windows be opened or will go out of doors. His face becomes pale and he perspires freely. As the hyperventilation continues, he begins to develop carpopedal spasm, spontaneous facial twitching, similar to that seen in the Chvostek test, and laryngeal stridor. Opisthotonos and stupor likewise may develop as the condition progresses.

The treatment of hyperventilation depends on its recognition. The most skeptical person will be convinced by a demonstration. For this the symptoms of the disease should be reproduced and subsequently corrected by having the patient either hold his breath or rebreathe air. These procedures allow reaccumulation of carbon dioxide in the alveoli. Other measures such as mild sedation to decrease the underlying tension of nervous patients are helpful. (Proc. Staff Meet. Mayo Clin., Dec. 29, '43.)

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Self-Selection of Diets: Man is influenced by many unnatural factors in his selection of foods. Among these are convention and what he reads about vitamins and other advertised substances. Also, he alters natural foods by cooking. On the other hand, one instance of man's ability to select instinctively a necessary food element is the increased appetite for salt often described by the patient with Addison's disease on his first visit to a physician.

The ability of certain animals to select a diet which is optimum for their growth with respect both to balance and to calories is interestingly demonstrated by Richter's experiments which have been carried on at the Johns Hopkins University School of Medicine for several years.

Rats kept several hundred days on a choice of sixteen purified substances (dextrose, casein, olive oil, essential minerals and vitamins) offered in separate containers made beneficial selections and grew at a normal rate.

Rats kept on this self-selection diet without any of the vitamin B factors would eat large amounts of yeast or liver when these substances were offered to them; but if not given access to these substances, they would eat almost no carbohydrate and take large amounts of fat. Rats made diabetic by pancreatectomy, stopped eating carbohydrate and started eating fat. However, when treated with insulin, the reverse was true.

In the absence of vitamin B components, the rats ate large amounts of fat, little or no carbohydrate and no protein. When thiamine (essential to carbohydrate

metabolism) was made available as the sole representative of the vitamin B complex, they ate carbohydrate, little fat and no protein. Progressively as the other components of the vitamin B complex were made available, they ate less fat, more carbohydrate and more protein.

Adrenalectomized rats compensated for their increased sodium excretion by ingesting large amounts of sodium solutions, likewise parathyroidectomized rats manifested a greatly increased appetite for calcium.

When liquids were given that had added calories (as by adding alcohol to the water), the rats reduced their food intake proportionally and maintained the same total caloric value. Fluids preferred by rats to water were usually those with nutritional value.

That this ability of rats to make beneficial selections apparently depends on taste and not on experience or the effects produced by the substances is suggested by the fact that after section of the taste nerves, adrenalectomized rats no longer select salt.

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Sprouted Soy Beans As a Source of Food and Vitamins: For many centuries sprouted beans have served the Chinese as fresh vegetables. When seeds sprout, water-soluble vitamins (including Vitamin C) are increased; also the protein is changed so that it may be utilized by the body without much cooking. The following item, prepared at the Naval Medical Research Institute for the Bumed News Letter, outlines a method of creating a source of fresh vegetable foods on ships, and at Naval activities ashore where fresh foods are difficult to obtain.

The beans that usually are sprouted are the small, round, green mung beans and field varieties of soy beans. After steaming or boiling a few minutes, the sprouted beans can be eaten as a salad. They are good also when boiled in a small amount of salt water. They can be worked into large numbers of dishes from chop suey to mince meat pies.

Since beans are sprouted without soil, they are safe for salads in regions where fresh garden produce may be dangerous.

Sprouts must grow rapidly. A good sprout is produced in about four days. At the end of this time they can be eaten. They will keep for several days in a refrigerator. They may be frozen and kept for months. They can be dropped into vinegar and preserved like pickles.

Beans will not usually sprout well if more than a year old. Old beans sprout slowly and tend to mold unless sprinkled twice a day with chlorinated water. Beans cannot be sprouted with sea water.

Contrary to popular opinion beans can be sprouted to best advantage in deep containers such as galvanized cans or large earthenware jars with holes in the bottom.

Beans for sprouting are first sorted to remove broken pieces. A simple device for sorting consists of a flat-bottomed trough with a gap near the bottom. Intact beans tend to jump the gap. The pieces fall through.

After being well washed, beans are soaked in three to four times their volume of water for 12 to 24 hours. This soaking water can be chlorinated to about five times the strength of drinking water without injury to the beans. After soaking, the beans are not covered with water again except for brief periods.

For sprouting, the beans are placed in a large galvanized can with a slit in the bottom large enough so the water will drain out but the beans will not be lost. The can is kept covered with a damp cloth. The beans are sprayed with fresh water two or more times a day.

For preparing small amounts or testing the suitability of beans for sprouting, an ordinary fruit jar covered with coarse cloth or wire screening can be used. The jar is turned upside down while the beans are sprouting. Beans can be sprouted also in a cloth sack dipped in water several times a day and then suspended in the air. This last method has not been entirely successful.

The sprouted beans tend to be rather flat in taste unless they are well cooked and seasoned with salt or meat. They have a consistency like peanuts after they are cooked.

A limited number of bulletins describing the sprouting and cooking of soy beans issued by the New York Emergency Food Commission is available at the Naval Medical Research Institute and may be obtained upon request. (C.M.McC.)

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Duodenogastric Physiology: Our attention was recently called to a series of papers describing some interesting research which has been done on the duodenal mechanism for the control of gastric acidity and motility and which represents a contribution to our understanding of the disturbances of gastric physiology in duodenal ulcer.

Studies of the gastric acidity by fractional analysis revealed (1) that in normal individuals wide variations in gastric acidity are found; (2) that in patients with uncomplicated duodenal ulcer there are generally hyperpepsinia and also hyperchlorhydria, with a sustained plateau curve which never recedes to the normal level.

Duodenal ulcer is characterized roentgenologically by hyperperistalsis, hypertonicity, and a rapid evacuation time.

According to the theory of Cannon, acid on the gastric side opens the pylorus and acid on the duodenal side closes the pylorus. The authors studied the effect on gastric function in normal individuals of applying various substances by means of a tube directly to the mucosa of the duodenum.

They discovered that weak acid solutions such as 0.1 per cent hydrochloric acid applied to the mucosa of the duodenum affected gastric secretion and motor activity very little, but that stronger acids (as 0.5 per cent hydrochloric acid) had a pronounced effect. This effect consisted of (1) induction of pylorospasm, (2) lengthening of the gastric evacuation time, (3) inhibition of peristalsis, (4) decreasing of gastric tonicity and (5) diminution of the secretion of hydrochloric acid and pepsin. However, equal stimulation of the duodenal mechanism could be obtained through the application of other hypertonic electrolyte solutions including sodium chloride and sodium bicarbonate, by hypertonic non-electrolytes such as glucose, by fats, by fatty acids and by any physical or chemical agents sufficiently irritating to the duodenal mucous membrane.

When the threshold of response of the duodenal mechanism is low and it responds at a higher than usual pH, gastric secretory depression will occur more readily and a low gastric acid response of the test meal will result. On the other hand, a duodenal mechanism with a higher than normal threshold of response, one requiring a greater duodenal acidity (lower pH) to activate it, will not react until the gastric acid has reached a peak higher than normal, and that individual will show a hypersecretory gastric acid curve. It is, therefore, in the variation of the threshold of response of this duodenal mechanism that the explanation lies for the isosecretory, hyposecretory and hypersecretory gastric acid responses of normal persons. It was found that in duodenal ulcer, the activity of the duodenal mechanism is so impaired that it takes a considerably higher acidity than the normal physiologic level of gastric acid to achieve an effect. If in a case of duodenal ulcer, the gastric acid response returns to normal after treatment, then it might be inferred that the duodenal mechanism was only dulled and not destroyed during the period of active ulceration. If, on the other hand, the gastric acid response does not return to normal after clinical healing of the duodenal ulcer, it is to be inferred that permanent injury to the sensitivity of the mechanism has occurred.

Milk and cream have been and remain the mainstays of the ulcer diet. It has been amply demonstrated how efficient is the protein of milk in the binding of pepsin and in the buffering of acid neutralization. The fat of milk lowers the rate of gastric secretion and the values of acid and pepsin by stimulating the duodenal mechanism as above explained. When cream is used this effect is more pronounced. In those cases of uncomplicated duodenal ulcer which fail to respond to medical treatment, the duodenal mechanism may have been so damaged, as to fail to react even to fat, the most powerful stimulant found.

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Causes Other Than Iodine Deficiency for Goiter: As early as 1928 Chesney, Clawson and Webster (Bull. Johns Hopkins Hosp., 1928, XLIII, 261, 278, 291) reported the development of large hyperplastic goiters in rabbits maintained on cabbage diets. In spite of the hyperplasia the animals showed low metabolic rates. Administration of iodine before goiter formation occurred served to prevent its occurrence, but administration of iodine after the goiter had formed threw the animals promptly into severe thyrotoxicosis.

Other workers have since shown that the leaves of many brassica plants, rape seed, soy bean flour, sulfaguanidine, thiocarbamide, methyl-cyanide, potassium thiocyanate, and various members of the sulfonamide group have a definite goitrogenic action.

Rawson, Hertz, and Means now report three cases of goiter developing in persons receiving potassium thiocyanate for treatment of hypertension. The cases are characterized by thyroid hyperplasia, hypothyroid symptoms, exophthalmos (in one case), low basal metabolic rate, low blood iodine, decreased urinary excretion of iodine and increased urinary excretion of thyrotropic hormone in the inactivated form. These workers suggest that this thiocyanate goiter can probably be prevented by prophylactic doses of iodine and that it can be relieved by the use of thyroid extract even when the administration of thiocyanate is continued. (Ann. Int. Med., Dec. '43.)

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Tetanus Toxoid: In a report recently submitted to the Bureau by a medical officer on duty in a combat area, it was stated that all of the casualties had been given prophylactic doses (1,500 units) of tetanus antitoxin. The use of tetanus antitoxin should be reserved for cases of clinical tetanus and for those individuals who have not had basic tetanus immunization.

The Form Letter of March 4, 1943, governing the prophylaxis of tetanus is reprinted herewith:

P2-3/EN(054-40)
Y:mlm
March 4, 1943

From: The Chief of the Bureau of Medicine and Surgery.
To: All Ships and Stations.

Subj: IMMUNIZATION OF ALL PERSONNEL AGAINST TETANUS, By The Use of Alum Precipitated (Insoluble) Tetanus Toxoid.

Ref: (a) BuM&S Form Letter No. 7, P2-3/EN(054), dated August 5, 1941.

1. Reference (a) is herewith canceled and superseded.

2. All personnel of the U. S. Navy and U. S. Marine Corps on active duty (regular, reserve and retired), regardless of age, shall be immunized against tetanus, using alum precipitated (insoluble) tetanus toxoid.

3. The INITIAL IMMUNIZATION shall consist of two injections, 0.5 (1/2) c.c. each of alum precipitated tetanus toxoid, given intramuscularly with an interval of not less than 4 or not more than 8 weeks.

4. ROUTINE "BOOSTER" (OR STIMULATING) IMMUNIZATION: One year after the completion of initial immunization, each individual shall be given a single "booster" (or stimulating) injection of 0.5 (1/2) c.c. of alum precipitated tetanus toxoid intramuscularly and thereafter every four (4) years in the absence of recorded emergency booster injections. When possible, in addition to the provisions of pars. 2 and 3 above, all personnel shall receive a "booster" injection of 0.5 (1/2) c.c. of alum precipitated tetanus toxoid before going into a combat zone, irrespective of time interval since previous injection. When practicable, this should be given approximately one month before entering the combat zone.

5. EMERGENCY "BOOSTER" INJECTIONS: In addition to the initial and routine "booster" injections, emergency "booster" immunization, consisting of 0.5 (1/2) c.c. of alum precipitated tetanus toxoid given intramuscularly, shall be administered immediately to the following:

a. Each individual who incurs a wound or severe burn in battle.

b. Patients undergoing secondary operations or open manipulations, when, in the opinion of the responsible medical officer, there exists the possibility of contamination with tetanus spores or organisms.

c. Individuals who incur punctured or lacerated non-battle wounds, powder burns, or other conditions which might be complicated by the introduction of tetanus spores or bacilli.

6. PRECAUTIONS: Extreme care should be exercised: (a) To assure that the injections are given deeply intramuscularly; (b) to avoid injecting tetanus toxoid directly into the blood stream as a result of puncturing small blood vessels. A preferable site of injection is in the deltoid muscle, approximately half the distance from the point of the shoulder to the insertion of this muscle.

7. All reactions following the administration of tetanus toxoid shall be recorded and reported in accordance with the instructions contained in par. 2606, Manual of the Medical Department, U. S. Navy, covering reactions to typhoid vaccination. It is to be expected that some degree of muscle soreness and swelling will result in most instances. Unless this is unusually severe, it is not considered necessary to report this as a reaction.

8. TETANUS ANTITOXIN shall be used only for the treatment of clinical tetanus and for the prevention of tetanus in wounded individuals who have not previously been actively immunized with tetanus toxoid. Patients given tetanus antitoxin prophylactically shall be immunized at the same time with tetanus toxoid as directed in pars. 3 and 4 above.

9. When the second dose of the initial immunization of tetanus toxoid has been given, the identification tag shall be die-stamped with the capital letter T, followed by the number of the month and the last two digits of the year, e.g. (T2-43). "Booster" injections shall be entered on the Vaccination Record sheet in the Health Record in the space under "Other Inoculations" and signed by the medical officer.

10. The tetanus toxoid will be supplied in containers of amber glass in 2 sizes, 10 c.c. and 50 c.c. Each activity requiring tetanus toxoid is directed to submit an NMS form 4 requisition (dispatch for stations and ships outside continental limits) to the nearest naval medical supply depot or naval medical supply storehouse.

11. Immunization of individuals who are incapacitated because of acute illness, or severe injury unassociated with danger of tetanus, may be deferred at the discretion of the medical officer until such time as may be considered safe or not interfering with the progress or convalescence of the individual.

12. There is no contraindication to administering the first injection of alum precipitated tetanus toxoid concurrently with triple typhoid vaccine or smallpox vaccine.

13. In summation, immunization against tetanus, using alum precipitated tetanus toxoid, shall be administered as follows:

a. INITIAL IMMUNIZATION: Two intramuscular injections of 0.5 (1/2) c.c. each given not less than 4 or more than 8 weeks apart.

b. ROUTINE "BOOSTER" IMMUNIZATION:

(1) All personnel shall receive 0.5 (1/2) c.c. intramuscularly, 1 year after completing the initial immunization and every four (4) years thereafter.

(2) When practicable, 1 month before entering a combat zone, all personnel will receive 0.5 (1/2) c.c. intramuscularly, irrespective of time interval since previous injection with alum precipitated tetanus toxoid.

c. EMERGENCY "BOOSTER" IMMUNIZATION: All personnel sustaining burns or wounds in battle, or who incur non-battle puncture wounds or burns in which there is danger of contamination with tetanus spores or bacilli, shall be given an emergency injection of 0.5 (1/2) c.c. of tetanus toxoid injected intramuscularly, providing that they have received initial immunization.

14. It is obvious that in combat areas where health records and even identification tags are often not available, absolute reliance must be placed upon the basic tetanus immunization of all personnel (pars. 3 and 4). Booster injections as outlined in paragraph 5 are without value for immediate protection unless basic immunization has been previously given. Unvarying and rigid compliance with this directive is therefore enjoined. BuMed. Ross T. McIntire.

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Pyrogenic Action of "Necrosin": In the Bumed News Letter of March 19, 1943, it was noted that Menkin of the Harvard Medical School had demonstrated the presence of a substance in exudates which is probably responsible for the basic pattern of injury in inflammation. This substance, which either is a euglobulin or is at least associated with the euglobulin fraction of exudates, has been termed by this investigator "necrosin." Menkin believes that necrosin is liberated from the cell which has been initially injured by an irritant. In a recent paper he further describes this substance as follows:

"The internal chemistry of the damaged cell is doubtless altered, yielding as a result various common denominators, which in turn are responsible for the unfolding of a fundamentally stereotyped pattern in inflammation. Leukotaxine, the leukocytosis-promoting factor, and necrosin belong to such a category of chemical units formed by the injured cells. In this connection necrosin has been found to induce a severe inflammatory reaction accompanied by lymphatic blockade. This substance introduced into the circulating blood is followed by a prompt leukopenia replaced several hours later by a leukocytosis. The internal organs are injured, notably the liver and to some extent the kidneys. Besides fatty deposits in the parenchyma of these structures, small foci of leukocytic infiltration may be found irregularly scattered throughout these organs."

Further data presented in this recent communication indicate that necrosin, unlike other protein fractions of exudates, induces an appreciable degree of fever

when injected into the circulating blood of dogs. The absorption of this substance into the blood stream from the site of an acute injury is probably largely responsible for the development of fever with inflammation. (Proc. Soc. Exper. Biol. and Med., Nov. '43.)

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Unusual Epidemic of Infectious Mononucleosis: Infectious mononucleosis commonly occurs sporadically rather than in epidemic form, although under the term of "glandular fever" there have been outbreaks in schools where a large proportion of children exposed have come down with the infection.

A recent epidemic reported by Halcrow, Owen and Rodger is unusual in that it involved adults rather than children and produced serologic evidence of infection in so many persons in whom there were no clinical manifestations of the disease.

In an E.M.S. Hospital a woman, aged 25, was admitted on August 5, 1943, with typical infectious mononucleosis. Within the next few days 4 other cases were admitted. The next victim was the first patient's physician. Other members of the hospital staff and many patients in the hospital next came down. A special study of the whole hospital group was then made with the following results: of 296 persons studied, 125 showed clinical evidence of the infection and 165 showed serologic evidence (Paul-Bunnell reaction) without clinical manifestation. On August 25 the hospital was closed to new patients. Studies of relatives of the hospital staff living outside the hospital and of people living in the vicinity of the hospital revealed numerous instances of latent or mild infection; but of 20 persons living 35 miles from the hospital none showed clinical or serologic evidence of the infection. It would appear that although the form of infectious mononucleosis in this outbreak was mild, it was extraordinarily communicable. (Brit. M. J., Oct. 9, '43.)

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Nervous Factor in Shock: Eversole et al produced fatal shock in dogs by traumatizing the muscles of both hind legs by repeated blows with a light rawhide mallet. The skin was not ruptured nor the bones fractured.

Spinal anesthesia, maintained for 3 to 4 hours, prevented all symptoms of shock and allowed uneventful recoveries in 10 of 12 animals.

A local anesthesia of the legs by means of pressure (tight tourniquets) maintained for a 2-hour period, protected 7 of 12 dogs against shock, and markedly prolonged the survival of 4 more.

Thorough infiltration of the areas to be traumatized with a 4 per cent procaine solution, repeated frequently over a 3 to 4-hour period, prevented fatal shock in 7 of 10 dogs.

The evidence indicates that a flow of nociceptive stimuli from the traumatized regions, unless prevented by spinal anesthesia or a local block, is an important contributing factor in the initiation of the shock state which follows the type of muscle trauma employed. (Am. J. Physiol., Jan. 1, '44.)

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Posture in Shock: Studies by Duncan and also by Evans have emphasized the importance of posture in the treatment of shock. There is marked instability of the vasomotor system of the patient in shock. Individuals who had lost through hemorrhage 30 per cent or more of their blood volume were studied. Their blood pressures fell to critical levels. Elevating the foot of the bed had a favorable effect on the condition of the patient and was followed by a significant rise in blood pressure. When their heads or the upper parts of their bodies were elevated, they showed signs of collapse.

The response of the condition of such a patient to changes in position can be used as a sensitive index of the degree of shock, and disappearance of vasomotor instability is evidence of improvement.

In late ("irreversible") shock, where vasoconstriction is no longer maintained, this vasomotor instability is naturally absent.

The deterioration in the patient's condition on elevating the upper part of the body is due to inability to maintain an adequate cerebral circulation. (Minutes of a Conference on Shock held at the National Research Council, Dec. 1, '43.)

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Rabies: The marked increase in rabies in the United States during the past twelve months has stimulated renewed interest in this disease. Also, it is remembered that naval personnel are operating in other areas of the world where rabies is common.

In 1937 over 6,000 cases of rabies in animals were reported to the U. S. Public Health Service. The animal rate declined steadily over the next five years, reaching an all-time low of 1,920 in the year 1942. Figures for 1943 are not as yet available, but it is believed that cases in animals will approach the 10,000 mark.

The reasons for this startling increase are probably associated with the economic dislocation of American life due to the war. The marked shift of population to centers of war industry has led to the transfer of dogs from areas where

rabies is endemic to others usually free of the disease. Owners in some cases have been forced to desert their dogs, increasing the number of homeless, vagrant animals. Meat rationing may cause a dog usually fed at home to forage for himself. These dogs swell the numbers of semi-vagrant dogs which constitute the most important animal reservoir of the disease.

A similar increase in rabies was noted during the first World War. Epizootic outbreaks of the disease in the past have always burnt themselves out in the course of 2 or 3 years, and one may reasonably expect the present outbreak to follow the same course, particularly if public opinion is marshaled behind measures aimed at controlling vagrant dogs.

The basic principles of the prevention of rabies after exposure remain unchanged. The most commonly used method of local treatment of the wound is still cauterization with fuming nitric acid. During the past year Shaughnessy and Zichis have presented evidence showing that thorough irrigation with 20 per cent green soap solution is equally effective. This method has obvious advantages for the treatment of wounds of the face.

Rabies vaccine is recommended by Public Health authorities for the treatment of exposed persons in spite of the lack of incontravertible evidence of its efficacy in preventing the disease after the virus has been introduced into the body. The Semple vaccine is most commonly used; it is available commercially and is prepared by a number of State Health Departments. The phenol-inactivated vaccine is injected subcutaneously in 2 ml. doses daily for two weeks. Serious local and general reactions are rare, especially if the course of treatment is the patient's first. Other vaccines are available commercially.

Johnson (in the Oxford Loose Leaf Medicine) recommends that rabies vaccine treatment be started at once when a person has been bitten or scratched under any of the following conditions: (1) The animal was apprehended and presented clinical signs of rabies; (2) the animal was killed and the brain found positive for rabies; (3) the animal was killed, and although the brain was negative the animal was suspected of being rabid; (4) a person in a community where rabies was known to be present was bitten by a stray animal which escaped..

Although it has been estimated that only one person in three bitten by a rabid animal develops the disease, even in the absence of specific therapy, rabies in man is universally fatal, so far as is known, once the clinical picture has developed. Immune serum in the treatment of the disease has proven useless, and its use in prophylaxis, although promising, is still in the experimental stage.

By far the most important vector of rabies in this country is the dog, and rigid dog control regulations offer the logical solution to the problem. The use of canine rabies vaccines offers promise of being an auxiliary aid, but it does not justify giving up the more fundamental control regulations. (F.S.C.)

Salt Requirements for Work in Hot Climates: Taylor, Henschel, Mickelson and Keys studied the effects of three different levels of NaCl intake on cardiovascular functions of 49 normal men in work and rest during exposure to hot, dry conditions.

The salt intakes per 24 hours were 4 to 8 Gm. ("low"), 13 to 17 Gm. ("moderate"), and 28 to 32 Gm. ("high").

No advantage in any of the variables measured was demonstrated for men on the high intake as compared to men on the moderate intake.

As would be expected, men on the low intake had higher pulse rates and rectal temperatures in work and poorer postural cardiovascular adjustment. They lost more than twice as much weight, drank less water and sweated less. The low salt intake resulted in an average net deficit of 13 Gm. of NaCl for 3 days in the heat, while the men on moderate salt intake appeared to be in NaCl balance under similar conditions.

Heat exhaustion occurred ten times as frequently in the men receiving about 6 Gm. as in those who were receiving about 15 Gm. (Am. J. Physiol., Dec. 1, '43.)

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Edible Plants of the Arctic Region: The Bureau of Medicine and Surgery has just published a 50-page bulletin, "Edible Plants of the Arctic Region." The author of the bulletin is Dr. Paul C. Standley, Curator of the Herbarium, Field Museum of Natural History, Chicago, Illinois. In addition to describing the edible fruits, berries, greens, roots and bulbs, Dr. Standley has included twenty-seven plates, a master color guide, and a master location table. A limited number is available for distribution by the Bureau.

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Reports on Research Projects at the Naval Medical Research Institute Available for Medical Officers:

X-205 The Effect of Cool Quarters on Efficiency and Performance of Naval Personnel Working in Hot Spaces. Report #1, 6 Dec '43.

X-235 An Investigation of the Adaptability of the Principles of Water Filtration to Individual or Squad (Small Group) Use. Report #1, 7 Dec '43.

X-127 Methods of Reducing the Amount of Drinking Water Required by Survivors of Shipwreck. Addendum to Report #3, 8 Dec '43.

X-258 Degree of Mosquito Protection Afforded by: (a) Poplin, (b) Byrd Cloth, (c) 8.2 oz. Cotton Twill, (d) British Cellular Weave, (e) Herringbone Twill. 9 Dec '43.

X-209 Acute and Chronic Toxicity of Dihydroquinine. Report #1, 14 Dec '43.

X-179 Statistical Study of Blood Plasma Administration. Report #2, 21 Dec '43.

X-182 The Lucite Calvarium: A Method for Direct Observation of the Brain. I. The Surgical and Lucite Processing Technics. Report #1, 22 Dec '43.

X-127 Sea Trials of Methods of Preventing Sunburn of Shipwrecked Personnel, and Information on the TWA Anti-Sun Headgear. Report #5, 27 Dec '43.

X-101 Investigation of Hog-Gut as Suture Material. 28 Dec '43.

NMRI-19 The Ticks of the Pacific Region. 29 Dec '43.

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Abandon Ship: Review of a training film, quoted from the Bi-Weekly Report of Emergency Rescue Equipment, January 26, 1944, Coordinator of Research and Development, U. S. Navy and Liaison Committee on Emergency Rescue Equipment.

Produced by: Bureau of Aeronautics, Navy Department (Wilding Pictures)
NUMBER: MN-1145 RUNNING TIME: 30
DATE: 1943 MM: 16

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Synopsis of Film: The film is based on authentic data taken from the testimonies of survivors of sea disasters. It is designed primarily to show the importance of the following factors to the problem of survival:

1. Being prepared for an emergency in advance.
2. Understanding the correct procedures for the maintenance and proper handling of emergency gear.
3. Knowing the various ways of leaving the ship.
4. Being able to escape through oil.
5. Knowing how to protect yourself in the case of underwater explosions.
6. Being familiar with the various types of emergency flotation equipment.
7. Being acquainted with the fundamentals of lifesaving and first aid.
8. Knowing some facts that will be helpful for defense against marine life.

These problems have been considered of primary importance by men who have been shipwrecked - those who have learned the hard way. The methods and technics described are based on their suggestions and reports that are filed in the Navy Department in Washington. It is felt that if men at sea know how to perform quickly and intelligently when the command "Abandon Ship" is given, a larger percentage of personnel will survive. (This review is prepared in detail for the benefit of those who have not seen the film and might wish to use a summary for instruction and training purposes.)

I. ADVANCE PREPARATION:

1. Always wear your life jacket everywhere, even sleep in it. It is considered wise to take it to the shower with you.

2. Assemble your own personal abandon-ship kit in a waterproof case. Keep it handy at all times. The following items are the most important gear needed:

a. Knife - most important; can always be used.
b. Whistle - to attract attention.
c. Flashlight - for finding your way in the dark and signaling.
d. Fishing kit - to aid in supplementing life raft rations.

3. Be able to dress in 2 minutes in the dark. This procedure should be practiced until it is almost automatic. Before going to bed, lay clothing out in a particular order so that valuable time will not be lost fumbling about in the dark.

4. Know several ways to reach topside. Become acquainted with alternate routes in case the path of exit is blocked by fire, jammed doors, etc. Know the peculiarities of the gangway so that you can travel in the dark. Follow the rules of traffic designed for your vessel to avoid confusion and panic.

5. Know your abandon-ship stations and report to them only when the command is given. If your station has been knocked out, or if you are not able to reach it, go to another, but do it in orderly fashion.

6. Be thoroughly familiar with the methods of lashing and launching the life rafts and floats aboard the vessel you serve.

7. Check to make sure that all emergency gear is in good condition. Keep floats secured by strong painters that are long enough to reach the water and be free of the ship.

8. It is the duty of officers to check all supplies, medicine, rations, etc., placed on rafts and floats. Supplies should be secured by a lanyard so that if raft overturns they will not be lost.

9. It is important to keep in mind that the ship may remain afloat for several hours after the attack. There will be sufficient time to follow orders and be calm. Lives have been lost by premature actions of frightened men. However, when the command "Abandon Ship" is given, snap and precision in carrying out orders show the results of a well-disciplined company and insure a greater percentage of survivors.

II. METHODS OF LEAVING THE SHIP:

1. It is always best to descend by cargo net or Jacob's ladder.

2. If these are not accessible, use an escape line knotted every few feet. In any case have several knots near the water line so men can check their descent while those below get away from the ship.

3. Men may also descend with a line thrown over the shoulder, around the body, and locked through the feet. Thus, the body will be supported in three places.

4. As a last resort jump, but never dive overboard.

a. Go off the bow if the ship is listing.
b. Look before you leap. Select a spot free of other men and clear of debris.
c. Fold your arms over the jacket. This will protect your face as the arms hit the water, and also prevent it from slipping up against your chin.
d. Jump with straight stance.

III. ESCAPE THROUGH OIL:

1. Characteristics of the various types of oil dispelled from vessels:

a. Heavy oil - spreads slowly and piles up, especially in cold water. Very difficult to swim through because there is practically no traction. Not likely to catch on fire.

b. Light Oil - spreads, quickly, but it is possible to swim through it if you use the proper technic.

c. Gasoline - spreads the fastest of all oils, but is very thin and burns off quickly.

2. The most danger in swimming through oil arises from panic. In case of fire, follow orders, plan your line of action, and keep cool.

3. Animated shots showed how oil spreads from a leak.

   a. If the ship is making way, the oil will stream along the end of the ship and gradually spread out in a fan shape.

   b. If the ship is drifting and the leak is on the windward side, the oil will spread out on the side opposite the direction the drift. In this case leave the ship from the bow or stern on the leeward side. Get out of the direction of the drifting vessel immediately.

   c. If the leak is on the leeward side and the ship is drifting, the oil will form a narrow thick band along the leeward side. It will gradually spread out over the edges of the bow and stern and flow opposite the drift of the ship.

4. The following procedure was described for swimming through burning oil:

   a. Remove life jacket because it will impede your progress under water.

   b. Unfasten shirt and pull over your head to protect the face when jumping into the oil.

   c. Jump in a straight stance with feet flat to splash away the burning surface.

   d. Using a strong breast stroke, swim underwater for about 50 feet before coming to the surface.

   e. To make an opening in the oil or burning gasoline, make a wide sweeping breast stroke across the surface. Thrash the flames away.

   f. With the body as high out of the water as possible, take a deep breath, and submerge again.

   g. Always swim against the direction of the wind, or to windward.

   h. If possible swim in groups because several persons pushing the flames away will clear a much wider space when on the surface.

IV. EMERGENCY FLOTATION EQUIPMENT:

1. Numbers and types of life rafts, rubber rafts, and floats vary according to the type of craft. Every plane aboard a carrier is equipped with some type of rubber life raft. Know where these are stowed and how they operate.

2. Steps to follow in using a rubber raft:

a. Inflate raft by releasing carbon dioxide cartridge.

b. Throw it overboard and jump into water immediately.

c. Grasp raft to prevent it from being blown away by the wind.

d. Tow it away from the ship. When climbing aboard have men on all sides to keep it upright.

e. Once aboard, remove oars from side pockets, assemble them, insert in row locks, and get away from the vicinity of the ship.

f. The hand pump may be used to touch off the cross seats. During the heat of day it may be necessary to release some of the air because the raft will expand. In the evening, use the hand pump to reinflate the collapsed raft.

g. Know the use and location of all emergency equipment stowed in the pockets of each type of raft.

3. Some crews are issued the inflation type life jacket. It must be handled with care to prevent punctures. It should be checked to see that carbon dioxide cylinder is ready to operate.

4. Experience has proved that there will usually be time to dress properly, locate a life jacket, and to release all life rafts stowed aboard. When leaving the ship, keep on all clothing, including shoes.

5. Underwater explosions present another problem.

a. The racing crawl is the fastest stroke for getting away from the suction area of the ship and out of the area of underwater explosions.

b. When depth charges are exploding in the vicinity of the disaster, stay on your back. Keep ears out of the water, mouth open, and belly and chest above the surface.

6. Debris, clothing and floating objects will offer support in the water.

a. An overturned bucket may be used.

b. A helmet provides sufficient buoyancy to keep a man on the surface. However, do not wear the helmet when jumping overboard.

c. Clothing may be inflated while in the water. Button shirt and tuck in around the waist. Open slightly at neck and blow into it until inflated.

Trousers may be used as water wings. Remove and tie each leg closed. Blow up; crawl onto them carefully.

d. Other floating aids include empty ammunition cases, mattresses, sheets, pillow cases, and shell cases.

7. Look around for wounded comrades in the water. The basic technics of lifesaving are important here. Film showed methods of rescue using the frontal-approach, hair carry, cross-chest carry, and the tired swimmer's carry. It may be necessary to turn over a rubber raft to administer artificial respiration. Wounded men should be given preference aboard rafts; others may hang onto the sides.

8. Collect rafts into a compact group, especially at night. The companionship bolsters morale; there is safety in numbers; and a group of several rafts is better seen by searching parties than an individual raft.

9. To attract attention, use a reflector mirror in the day and a flashlight at night.

V. DEFENSE AGAINST MARINE LIFE:

1. Sharks: This film presents the view that few sharks are man-eaters and that experience has shown that, although sharks may be all around in the water, they have not attacked. The best defense according to the film, is to thrash the water to frighten them away.

2. Barracuda: These animals are much more vicious than sharks, and will attack anything. Splash the water violently to ward off an attack.

3. Portuguese Man O'War: The sting of these over-sized jelly-like animals is very painful. Relax and float on the surface. The pain will gradually wear off.

VI. RESCUE:

1. Keep a constant watch for planes that will be looking for you.

2. If you are sighted by an enemy plane, throw off life jacket and get under the water or some floating debris. If your raft is equipped with a camouflaged tarpaulin, hide under it.

3. Continue always to fight for life. Hang on and don't give up. Remember that you haven't been forgotten.

4. When rescue ships are sighted, make them see you. Board the vessel quickly because enemy submarines may be in the vicinity. Wounded men should

be taken aboard on a litter. Never try to climb a rope, but use a ladder or bosun's chair.

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Procurement: All films are distributed on a loan basis from the Training Aids Libraries. Requests for the films should be made to the District Medical Officer, Naval District Headquarters.

By addressing requests to the Audio-Visual Aids Utilization Officer at the nearest Training Aids Library, loan copies of films may be secured by the following Navy Commands: Severn River, Potomac River, Air Technical Training, Air Intermediate Training, Air Operational Training, Airship Training, Training Task Force. (Bumed News Letter, Vol. 2, No. 6, Sept. 17, '43.)

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Public Health Report

Disease	Place	Date	Number of Cases
Dengue Fever	Honolulu, T.H.	Dec. 4-11, '43	34
			1,284 (total number reported)

(Pub. Health Rep., Dec. 31, '43.)

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BUMED-X-AMM-II
A11/A16-3(093)

To: All Ships and Stations.

Subj: Personal Decontamination: Liquid Vesicant Gases. 6 January 1944

Ref: (a) BuMed Form Ltr R-1094, Prevention and Decontamination of Mustard Gas and Lewisite Casualties by Use of S-461 Ointment and BAL Ointment, Directions for - Restricted. F34-5(052-37), F-4: KC, 21 May 1943.

1. This form letter is issued as supplementary to and in amplification of reference (a).

2. Recent reports prove that a specific routine of SELF-DECONTAMINATION must be accomplished within 5 minutes if serious eye, skin and lung damage is to be prevented after contamination by liquid vesicant gas. This must be begun by the individual himself.

3. However, if battle conditions at the time of exposure compel continuous manning of guns and stations, then self-decontamination must be accomplished at the earliest possible moment.

4. The fact must be recognized that the use of prescribed protective equipment is the most effective means of preventing serious injury from liquid vesicant gases.

5. PROCEDURE OF SELF-DECONTAMINATION FOR LIQUID MUSTARD:

(1) Instantly on contamination each man will carry out all of the self-decontamination procedures exactly and consecutively in the following order:

(a) Liquid mustard vaporizes from the skin, clothing, equipment and any other objects. Therefore, turn the face away and breathe as little as possible until the eyes and face are decontaminated and the mask is in place as directed in (h).

(b) When eye shields are not worn, wash out eyes at once. Hold the lids open with fingers and pour water slowly from canteen or other uncontaminated source into one eye and then into the other. This must be done immediately after exposure; a delay of 2 minutes may result in blindness. Irrigate for at least 30 seconds and no longer than 2 minutes. If uncontaminated water is not available, use urine.

(c) When eye shields are worn, irrigation of eyes is not necessary.

(d) Blot, not rub, all visible liquid on the skin with the paper absorbent provided with the ointment, or any other suitable material.

(e) Decontaminate hands by covering and rubbing for 20 to 30 seconds with ointment, protective S-461.

(f) Decontaminate face, neck and ears by covering and rubbing for 20 to 30 seconds with ointment S-461. Avoid getting the ointment into the eyes as irritation will result.

(g) Discard the eye shield worn.

(h) Put on the gas mask after the face, neck and ears have been decontaminated. The mask must be on the face within 3 to 4 minutes at the latest after exposure.

(i) Continue decontamination by covering all untreated exposed skin with the ointment, whether or not actual contamination can be seen.

(j) If tactical conditions permit, remove contaminated clothing. Dispose of clothing in such a way that it cannot serve as a source of poisonous fumes. These cause serious eye, skin and lung damage.

(k) If clothing has been removed, spread ointment on areas of skin which may be contaminated.

(l) If not possible to remove clothing, cover contaminated areas of clothing with ointment, protective.

(m) As soon as tactical conditions permit, remove all ointment, protective, S-461, and bathe with soap and water.

6. PROCEDURE OF SELF-DECONTAMINATION FOR LIQUID LEWISITE:

(1) SELF-DECONTAMINATION is the same as that described above for liquid mustard, except:

(a) Ointment BAL is used as the specific decontaminant and substitutes ointment, protective S-461 referred to.

(b) When eye shields are not worn, pull open the lids with the fingers and squeeze ointment BAL directly into the injured eye or eyes and gently massage the lids. If the eye cannot be opened because of pain, the ointment BAL should be applied to the closed lids and as well as possible rubbed into the slit between them. As soon as the pain lessens and the lids can be pulled apart, squeeze additional ointment BAL into the eyes.

(c) Ointment BAL must remain on the skin for at least 5 minutes, after which it may be removed, when conditions permit.

7. PROCEDURE OF SELF-DECONTAMINATION FOR LIQUID NITROGEN MUSTARDS:

(1) SELF-DECONTAMINATION is the same as described for liquid mustard.

(2) Wash the ointment off at the earliest possible moment, since ointment, protective S-461 dissolves, but does not effectively neutralize the Nitrogen Mustards.

8. Subject ointments are listed in the Medical Department Supply Catalog under stock numbers:

S1-3375 OINTMENT, Protective, S-461, 3 oz. tube.
S1-3361 OINTMENT, BAL, 1/2 oz. tube.

--BuMed. Ross T. McIntire.

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1 Jan 1944

BUMED-R1-JLA
P3-5(024-41)

To: All Ships and Stations.

Subj: Reports of Medical Survey in the Cases of Enlisted Men After Three Months on the Sick List.

Ref: (a) Paragraph 3423(d)(2), Manual of the Medical Department.

1. With the approval of the Secretary of the Navy the provisions of reference (a) as applied to enlisted men of the Navy, Marine Corps, and Coast Guard who are in need of further treatment after expiration of 3 months on the sick list are suspended for the duration of the war. In lieu thereof, a Report of Medical Survey is required in the cases of all enlisted men who have been continually on the sick list for a period of six (6) months.

2. Attention is invited to the fact that the provisions of reference (a) as they apply to officers who have been continually on the sick list for a period of 3 months are NOT modified.

3. This modification of reference (a) is intended to save clerical work and in no way lessens the necessity to expedite the return to duty or other disposition of enlisted patients.

--BuMed. Ross T. McIntire.

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