Restricted

NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Emergency Ration - Food and Water for Lifeboats, Rafts and Floats: The Bureau of Medicine and Surgery has recognized that the ration now supplied to lifeboats, rafts, and floats is not the best for the purpose, and has sponsored research on the problem of sustenance of shipwrecked men. Most of the work has been done at the Naval Medical Research Institute, some at the Massachusetts Institute of Technology. Investigations of this problem have also been carried out under the authority of the National Research Council. These studies are not complete, but the findings available at this time are sufficient to warrant an opinion as to the best method of providing abandon-ship ration.

The principal factor that determines the quantity and quality of food is the scarcity of water with which, sooner or later, most survivors have to contend. Of what kind of food can and should a thirsty, dehydrated man partake? No matter how physiologically correct a ration may be, it is of negative value unless it can be ingested and digested. Fortunately, the foods which a thirsty man usually finds most palatable are also the least disturbing to his water-balance. These foods are the sugars and fats. Sugars leave nothing for the kidneys to excrete. Fats also leave nothing if completely burned. Proteins and foods with high content of salts, on the other hand, leave metabolic residues which require excretion, stimulate an increased flow of urine, and thus cause undue loss of water. By combining glucose and fat in about equal amounts, fats are completely burned and ketosis is avoided.

Water of combustion in which, by oxidation, the hydrogen of the carbohydrates and fats becomes H_2O, is calculated roughly as .75 gram of water for a gram of food. Actually, the quantities of water produced per 100 grams of each food metabolized are: Fat - 107.1, starch - 55.1, protein - 41.3. Thus, starch and fat supplement, in an important fashion, water ingested as such, without also leaving salts or nitrogen end-products, requiring renal excretion.

Actual trials have shown that even such a crude preparation as fat boiled in glucose is quite palatable to men in dehydration, and is digested without gastro-intestinal upsets. More desirable and more practical, from the standpoint

of procurement, packaging, and stowage would be hard candies, such as "butterscotch." The addition of citric acid to such candies has been found to relieve the "after-sweet thirst." This is a factor of no small importance and one which must not be overlooked.

Based upon the findings now available, one can make tentative prescriptions for the minimum allowance of water and food, as noted above, that will maintain men in good to fair condition:

(1) For three days' survival: Water - 300 cc. daily. No food is necessary for this period.

(2) For six days' survival: Either 500 cc. of water per day and no food, or 400 cc. of water and 100 grams of food per day. Men on 400 cc. of water plus the food will be in slightly better condition than those on water alone, although the water alone will leave them in fair condition.

(3) For twelve days' survival: Water - 400 cc. plus 100 grams of food daily. For this period, food becomes of more importance. Men would survive without food, but would be quite weak.

(4) For a period longer than twelve days: The same daily water and food ration should be used. At no time is there apparently any indication for giving more than 1 part of food to 4 parts of water except perhaps in cold weather, when increased caloric intake becomes most essential.

The conditions above obviously apply in full only when the survivors are in favorable climatic conditions as in subtropic or tropical areas, and when exposure to the sun and excessive perspiration can be prevented. In cold climates, death from exposure comes long before death from dehydration or starvation. (E.G.H.)

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Persistence of Yellow Fever Virus in the Brains of Monkeys Immunized by Cerebral Inoculation: Persistence of virus in the body of the host after infection, despite a refractory state to reinfection from without, has been shown to occur in the case of a number of the viruses. It has been suggested that lasting specific immunity following some virus diseases depends on this persistence. Psittacosis and salivary gland virus infection of guinea pigs are classic examples of diseases in which such conditions have been encountered. Recovery of virus from the brains of animals long after they had been inoculated and found to be refractory to reinoculation has been reported in encephalomyelitis of mice by Theiler, and by Perdrau in rabbits immunized with herpes virus.

Yellow fever vaccine is prepared in this laboratory (Yellow Fever Research Service, Rio de Janeiro) with active attenuated virus, "17D" strain. As a routine control procedure a sample of each lot of vaccine is inoculated into a rhesus monkey by the intracerebral route. Usually, the reaction observed is limited to a fever of short duration followed by recovery.

Attempts were made to recover virus from the brains of some of these monkeys two to five months after inoculation. Strains isolated from three monkeys that died 63, 93 and 159 days after inoculation, apparently because of generalized tuberculosis, were identified immunologically as yellow fever virus.

The possibility that the tubercle bacillus may play some role in unmasking a latent virus is suggested by the fact, already mentioned, that all three monkeys from which virus was recovered had died in the last stages of generalized tuberculosis. (Penna and Bittencourt, Science, May 14, '43.)

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War Wounds of the Peripheral Nerves: War injuries to the peripheral nerves constitute one of the major problems confronting the medical officer. They differ from peacetime injuries in that usually more tissue destruction as well as delay in suturing have occurred. New methods of treatment are being developed both here and abroad; however, the fundamental principles of nerve degeneration and regeneration remain the same. Special stains and tissue culture as well as the development of fibrin suture may bring about a new technic, but so far the best results are obtained by end-to-end anastomosis without tension, without hemorrhage and without infection. The sulfonamides do not inhibit nerve regeneration but allow for the suture of infected or potentially infected nerves, thus shortening the period which formerly was allowed for the infection to clear.

Silk or cotton sutures are the accepted suture material but steel and tantalum wire are proving of value, being inert and not associated with any reaction on the part of the tissues.

Nerve grafts are as yet not as efficacious as end-to-end suture, which may be achieved by multiple operations with lengthening of the nerve by wide dissection and primary suture of the separated nerve ends with flexion of the neighboring joints. The subsequent slow extension of the joints with secondary suture has been done with success. The blood supply of the nerves is important and should not be interfered with.

After successful end-to-end suture of the nerve, massage and passive motion are of value to keep the muscles in a condition which will be receptive to the regenerated nerve endings. They play no part in the stimulation of regeneration.

Ample time for the nerve regeneration, at least two to six months, should be allowed. When in doubt, it is much better to explore the nerves in which there is not a satisfactory functional recovery.

As soon after the operation as possible the patient should be encouraged to active motion and exercise for stimulation of the muscles of the affected extremity. (Craig, U.S.N. Med. Bul., May, '43.)

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Urinary Excretion of Nitrogen by Severely Burned Patients: The daily urinary excretion, by severely burned patients, of large amounts of nitrogen (up to 45 grams), the catabolic equivalent of up to 250 grams of protein, is reported by F.H.L. Taylor and his associates at the Boston City Hospital. Much of this nitrogen appears to be in the form of polypeptides and is presumably the result of tissue degeneration. Increased nitrogen excretion by post-operative patients has been reported by other workers.

The therapeutic implications are clear. Post-operative patients and those severely burned should receive high-protein and high-vitamin diets, if necessary by duodenal tube, to prevent hypoproteinemia. These should be supplemented by intravenous whole blood, human plasma, human serum albumin, protein hydrolysates or amino acids as soon as anemia, hypoproteinemia or edema appear. (L.R.N.)

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Treatment of Hyperthyroidism with Thiourea and Thiouracil: Thiourea derivatives including thiourea and thiouracil have been found, in experimental animals, to lower basal oxygen consumption, decrease rate of growth and development, and to diminish food intake--changes comparable with a state of hypothyroidism. Astwood administered thiourea and thiouracil to three patients with hyperthyroidism. The daily administration of thiourea was 1 to 2 grams and of thiouracil 0.2 to 1 gram. After a variable latent period and a similar although somewhat shorter period of one to two weeks, clinical improvement both subjectively and objectively became apparent. There resulted a relief of symptoms and return to normal of serum cholesterol and basal metabolic rate. There was an increase in body weight with the decrease of metabolic rate. When therapy was discontinued, return of hyperthyroidism was noticed. Too large a dose of thiourea or thiouracil can produce various states of hypothyroidism. These preliminary studies indicate that thiourea and thiouracil may be useful in the control of hyperthyroidism but true evaluation awaits prolonged observation. (Astwood, J.A.M.A., May 8, '43.)

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While thiourea derivatives may be useful in control of hyperthyroidism, further control studies are warranted. These substances apparently induce a temporary remission but the concept of their inhibition of the synthesis of thyroid hormone is not too well understood. Blood concentration of these substances must be determined and further data as to their toxicity and after-reactions must be obtained before clinical trial is attempted. The use of thiourea derivatives may prove a valuable aid in the medical management of mild hyperthyroidism and in the preparation of the severely toxic case for surgical correction. (A.M.H.)

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ALNAV - May 10, 1943: SECNAV: Positive serological tests for syphilis without definite clinical signs or history shall not be cause for discharge from the naval service until biological false positive tests are excluded.

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Ankylosing Spondylarthritis, Marie-Strumpell Arthritis - Roentgen and Orthopedic Therapy: With a combined X-ray and orthopedic treatment of ankylosing spondylarthritis, adopted at Duke University School of Medicine, the average time for correction of deformity is 10 days and hospital stay is 2 weeks, as contrasted with the many weeks of hospitalization required by the former method of recumbency on a Bradford frame. However, a longer hospitalization, or a second hospitalization of 10 days to 2 weeks, 6-8 weeks after the first, is beneficial for continued physical therapy and supervised muscle training. X-ray dosage, at 200 K.V. for areas of about 5 cm. x 15 cm. is 150 r over one or more areas daily for 3-5 treatments; if necessary treatment may be repeated after 3-6 weeks. Radiation is given over the entire spine or involved area only, depending on clinical findings. Should such X-radiation be followed by nausea, dosage is reduced, exposures are spaced further apart, and intravenous fluids are given. The X-ray alleviates pain and muscle spasm promptly, allowing rapid correction of deformities and more vigorous attempts at restoration of muscle balance. It is not yet known whether it is merely analgesic or whether it prevents further ossification of the ligamentous structures of the spine. Orthopedic measures include hyperextension of the spine by a Gatch bed, traction, heat, massage, corrective exercises, and braces. (Baker, South M. J., Mar. '43.)

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Storage and Significance of Tissue Glycogen in Health and in Disease, Especially Diabetes: After reviewing the physiologic importance of glycogen storage, the author points out that control of diabetes should not only abolish hyperglycemia and glycosuria, but should also lead to increased stores of glycogen in the tissues. He warns that high fat diets or drugs like decamethylenediguanidine (Synthalin), which depress glyconeogenesis by damaging the liver, are dangerous in diabetics even though they may abolish the obvious signs of the disease. In diabetic coma, it is erroneous to regard the patient as already sated with sugar and hence not needing more carbohydrate; glycogen stores in such persons are negligible and the blood sugar, although high in concentration is insignificant in absolute amount, as compared with the amount necessary to replenish glycogen stores and supply caloric requirements as insulin is given. In a hypothetical case of diabetic coma presented, almost 500 Gm. of carbohydrate are required during the first 24 hours, and about half that amount during subsequent days to maintain normal glycogen stores and carbohydrate metabolism. (Soskin, Arch. Int. Med., Feb. '43.)

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Myxedema Heart, A Pathological and Therapeutic Study: Although myocardial lesions in a patient dying of heart failure due to myxedema resembled those of "beriberi heart," another patient with myxedema heart showed no benefit from thiamine 50 mg. parenterally daily for 33 days, supplemented for the last 15 days by tablets containing brewers' yeast plus cod liver oil 10 gr. q.i.d. The latter patient was then greatly benefited by thyroid extract increasing from 0.5 gr. b.i.d. to 1 gr. q.i.d. during 11 days and thereafter maintained at the upper dosage level. (La Due, Ann. Int. Med., Mar. '43.)

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Massage for Adipose Tissue: It can be concluded that in normal persons heavy massage to the thighs or abdomen in the attempt to aid in local reduction of fat, would probably do little damage to the lymphatics or liver but the procedure would be futile as far as its effectiveness in removing deposits of adipose tissue is concerned. Study indicates that although pressure, often sufficient to produce multiple capillary hemorrhages, may be used, neither this degree of trauma nor that of lighter massage produces a local breakdown and absorption of this "too, too solid flesh." (Science, May 14, '43.)

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Synthetic Detergent in Treatment of Empyema: Excellent clinical results in the treatment of empyema have been achieved by a combination of azochloramid, and the synthetic wetting agent, sodium tetradecyl sulfate, Dr. Orville Wyss, of Wallace and Tiernan Products, reported at the meeting of the New York Bacteriologists' War Research Projects Group.

Synthetic wetting agents or detergents are generally known to the layman as soap substitutes. Their effectiveness against bacteria, or germs, is due to their property of concentrating around the bacterial cells and bringing about a disturbance of the electric charge distribution on the cell wall. This disastrously upsets the vital chemical processes of the germs.

The wetting, penetrating and pus-dispersing properties of these soap substitutes or synthetic detergents can be used in the treatment of infected wounds by combining them with antiseptics, Dr. Wyss stated. Many other practical applications of such combinations, he added, suggest themselves in fields other than medicine. (Science News Letter, Mar. 27, '43.)

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Japanese-grown loofa sponges have been used as filters in certain types of marine engines. They can, however, be grown in America, and a wild Central American variety is available.

Loofa sponge is the closely entangled fibrous mass in the inside of the loofa gourd. It is an effective filter to separate oil and grease in boiler-feed water without absorbing the water. Marine sponges absorb the water and cannot be used as filters in these engines.

Loofa sponge, luffa sponge, dish-rag gourd sponge, or wild cucumber sponge, whichever name you want to use, is not a true sponge of the familiar marine variety but it is used for many of the same purposes. It grows both wild and cultivated in Japan, China, India and in certain islands in the Far East. A wild variety, that grows in the West Indies and Central America, is satisfactory for making the sponges. A cultivated crop could be raised each year and America assured independence of the Asiatic supply, most of which came from Japan in pre-war days.

The gourds are ready for harvesting six months after planting. They are some 20 inches long, and hang from the vines which grow on trellises to permit

regularity of shape and freedom from ground fungus. One end is cut off and the gourd soaked in water for five or six days. The tough fibrous center is then easily removed, washed, dried and packed for shipment.

Japanese use loofa sponges for the bath, but they are rough and have never found favor in the U.S.A. The Japs also use them to clean their shoes, and for making toys, mattings, sandals and hats. They extract a clear liquid from the stem which is used for medicinal purposes and in skin lotions. Sometimes they eat the pulp, but the food value is questionable, and dish-rag gourd soup is not apt to replace okra soup on the American table. (Science News Letter, Apr. 17, '43.)

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Sensitivity to Sulfonamides - Extracts from the Conclusions and recommendations of the Committee on Chemotherapeutic and Other Agents, National Research Council.

Accumulated information indicates that following the administration of the various sulfonamide drugs the incidence of all toxic effects is approximately as follows: Sulfanilamide, 12%; sulfapyridine, 16%; sulfathiazole, 19%; sulfadiazine, 6.5%. These percentages include all types of reaction, i.e., fever, rash, anemia, leukopenia, acute agranulocytosis, renal complications and hepatitis. When one takes into account only those patients who develop fever or skin eruption, which is the best evidence for acquired sensitivity, then there are fewer reactions. They are approximately as follows: Sulfanilamide, 10%; sulfapyridine, 8%; sulfathiazole, 10%; sulfadiazine, 3-4%. These data do not include the cases in which no evidence of sensitivity developed during the first course of sulfonamide, but those in whom following the second course, fever or a skin eruption developed.

If a patient has been given a sulfonamide and reacts with fever or a skin eruption during the course of the treatment, this fact should be entered in the Service Health Record, together with the type of sulfonamide causing the reaction.

If it is known that a patient is sensitive to one of the sulfonamides and he needs further treatment, the best procedure to follow is to use a different sulfonamide. This should be done with caution and the patient should be under observation. There is no simple test for detecting sensitivity other than giving a test dose of the drug. There is no information concerning the relation of reactivity and blood groups.

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Growth-Accelerating Protein: White and Sayers have reported recently the isolation of a pancreatic protein that has remarkable growth promoting properties. Weaned male white rats were placed on a basal diet containing 22 per cent of this protein or a similar nitrogen equivalent of other proteins. The control proteins included commercial casein, dried whole beef serum, heat

coagulated beef serum protein, pumpkin seed globulin and soy bean protein. Each diet contained 25 per cent of crisco, 35 per cent of starch and 4 per cent of Osborne-Mendel salt mixture with a daily supplement of 400 mg. of dried yeast and 200 mg. of cod liver oil.

An extraordinary difference was observed in the average daily consumption of these diets, the lowest ad libitum consumption (4.7 Gm.) being with the diet containing 25 per cent of heat coagulated beef serum protein. The daily consumption of the diet containing 22 per cent of pancreas was more than twice that amount (10.8 Gm.), other diets occupying intermediary positions. No reason was offered to account for this remarkable difference in daily food intake.

Even greater differences were noted in the nutritional value of the different diets. Here the slowest growth rate was recorded with animals fed 21 per cent of soy bean protein, each daily ingested gram of this diet leading to a daily increase of only 0.19 Gm. in body weight. The diet containing 22 per cent of pancreatic protein was three times more effective, giving an 0.55 Gm. daily increase in body weight per gram of food intake. With the exception of casein, other proteins occupied intermediary positions. Commercial casein also gave a daily increase in body weight of 0.55 Gm. per gram of ingested basal diet. Here also no theory was suggested to account for the remarkable nutritional differences.

As a result of the increased daily consumption of the diet containing pancreatic protein and its exceptionally high nutritional value, an extremely accelerated growth rate was recorded for the pancreas fed rats. During the first twenty-eight days the control soy bean diet led to only a 28 Gm. increase in body weight. The pancreatic protein gave a twenty-eight day weight increase six times as great, i.e., 166 Gm. The second best protein (casein) led to a weight increase of 133 Gm. during the same length of time, other control proteins occupying intermediary positions. Comparison between the two superior proteins (pancreatic residue and casein) was continued for a hundred and forty-five days, at the end of which time one of the rats that had been fed on pancreas had reached a body weight of 640 Gm. while its casein control litter mate weighed only 490 Gm.

The physiologists emphasize the fact that the ratio of body length to body weight remained constant throughout all their experiments: i.e., larger animals were produced, not animals which were merely fatter.

With the present overemphasis on the health-producing and growth-promoting properties of vitamins, proof of equally definite acceleration of growth by the use of certain selected proteins is of basic clinical interest. The nutritional inferiority of soy bean protein is particularly suggestive, even though "soy bean dwarfism" has thus far been demonstrated only with white rats. (Editorial, J.A.M.A., May 22, '43.)

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Public Health Foreign Reports:

Plague

Peru: For the month of February 1943, 4 cases of plague were reported in Peru as follows: Department of Lima, Huaura, 2; Department of Lambayeque, Chiclayo, 2.

Typhus Fever

Algeria: For the period March 1-10, 1943, 373 cases of typhus fever were reported in Algeria, including 17 cases in Algiers, 13 cases in Azefon, 13 cases in Bone, 13 cases in Philippeville, 42 cases in Oran, and 10 cases in Mostaganem.

Guatemala: For the month of February 1943, 101 cases of typhus fever were reported in Guatemala.

Hungary: For the period March 21-27, 1943, 47 cases of typhus fever were reported in Hungary. (Pub. Health Rep., Apr. 23, '43.)

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The following Surgeon General's letter is in reply to a request for a directive which may be used in the instruction of Hospital Corpsmen for independent duty, for gun crews on merchant ships and for other personnel in whom the use of sulfonamides may be required in the absence of trained medical personnel.

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1. Instructions for the use of sulfonamides in the absence of medical personnel may be written along the outline given below. Modifications of these instructions may have to be made from time to time to provide for the use of new, more effective, or safer sulfonamides, as well as for changes indicated as a result of research or clinical observations on the ones now in use.

2. Sulfonamides may be used for the following conditions: Wounds and burns; pneumonia; meningitis; streptococcus sore throat and tonsillitis; ear and mastoid infections; dysentery; gonorrhea; chancroid (soft chancre), and chancroidal bubo; lymphogranuloma venereum (tropical bubo); boils and carbuncles; cellulitis, lymphangitis, septicemia ("blood poisoning").

A. WOUNDS AND BURNS. - For large and penetrating wounds and extensive burns, give sulfadiazine, 4 Grams (8 tablets) with first-aid treatment to prevent infection. If care by medical personnel does not become available within a few days and the patient develops local signs of infection (pain, redness, swelling) and fever, give sulfadiazine as follows: First dose, 4 Grams (8 tablets); then 1 Gram every 4 hours until improvement occurs, when the dose should be reduced to 1 Gram every 6 hours, and continued for 3 days.

B. PNEUMONIA.

Characteristic symptoms: Chills followed by fever; cough, and pain in chest; rapid pulse and rapid respiration; later rusty or bloody sputum.

Sulfadiazine, first dose, 4 Grams (8 tablets); then 1 Gram every 4 hours, day and night, until the fever, pain, and other serious symptoms have subsided; and then for 3 more days.

C. MENINGITIS.

Characteristic symptoms: Headache and fever, sometimes chills; later stiff, painful neck.

Sulfadiazine, first dose, 4 Grams (8 tablets); then 1 Gram every 4 hours, day and night, until the temperature has been normal for 7 days.

D. STREPTOCOCCUS SORE THROAT AND TONSILLITIS.

Characteristic symptoms: Fever, sometimes chills; red, painful throat, enlarged swollen tonsils.

Sulfadiazine, first dose, 4 Grams (8 tablets); then 1 Gram every 4 hours, day and night, until the temperature has been normal for 2 days; then 1 Gram every 6 hours for 2 more days.

E. EAR AND MASTOID INFECTIONS.

Characteristic symptoms: Pain in the ear; later discharge of pus; sometimes swelling and tenderness over the mastoid and fever.

Sulfadiazine, first dose, 4 Grams (8 tablets); then 1 Gram every 4 hours, day and night, until symptoms relieved and temperature normal; then continue for 3 more days.

F. DYSENTERY.

Characteristic symptoms: There are two types of dysentery, bacillary and amoebic. Bacillary dysentery is epidemic, likely to affect not one man but a large number within a few days. The onset is sudden with fever and abdominal cramps followed by loose stools, at first watery, later containing mucus and blood. Amoebic dysentery is not epidemic, but occurs sporadically from time to time. It is a "walking dysentery," the patient not being very sick, although he may have 10 or more bowel movements daily with blood and mucus.

Sulfonamides are effective only for bacillary dysentery. Use sulfaguanidine if available, first dose, 6 Grams (12 tablets), then 3 Grams every 4 hours, night and day, until number of stools per day is reduced to 5 or less; then give 3 Grams only every 8 hours until stools have been normal for 3 days.

If sulfaguanidine is not available, use sulfadiazine, first dose, 3 Grams (6 tablets), then 1 Gram every 4 hours, night and day, for 3 days, or less if dysentery stops; then 1 Gram 3 times daily until stools have been normal for 3 days.

If no improvement within 3 days, discontinue the drug since it is not likely that the dysentery is bacillary in type, and an additional amount of sulfonamides will be of no value. Use instead bismuth subcarbonate, 1 level teaspoonful every 3 hours until stools are formed.

G. GONORRHEA.

Characteristic symptoms: Purulent discharge from the urethra following venereal exposure.

Sulfathiazole, 1 Gram (2 tablets) 4 times a day, for 5 days; a total of 20 Grams. If sulfathiazole is not available, use sulfadiazine or sulfapyridine.

H. CHANCROID (soft chancre) and CHANCROIDAL BUBO.

Characteristic symptoms: Single or multiple ulcers on genitalia, occurring from 3 to 14 days after venereal exposure.

Sulfathiazole or Sulfadiazine, 1 Gram (2 tablets) 4 times a day for 5 days; a total of 20 Grams.

I. LYMPHOGRANULOMA VENEREUM (tropical bubo).

Characteristic symptoms: Enlarged, tender glands in the groin (bubo), occurring from 10 to 30 days after venereal exposure.

Sulfathiazole or sulfadiazine, 1 Gram (2 tablets) 3 times daily for 5 days, then 1 Gram twice a day for another 5 days.

J. BOILS and CARBUNCLES. - For small boils, sulfonamides are not necessary; hot boric acid dressings usually suffice. For large or multiple boils and carbuncles, give sulfadiazine, first dose, 4 Grams (8 tablets) followed by 1 Gram every 4 hours until acute inflammation has disappeared.

K. CELLULITIS, LYMPHANGITIS, SEPTICEMIA ("BLOOD POISONING").

Characteristic symptoms: Red streaks extending from infected, swollen, painful wound.

Sulfadiazine, first dose, 4 Grams (8 tablets), then 1 Gram every 4 hours until the spread of the infection has been stopped; then 1 Gram every 6 hours for 5 days. Do not neglect local treatment with hot boric acid dressings.

Note: In all the above conditions, sulfathiazole may be used when sulfadiazine has been recommended. The dosage for the two drugs is the same.

3. The sulfonamide tablets should be given with liquids (water, milk, fruit juices). Should the patient have difficulty in swallowing the tablets, they may be broken up and mixed with the liquid. While taking sulfonamides, the patient should receive enough water or other liquids (about 3 quarts) to produce at least 3 pints (1,500 cc.) of urine per day. This is of utmost importance. Measure and keep a record of the daily amount of urine. Should the urine become very scanty in spite of adequate fluid intake, discontinue the drug immediately. The sulfonamides should also be stopped if the patient develops other toxic symptoms, such as skin rashes, jaundiced sclera (yellowish color of the white of the eye), or very pale mucous membranes. If the fever has disappeared and then recurs while the sulfonamide is being given, it is very likely a drug fever and the sulfonamide should be discontinued.

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Refrigeration (Cryno-) Anesthesia: "Future generations may find it difficult to understand why it is taking us so many years to appreciate the significance of reduced temperature. Little thought has been given to temperature physiology by most of us, except for rather empirical fever observations. Attempts are still made to keep tissues at 'normal' temperature in spite of the rebellion of many patients with peripheral vascular disease. The usefulness of maintaining life processes at a reduced rate by lowering the temperature is still not generally understood. Perhaps this is due in part to the erroneous tradition that external heat should always be applied for the prevention and treatment of traumatic shock.

"Recent reports indicate that in combat areas military surgeons are largely occupied with the care of injuries of the extremities. The older methods of anesthesia for these cases are not completely satisfactory. In minor cases general anesthesia frequently seems out of proportion to the primary condition, and in severe cases the added burden may be dangerous.

"Life processes, in common with chemical reactions, have a speed which is profoundly influenced by temperature. Oxygen consumption of the tissues can be reduced about 13 per cent for each degree centigrade. When a tourniquet is applied and the extremity is packed in ordinary chipped ice (without salt) the oxygen demands are reduced sufficiently to prevent necrosis for many hours. The skin temperature falls to 2-4 C. and surgical anesthesia is complete within about two hours.

"This method should not be confused with placebo freezing with ethyl chloride spray, which is quite unsatisfactory and objectionable. True refrigeration anesthesia was first used for amputation of partially gangrenous extremities of patients in the older age groups. There has been caution in applying it to traumatic cases. Refrigeration without a tourniquet is useful but not completely anesthetic. Refrigeration with a tourniquet affords surgical anesthesia and does not of itself require amputation.

"If it is necessary to demonstrate the presence or absence of circulation in tissue of doubtful viability, the tourniquet can be loosened, but this results in loss of anesthesia as soon as the tissues are warmed. The manufacture of sterile ice is neither difficult nor expensive; with proper equipment it can be made by medical units in the field.

"Each anesthetic method has its own difficulties and disadvantages. Cooling inhibits or delays inflammatory reactions and the autolytic changes that are familiar as the gross evidence of gangrene. Failure to appreciate these refrigeration phenomena may lead to misinterpretation of the true nature of the situation and faulty management.

"Theoretically, one might expect that the tourniquet and refrigeration would increase the dangers of post-operative sloughing. Practically, it has been found that the factors of safety in this respect are quite adequate even in the presence of arterial disease. Actual experience with the procedure convinces surgeons, internists, nurses and especially patients that it is a far more conservative and sensible anesthesia than the commonly accepted methods.

"Refrigeration offers advantages for nearly all cases of severe wounds of the extremities. Prevention and treatment of shock may be sufficient indication; surgical anesthesia is a valuable by-product. The suffering and blood loss from periodic loosening of an emergency tourniquet can now usually be avoided. Certainly external applications of heat should never be used in conjunction with a tourniquet. Simple measures can and always should be instituted to help cooling whenever a tourniquet is applied. This is especially important in hot environments.

"The large scale program of medical education for war which is now in progress should include instruction in temperature physiology and advanced courses in the principles and practice of refrigeration anesthesia. Anesthetists should not cloister themselves in the surgery and devote their lives to the dogma and rituals of the past. These subjects must be made known to all." (Editorial, J.A.M.A., May 1, '43.)

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Use only cool water in reconstitution of dried plasma. The attention of all medical officers concerned with the administration of dried plasma in the tropics is called to the inadvisability of reconstituting dried plasma with distilled water warmer than 37°C. (98.6°F.). The use of water warmer than this will result in an increased number of untoward reactions. The plasma proteins will be denatured, their solubility decreased and actual "gelling" may occur. (L.R.N.)

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Blood Groups and the Importance of the Rh Factor in Blood Transfusions: A few years ago blood of various individuals was classified as belonging to one of four blood groups. Today it is necessary to divide blood into additional sub-types, if transfusion reactions are to be avoided.

The two early systems of designating blood groups by numbers were introduced by Jansky and by Moss. Each author classified the blood into four groups designated I, II, III, and IV; unfortunately, the group Jansky classified as group I, Moss identified as group IV. This reversal of type led to considerable confusion. Many hospitals, including some of the largest teaching institutions, are still using one or the other of these systems. It is hoped that in the near future these institutions will adopt the international letter nomenclature, which is recommended by all authorities, is employed exclusively in the scientific literature, and is official in the Navy.

This system was based on the fact that there are two different agglutinable substances present in the red blood cell. The substances, agglutinogens, may be found singly or together, or may be absent. One type of agglutinogen has been designated as A and the other as B. The presence of both in one person is grouped as AB, while the absence of both makes the individual an O, meaning no agglutinogen is present. Furthermore, a substance can be demonstrated in the sera of all A, B, and O groups that possesses the ability to agglutinate cells of other groups. These substances have been named agglutinins.

COMPARISON OF THE SYSTEMS

SYSTEM				
Jansky	Moss	International	Agglutinogen in cells	Agglutinin in serum
I	IV	O	None	Anti-A & Anti-B
II	II	A	A	Anti-B
III	III	B	B	Anti-A
IV	I	AB	A&B	None

Sub-Groups: Occasionally one finds cells of an A donor that will give only weak agglutination with B (anti-A) typing serum; this individual probably belongs to a sub-group of A.

The group as a whole is classified as group A. However, members of this group are either sub-group A1, A2, A3, A4. Approximately 75 per cent of group A are of sub-group A1, and 25 per cent, sub-group A2.

Any subdivision of either group A or B will result in a similar subdivision of group AB. Because of the absences of the anti-A and anti-B agglutinins in this group, one does not encounter any difficulty in obtaining a satisfactory donor for an AB recipient.

Distribution of the A and B factors: 1. The agglutinogens are present in the red blood cells; while the agglutinins are present in plasma.

2. The A, B blood factors may also be demonstrated in other tissues and fluids of the body.

3. Ninety per cent of the population have this factor present in the saliva. (These are classified as secretors.)

4. The A, B factors have the ability to produce isoimmunization.

The M and N factors: Unlike the A and B factors, normal agglutinins for the M and N factors are almost never encountered. These agglutinogens are found only in the red blood cell. Furthermore, the M and N factors do not have any isoimmunizing capacity. The presence of the M and N agglutinins in the serum of man has been reported in only a very few instances. Therefore, the M and N factors need not be considered in blood transfusions.

The Rh factor: Landsteiner and Wiener (1941), found that the serum from rabbits and guinea pigs, injected with washed Rhesus monkey cells, was capable of agglutinating the cells of approximately 85% of human bloods tested. These cells contained an agglutinogen which was called the Rh agglutinogen. Those having this factor in the cell were classified as Rh positive. Those in which it was absent were called Rh negative.

There is no Rh agglutinin (antibody) normally present in either the Rh positive or Rh negative blood. When this agglutinogen is present in the cell no corresponding agglutinin can be induced in the serum. In the Rh negative individual there is no Rh agglutinogen in the cell, therefore an Rh agglutinin can be developed in the serum. This may occur either by administering an Rh positive blood transfusion or, in pregnant women, by the presence of an Rh positive fetus.

The Rh agglutinogen is inherited as a simple Mendelian dominant. Therefore an Rh negative mother mated with a homozygons Rh positive male would produce an Rh positive fetus.

During the term of pregnancy the Rh agglutinogen from the fetus may sensitize the mother. The mother's serum will contain Rh agglutinins. If this mother were to receive a blood transfusion from an Rh positive donor a reaction might occur. It is important to remember that the presence of Rh agglutinins in the mother's serum would probably not be demonstrable as the concentration of the agglutinins would not be very great. Therefore in the majority of instances, a satisfactory cross-match would be obtained. Furthermore, the presence of any Rh agglutinins in the serum would be capable of causing a serious transfusion reaction. The Rh negative individual must be determined by proving the absence of the Rh cell agglutinogen. This can only be accomplished by a satisfactory anti-Rh typing serum.

As previously stated, it is possible to develop Rh agglutinins in an Rh negative person by repeated blood transfusions from an Rh positive donor. This probably is not a frequent occurrence.

Summary: 1. The A, B and the Rh factors are of great importance in blood transfusions. Two bloods which possess toward one another A and B factor incompatibility can be detected quite readily by routine cross-matching. However, with the Rh factor a routine cross-match probably will not detect an incompatible blood.

2. The Rh factor is of primary importance in Rh negative women, mainly those who have been pregnant. These women may be sensitive to the Rh agglutinogen and if given a blood transfusion of an Rh positive blood, may have a serious reaction.

3. It is possible that an Rh negative male or nulliparous female may be sensitized to the Rh agglutinogen by repeated blood transfusions. This patient may have a mild transfusion reaction.

4. Considerable difficulty may be encountered when it is necessary to obtain an Rh negative donor of the less common blood groups, B and AB. It may be necessary to use a group O, Rh negative donor for a B recipient. A group A, Rh negative donor can similarly be used for a patient of group AB when a suitable AB donor is not available. (J.J.E.)

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Rheumatic Fever in the United States - Its Public Health Implications: Approximately 170,000 new cases of rheumatic fever occur yearly. The number of individuals having rheumatic heart diseases is set at 1,100,000 for the U.S. with distribution chiefly among the northern states. In 1938, 5,000 children were under treatment; 86 colleges and universities reported an incidence rate of 11.6 per thousand; the New Haven Hospital reports rheumatic fever to be exceeded only by tuberculosis and syphilis in the number of admissions. The average mean death rate for 1922-1936 in the U.S. for people from 5-24 years was 15.3 per hundred thousand. In general, the incidence was highest among the poor living in urban industrial areas, although rheumatic fever is often found among the well-to-do. Serological evidence indicates the presence of streptococcus hemolyticus in most cases of rheumatic fever. Epidemics of hemolytic streptococcus sore throat usually have preceded rheumatic fever epidemics by 2-3 weeks and 6-14% of certain groups of "sore throat" patients develop rheumatic fever. The searching out of cases, especially of early stages, proper housing facilities, adequate convalescent care, educational programs to awaken public concern, and public programs for the care of patients all require immediate and substantial public support. Much might be gained by including rheumatic fever among "reportable diseases." (Spekter, Conn. M. J., Mar. '43.)

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An Epidemic of Rheumatic Fever in a Children's Institution Following an Outbreak of Acute Tonsillitis: Following an outbreak of acute tonsillitis in the Illinois Soldiers' and Sailors' Children's School, acute rheumatic fever developed in 21% of the tonsillitis cases. In these the familial incidence of rheumatic fever was 50%. Children between 9 and 14 years were the most susceptible. Of the children, 51% showed, via X-ray, abnormality of the contour of the heart, probably indicating that many had had previous attacks of rheumatic fever. Rashes and joint manifestations were prevalent in children above 10 years of age while younger children evidenced only carditis or chorea. These data further indicate that streptococci infections of the upper respiratory tract are a causative factor in rheumatic fever. (Ditkowsky, et al, J.A.M.A., Mar. 27, '43.)

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Prophylactic Use of Sulfanilamide in Rheumatic Children: During the winters of 1940-41 and 1941-42 Kuttner and Reyersbach divided the 108 rheumatic children at Irvington House into two closely matched groups. Beginning in October 1940 and continuing until the following June, half of the children were given small daily doses of sulfanilamide. The other 54 children served as controls. During the second winter 54 children were given sulfanilamide and 50 served as controls. Only children who showed neither clinical nor laboratory signs of rheumatic activity received this drug.

Streptococcic infections of the upper part of the respiratory tract and rheumatic relapses were prevented by the sulfanilamide. Sufficiently severe toxic manifestations, necessitating the withdrawal of the drug, occurred in 15 per cent of the patients. The other children tolerated the drug well. The effectiveness of sulfanilamide in preventing rheumatic recurrences indicates that infection with group A hemolytic streptococci is an important factor in the causation of rheumatic fever. (J. Clin. Inves., Jan. '43.)

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Report on the Use of Sulfadiazine in Controlling an Outbreak of Scarlet Fever at a U.S. Naval Activity: Sulfadiazine in daily doses of 1.0 Gm. effectively controlled the outbreak of scarlet fever. The conditions prevailing at the station were such that the entire personnel could be divided into two groups, one of which served as a control for the other during the period of prophylaxis.

The results were even more striking when the epidemiological situation was considered. About one quarter of the men remaining at the activity for four months apparently acted as a focus from which a transient group, three times as large, were being infected. There can be little question that sulfadiazine in small doses was effective in controlling the epidemic in both groups.

The high carrier rate persisted, but this was not surprising for it has been shown that children receiving small doses of sulfanilamide may become carriers of group A hemolytic streptococci without showing any evidence of infection. In full therapeutic doses sulfadiazine often fails to rid the patients of these micro-organisms.

The proportion of toxic reactions occurring was less than that reported by any of the workers employing sulfanilamide prophylaxis in rheumatic children.

Besides the danger of immediate toxic reactions in employing the sulfonamide drugs in prophylactic doses, one must bear in mind the possibility of producing drug-fast strains as a future hazard. Also, the possibility of sensitizing large groups of individuals to the sulfonamides to such a degree that they might subsequently be unable to take these drugs for therapeutic reasons must be considered. The first possibility is speculative; the second has not been encountered in rheumatic subjects who have taken small doses of sulfanilamide over long periods. (T.M.R.)

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The Bone Marrow in the Five-day Treatment of Syphilis: Laboratory tests have shown no change in the bone marrow of patients with primary or early secondary syphilis who had received intensive therapy comprising 0.24 Gm. Mapharsen in 2,000 cc. of 5% glucose in 12 hours by intravenous drip daily for 5 days. These cases had shown no individual idiosyncrasy to arsenicals. (Schwind, Proc. Soc. Exptl. Biol. Med., Feb. '43.)

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Vaccination Against Smallpox: Accidental inoculation and secondary infection of physicians during mass prophylactic cowpox vaccination can be avoided by adhesive strip tapes on the tips of the fingers, especially the thumbs and index fingers, and rubber gloves or finger cots. Mark filing of the capillary glass tube enclosing the vaccine and needle tubes and breaking of the tubes in gauze or cotton prevent splintering of the glass. (Trommer, J.A.M.A., Mar. 20, '43.)

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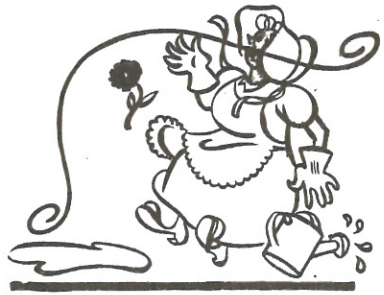
GAS

★ Every soldier, if he expects to live and fight another day, must be able to identify gases. The following pictures were prepared by the Armored Force Replacement Training Center to assist in instructing such identification.

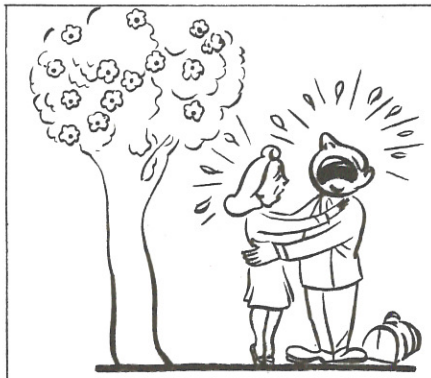


GRANNY SMELLED GERANIUM
STARTED FEELING KINDA BUM,
THOUGHT SHE HAD A GARDEN BLIGHT,
WHAT SHE'D FOUND WAS—

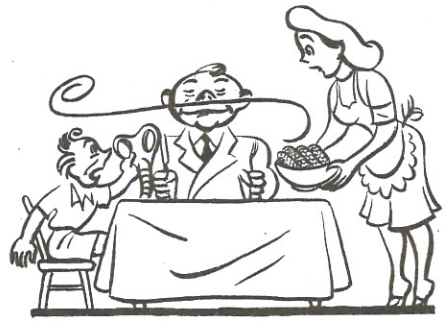
LEWISITE!

NEVER TAKE A CHANCE, MY FRIEND,
IF SOME GARLIC'S IN THE WIND
DON'T THINK MUSSOLINI'S PASSED-
MAN — YOU'RE BEING

MUSTARD GASSED!

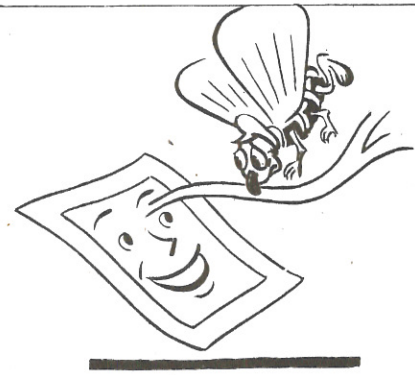


APPLE BLOSSOMS LEND THEIR SMELL
TO THE SADNESS OF FAREWELL,
IT'S O. K. IF YOU FEEL BLUE,
BUT **TEAR GAS** STARTS
YOU SOBBING TOO.



FATHER WAS PLEASED THAT SUNDAY MORN
TO NOTE THE AROMA OF FRESH CUT CORN-
CRIED LITTLE WILLIE — TURNING GREEN-
GRAB YOUR MASK, POP — THAT'S

PHOSGENE!



SAID THE FLYPAPER TO THE FLY-
"YOU LOOK SICK ENOUGH TO DIE-
THAT AIN'T FLIT YOU'VE CHANCED TO SNIFF
IT'S **CLORPICRIN**
ONE SMALL WHIFF"

There is now in preparation a form letter which will contain information on the measures now available for the neutralization of the effects of the common agents of chemical warfare, such as mustard, lewisite, etc. This will be published with further explanatory discussion at a later date.

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Treatment of Wounds - "The quickest and simplest procedure is the best.": Medical officers returning from the battle fronts emphasize that, in the handling of wounds aboard ship during and after battle, the quickest and simplest procedure is also the best procedure. Some have facetiously remarked that the wounded left alone without any attention except morphine seem to get along better than those who are worked on. A minimum of debridement, the dusting of sulfonamides into the wound, no closure, and immobilization seem to constitute the method of choice.

In this connection, it is of interest to note that recent and reliable information regarding German methods of primary treatment of wounds includes four "musts": (1) a minimum of debridement; (2) sulfanilamide powder dusted into the wound; (3) no closure; (4) immobilization by plaster cast with window. The Germans have forbidden the use of plaster casts without windows; also the use of ointments on account of danger of gas infection. (E.G.H.)

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Arsenical Reactions - New Substance Effective in Treatment: A new substance, the formula of which must remain a secret for the duration of the war, has been tried out in a sufficient number of cases of arsenical reactions to warrant an announcement.

The various programs for intensive arsenotherapy of syphilis have provided the group supervising this type of therapy with a number of arsenical reactions. These have varied from simple headache to acute encephalitis and have included varying degrees of exfoliative dermatitis. Utilizing the substance both in an ointment form for external application in the case of dermatitis, and by parenteral injection for severe reactions involving either the central nervous system, parenchymatous organs or skin, they found that they were able to halt the reaction promptly. The availability of this agent will make all arsenotherapy, particularly the intensive programs, much safer.

The material when given parenterally must be given in repeated injections as it, itself, is toxic when given in large amounts. It combines with the arsenic and promotes immediate excretion. Quantitative estimates of arsenic excreted demonstrated a fortyfold increase of arsenic elimination after such therapy. Ample trial in animals preceded the use in a large number of human beings.

The program of therapy is now fairly well routinized. It is hoped that the material may be soon made generally available. Further announcement

will be made as soon as practicable. It should be noted that the remedial agent cannot be used prophylactically for it not only neutralizes arsenic chemically but neutralizes the therapeutic effect of any arsenical preparation.

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Tissue Extract Hemolyzes Red Blood Cells: Maegraith, Findley and Martin writing in Nature report that they have been able to demonstrate hemolytic properties elaborated from washed portions of lung, liver, spleen or muscle of the same species placed in a 5.0% saline suspension of red blood cells. The suggestion is made that an enzyme may be the agent involved. However, it was observed that even small amounts of serum or plasma introduced into the mixture prevented hemolysis. It has been suggested that this observation emphasizes the possible value of plasma injections or transfusions in the treatment of acute anemias and in such crises as occur in blackwater fever.

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Malaria as a World Menace: Coggeshall, speaking before the National Conference on Planning for War and Post-war Medical Service, made clear the tremendous dislocation of natural factors; factors which have previously served as barriers to hold malaria within relatively fixed geographical limits.

He said regarding World War I, "The Red Cross reported three million cases in the republic west of the Ural Mountains. Some cases appeared in Archangel and, as Hackett states, 'for the first time, as far as we know, the King of Tropical Diseases set foot within the Arctic Circle.' Thus we see illustrated from this brief account of malaria in the last war the two great problems, first the acquisition of malaria in epidemic proportions in the military forces, second and more important, its scattered transfer to the large reservoir of susceptible civilian hosts.

"Men have chosen some of the worst disease-ridden corners of the earth as theaters of combat. A major proportion of our troops overseas is in tropical areas in close contact with the huge native malarial reservoirs. If we ever approach the proposed figure of eleven million men in the armed services, which means practically one half of our adult male population, and if the same proportions are to serve in the tropics as now, then we can gain some appreciation of the probable consequences.

"If the damage were solely confined to the troops in the affected areas the problem would be serious enough to cause considerable apprehension. Unfortunately this is just the initial step in the chain of events that is likely to create a more serious disaster. The return of infected troops to hospitable territory is likely to result in the initiation of serious epidemics, especially in those places where control efforts are lax because of the absence or low incidence of malaria. We have already referred to the secondary eruptions which followed the last war. At the present time we can expect more serious outbreaks if for no other reason than the increased number of infected cases. In the United States during the past few years there have been minor spontaneous outbreaks of malaria in northern California, Iowa and Connecticut. The origin

has occasionally been traced to infected fruit pickers who live a nomadic life in trailers and follow the summer seasons northward. Their environment is always a tropical one. More serious disturbances have probably not occurred because the infected persons have been too few in number. Sir Ronald Ross pointed out years ago that there is a critical ratio between the number of infected cases and mosquito vectors below which the infection would die out, or a relatively small change in the ratio might produce striking changes in the malaria incidence. Throughout the United States we have an abundance of Anopheles quadrimaculatus, the important mosquito vector for this country. It thrives as far north as the Canadian border and thus the stage is all set for trouble. We have the susceptible population and the vector, and the disease seems to be on its way."

The author points out that although we have good vectors for malaria in this country which will transmit any of the three plasmodia, there is also danger that new vectors may be introduced. The terrific mortality change resulting from the introduction of the new and very efficient vector Anopheles gambiae from Africa into Brazil in 1930 illustrates this point. Fortunately, gambiae was eradicated at the cost of millions of dollars and the death of fourteen thousand patients. "This mosquito would probably behave in the same way should it be introduced into this country because the climatic conditions in some of our Southern states are not too different from some of its natural habitats in Africa. This is only one of the hundreds of similar possibilities. The Hawaiian Islands and our West Coast, for example, have always been practically free from malaria but now they are the terminus for a huge air traffic originating in the Southwest Pacific, where the disease is rife. It seems quite unlikely that the islands can escape an epidemic that can result in a public health and economic disaster."

Coggeshall points out that "we are living within sixty hours of any part of the earth" -- the airports in these areas are usually located in the insanitary areas -- another danger is the transportation of mosquito vectors which has already been known to occur in spite of vigorous efforts to destroy them by spraying the plane with insecticides. He concludes "that the potential danger of malaria during the present war is a greater worldwide menace than ever before. How can we prevent this possibility from becoming a reality? For the present, more energetic application of accepted methods of control must be the rule. We need not accept past failure as inevitable, but a more widespread recognition of the danger can result in more effective control effort. The stimulus will come from the secondary outbreaks traceable to imported infections. At the first sign of such episodes an all out effort should be instituted by local, state and federal authorities. If this is done early, the danger of spread can be averted. The severe Brazilian epidemic cost the Brazilian government and the Rockefeller Foundation approximately $2,500,000 to eradicate Anopheles gambiae -- certainly a cheap price, at least compared to the economic loss that would have resulted if that species of mosquito had not been destroyed, as it was spreading rapidly to new areas. It is an example of what can happen and what can be done and is a major achievement that will go down in the annals of preventive medicine.

"The long-term policy must include more training centers and opportunities for fundamental research. These places must be available to the local as well as the foreign student. It seems inevitable that we shall continue to expand into the tropical areas rich in their natural resources long after the war has finished. If we do, then we must accept the public health responsibilities and malaria will always be the foremost in the picture. Actually malaria may be one of the principal determining factors in deciding the failure or success of many of our postwar plans. Certainly we have every reason not to minimize its potential dangers now or at any time in the future." (J.A.M.A., May 1, '43.)

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Immunity and Influenza: At the National Conference on Planning for War and Postwar Medical Services in New York City March 15, 1943, Dr. Thomas Francis, Jr. expressed the belief that pandemic influenza, such as we experienced in 1890 and 1918, is not a strange infection arising spontaneously in a population but rather a modification of our ordinary virus-caused epidemic influenzas. In this belief Dr. W. G. Smillie concurred adding the observation that our frequent exposure to ordinary epidemic influenza in community living in temperate climates built up a "mosaic of overlapping antigens which produces a relative degree of community immunity to epidemics." Dr. Smillie stated that when the 1918 epidemic of influenza struck the village of Okkak on the Labrador coast the population of the whole village was wiped out with the exception of the Moravian missionary and his wife.

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Supply of Physicians: In the May 1, 1943 Journal of the American Medical Association Dr. Fishbein made the following estimates of the supply of physicians for the civil population:

In U.S. at beginning of War	-	1	physician	to	every	700	persons.
In U.S. Jan. 1, '43			"		"	1500	"
In Great Britain Jan. 1, '43			"		"	3000	"
In Sweden	"	"	"		"	2500	"
In Germany	"	"	"		"	8000-12000	persons.

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Immigration Record, Prewar: F.P. Keppel, a member of the two-man board of appeals set up to pass on applications for immigration, stated at the National Conference on Planning for War and Postwar Medical Services "There seems to be a widespread impression that great hordes of unwashed and ignorant foreigners are beating at our doors. The facts are that, if every single application received in the year 1942 had been approved and if every single holder of a visa had been able to get here, the total would have been less than 10 per cent of the immigrations under the quota system in a normal prewar year. But less than half the applications are actually approved, and a high proportion - I should say fully one-half of those who were granted visas have not been able to use them."

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Sulfonamide Treatment of Shigella Dysenteriae Infections: Although prevailing medical opinion appears to favor the use of the poorly absorbed sulfonamides, recent findings indicate that the use of the readily absorbed sulfonamides must also be considered. In these cultural and clinical studies sulfadiazine appears to be a promising chemotherapeutic agent against the Shigella dysenteriae infections. (A.V. Hardy et al, Pub. Health Rep., Apr. 30, '43.)

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Dermatitis as the Result of Handling Electric Cable: From a shipyard on the Pacific Coast has come the report of 24 cases of workers affected with a troublesome eruption on the exposed surfaces of neck, face, forearms, wrists and hands with occasional lesions on the body. The eruption consists largely of deep-seated comedones and indurated acne pustules.

The occurrence of the eruption has been limited to those workers who handled electric cable. The specific substance in the cable which is apparently responsible for the eruption is chlorinated naphthaline which is used as a substitute for resins for the impregnation of the cable materials.

Wouer described the condition in 1918 under the name of "Perna Krankheit" (Perna Disease). (D.F.S.)

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Report on Propylene Glycol: As the result of an extensive study at Bainbridge, of the use of propylene glycol vapor for the sterilization of air to combat aerial transmission of communicable diseases, Lt. Commander Francis F. Schwentker concludes as follows:

"Except for limited application, propylene glycol vapor is not a practical medium for air sterilization. The relatively large amounts required, the high cost, the unpleasantness of glycolized atmospheres, the apparent necessity of high relative humidity, and the low flash point, all combine to make it impractical."

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Microfilm Service Available to Naval Medical Officers: Microfilm copies of papers in current or filed medical journals, either American or foreign, can be obtained from the Army Medical Library. This service is available to Naval Medical Officers without charge. Requests should be addressed to Photoduplication Service, Army Medical Library, Washington, D. C. The name of the desired journal together with the year and volume number, title of paper and initial and final page numbers, if possible, should be given. Plans are near completion for three models of hand microfilm readers to be produced in quantity in the near future. These readers will probably sell at prices from three to eleven dollars. They are portable and sufficiently compact to be carried in the pocket.

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Blood Vessel Suture: Goodman advocates primary suture of lacerated large vessels rather than ligature which generally results in gangrene and loss of an extremity. Elaborate instruments are not required. Five straight cambric needles (Kirby 16) threaded with fine silk are employed; flexible blood vessel clamps are best for the temporary control of the injured vessels but other devices may be used. The threaded needles are sterilized in mineral oil. A needle holder is not a necessity. Debridement should be complete before the repair of injured vessels is undertaken. The advantage of suture over ligature is the restoration of the circulation of the limb, obviating the tendence for gangrene and gas infection.

Technic employed: Washing away blood clots, freeing the cut margins of adventitia, use of guide sutures, simple overhand sutures for approximation or circular suture using eversion of end to end instead of inversion.

The danger of secondary hemorrhage following suture is a negligible one. (Amer. J. Surg., May '43.)

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A Comparison of the Effect of Tanning Agents and of Vaseline Gauze in Fresh Wounds of Man: The authors compare the reaction of normal tissues to tannic acid and to vaseline impregnated gauze by applying them to donor sites of individuals receiving skin grafts.

Patients complained that the stiff eschars on donor sites treated with tannic acid caused considerable pain while comparable donor sites treated with vaseline gauze were relatively painless. On inspection it was found that the donor sites treated by vaseline gauze healed more quickly than those treated by tannic acid. From a series of biopsy specimens it was found that, to form the eschar, the tanning agents destroyed the dermis to a great depth. Vaseline gauze proved to be non-irritating to the exposed dermis.

It is concluded that (1) donor sites heal more quickly with less discomfort when treated by vaseline gauze than when treated by tannic acid; (2) tanning agents produce extensive tissue damage to the dermis to form the eschar while vaseline gauze produces a minimal damage. (Hirshfeld, et al, Surg., Gynec. and Obst., May '43.)

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These results are for normal tissues and not for burns. However, since the free use of blood plasma in the treatment of burns, the use of chemicals to form eschars for the prevention of fluid loss has diminished. Vaseline gauze plus light pressure dressings have produced results in the treatment of burns in keeping with the results here reported. (J.S.B.)

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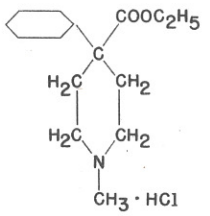
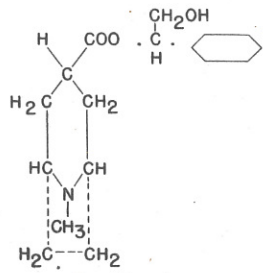
Demerol - A New Synthetic Analgesic: The increased need for morphine in time of war and the present threat to our opium supply make it important that appropriate consideration be given to Demerol, for this compound can be prepared synthetically from available chemicals.

Demerol (1-methyl 4-phenyl-piperidine 4-carboxylic acid ethyl ester hydrochloride) was synthesized in 1939 by Eisleb and Schaumann. It represents one of a large group of piperidine compounds possessing spasmolytic properties. Its close similarity to atropine can be discerned on inspection of the chemical formulas.



Demerol.



Atropine.

It is apparent that Demerol might possess mild atropine-like properties. Of greater interest, however, was the unexpected finding that the drug had a morphine-like effect on the central nervous system of animals. Definite analgesia comparable to that of morphine without the occurrence of a striking depression of the central nervous system has been reported. While close similarity of morphine and Demerol is difficult to visualize on a flat plane, it is possible with molecular models to discern similarities involving particularly the piperidine ring.

Demerol possesses three main actions: Analgesia, spasmolysis and sedation. In studies to determine the relative analgesic effect of Demerol as compared with codeine and morphine, it was found that 50 mg. of Demerol administered intramuscularly was approximately twice as potent as 22 mg. of codeine. Similarly, 125 mg. of Demerol approaches the effectiveness of 17 mg. of morphine but does not persist as long; the duration of analgesia is about three hours. Visceral pain such as that arising from the peritoneum, pleura or smooth muscle is relieved more effectively than pain arising from skeletal and neurological structures. Demerol administered parenterally is at least as effective as morphine in producing clinical analgesia. Comparative studies on the same patient would indicate that 100 mg. of Demerol parenterally is equivalent to 10 mg. of morphine. Oral administration of Demerol is less satisfactory, involving a greater incidence of side reactions in ambulatory patients. In post-operative patients, it has been reported that Demerol is a more suitable drug than morphine or its derivatives.

The second important action of Demerol is its general spasmolytic effect in man. The effect is due to an atropine-like action on the parasympathetic nerve endings and a papaverine-like direct depression of smooth muscle. In direct contrast to the action of opiates, the motility of the intestine is so influenced that the segmental contractions and tone are diminished or abolished, while propulsive action is unaltered. Prolonged use of the drug in therapeutic doses does not result in constipation.

An antispasmodic effect on bronchial musculature was noted in animal experiments by Schaumann, Gruber and Barlow. Clinically beneficial effects in patients with bronchial asthma have been reported by several investigators. It is well known that the use of morphine is contraindicated for such patients. An acute attack of asthma can be relieved within ten minutes by the subcutaneous injection of 35 mg. of Demerol, a dose far below that required to produce analgesia or sedation. The bronchial relaxation is less than that achieved with epinephrine. Nevertheless, Demerol probably has a theoretical advantage as an antiasthmatic agent, since it would tend to reduce the autonomic reactions usually associated with a severe attack. Good results have been obtained with a mixture consisting of 35 mg. of Demerol and half the usual amount of epinephrine.

The third action of Demerol to be considered is sedation. Larger parenteral doses are required, resulting in sleep from which the subject can be aroused easily. Neither after-reactions nor mental confusion have been noted on awakening.

In a series of 338 surgical patients requiring a general or spinal anesthetic, Demerol was found to be in every way as satisfactory a pre-anesthetic agent as morphine.

The authors conclude: With the exception of the production of cough and diarrhea, Demerol has been found to be a satisfactory therapeutic substitute for morphine. It appears to possess the following clinical advantages over morphine:

1. Its spasmolytic action makes it ideal for the relief of conditions due to smooth muscle spasm, in which morphine is pharmacologically contraindicated.

2. Its rapid dissipation tends to offset undesirable cumulative effects such as respiratory depression and urinary retention.

3. Prolonged use of Demerol may lead to the development of habituation, but it appears to possess a lesser liability than morphine for the development of physical dependence.

In order to avoid the dangers of habituation, physical dependence and undue cerebral irritability, amounts greater than 150 mg. every three hours should not be given. If this amount will not meet the clinical need, increasing the dose and shortening the interval not only may not have any additional therapeutic value but are apt to result in serious consequences. (Batterman and Himmelsbach, J.A.M.A., May 22, '43.)

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The following circular letter from the Bureau of Personnel is reprinted from the Navy Department Semimonthly Bulletin of May 15, 1943.

BUREAU OF NAVAL PERSONNEL
Circular Letter No. 65-43

From: The Chief of Naval Personnel
To: All Ships and Stations.

Pers-316-PLS
P2-5
May 6, 1943

Subject: PHYSICAL EXAMINATION OF NAVAL AVIATORS RETURNING FROM THE COMBAT AREAS.

1. In order to insure that naval aviators returned to the continental United States from duty in combat areas may be assigned to new duties commensurate with their physical condition, the following procedure is hereby established.

(a) Naval aviators returning to the continental United States from combat areas will be directed to appear before a reclassification board appointed by either Commander Air Force, Pacific Fleet, or Commander Air Force, Atlantic Fleet, for examination to determine their physical and psychological condition with a view to submitting suitable recommendations to the Bureau of Naval Personnel for future assignment to duty. Such examination will be comprehensive enough to distinguish between those individuals in immediate need of medical or hospital treatment and those capable of departing on leave. Personnel will not be unduly delayed for extended examination at this time, since a more complete examination will be conducted upon the officer's reporting at his new duty station.

(b) Upon completion of leave, pilots returning to combat duty will, prior to departure from the continental United States or prior to resumption of their flying duties, if within the continental limits, be given a complete physical examination to determine their fitness to resume the flying duties assigned. Particular consideration will be given to those individuals with a history of exposure to malaria or the tropical diseases and evidence of physical or nervous depletion. In those cases found physically qualified, no official report on NMS Form 1 will be required by the Bureau of Medicine and Surgery, and none shall be forwarded. A report by the individual commanding officer will be made by endorsement to his orders. In all cases where the officer is found not physically qualified, report will be forwarded to the Bureau of Medicine and Surgery on NMS Form 1 as now provided.

(c) The commanding officers of all naval aviation shore activities will require each officer reporting from fleet duties to be examined to determine his physical and psychological fitness to perform the flight duties required at his new station. The commanding officer will attempt to appraise the officer's current physical and professional ability as a pilot but will not reflect on the officer's record for temporary disqualification for more arduous duties as a result of recent arduous combat duties. On the contrary, pilots considered not qualified

for arduous flying duties will purposely be ordered to administrative duties and light flying duties to enable them to regain their normal characteristics. Where under these measures an officer is adjudged qualified to continue on flying duties as may be assigned administratively within the command, no report to higher authority will be required.

However, if after a reasonable period, not to exceed 6 months, the officer has not regained his normal health and flying qualifications, and is not considered qualified for retention on a flight status, the commanding officer will forward his recommendations to the Bureau of Naval Personnel via the Bureau of Aeronautics. If the disqualification is for medical reasons, the report will be forwarded via the commanding officer to the Bureau of Medicine and Surgery on NMS Form 1 as now provided.

(d) Since the normal routing of officers ordered to flying duty beyond the continental limits of the United States for transportation is via the Commandants, First, Seventh, Eleventh, Twelfth, and Thirteenth Naval Districts and the Service Force, Atlantic Subordinate Command at Norfolk, Virginia, the following medical examining boards will be set up by the commands indicated:

At Boston, Mass., by Comdt., First Naval District.
At Norfolk, Va., by Comdt., Naval Air Center, Hampton Roads.
At Miami, Fla., by the C.O., Naval Air Station, Miami.
At San Diego, Calif., by Comdt., Eleventh Naval District.
At San Francisco, Calif., by Comdt., Twelfth Naval District.
At Seattle, Wash., by Comdt., Thirteenth Naval District.

An officer being returned to combat duty involving flying beyond the continental limits of the United States, upon the expiration of his leave, will be directed to appear before one of the above boards prior to reporting for transportation to his new station. Such directives will be contained in the officer's orders in all cases which require a physical examination.

L. E. DENFELD
Assistant Chief of Naval Personnel