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A Radiation Meter for Disaster Use: Because of the large-scale development of atomic energy sources and the present emphasis in several countries on the production of increasingly powerful atomic weapons, tremendous and altogether unprecedented quantities of dangerously radioactive substances can now be liberated in a single explosion, or manufactured in a nuclear energy plant and delivered in the form of radioactive poisons, producing radiation hazards of fantastic magnitude. Spectacular as are the immediate destructive effects of the explosion of a nuclear bomb, the aftereffects of the radiation and the contamination by radioactive elements bid fair to be even more decisive in future warfare. When one considers that only a few pounds of radioactive materials are produced in a bomb such as was exploded at Bikini, and that perhaps some tons would be produced by the neutrons resulting from an H-bomb explosion, it does not seem unreasonable to expect that such an explosion, under suitable meteorological conditions, could render a large city so "hot," in the sense of producing a high level of radiation, that it could not be inhabited for years or even generations. Nor need such a catastrophe be accompanied by an explosion: Thirring has pointed out in a careful and conservative analysis that the by-product radioactive materials from a single nuclear power reactor of the size of the Hanford installation could be used to render a large city uninhabitable for an indefinite period. The active materials could be incorporated in a few hundred pounds of dust or sand and distributed from an airplane or from rockets launched from ships or submarines.

An insidious feature of radioactive contamination, whether present as the aftermath of a nuclear explosion or as a primary weapon, is that the radiation is undetectable by the senses. A general body dose of the order of a few hundred roentgens, accumulated in a sufficiently short time, may produce no immediately visible effect but may, nevertheless, result in the death of the victim in a few days or weeks. Even at a much slower rate of a few tens of roentgens per day, grave damage may be done before identifiable physiological effects appear. In this repect, an overdose of radiation is analogous to sunburn; the victim may receive a painful or dangerous burn without any effects being observable during the exposure period. In view of the impossibility of judging without instruments the extreme hazards to which large numbers of people will be exposed without warning in case of an attack, it is clear that there exists a need of quite a new order of magnitude for radiation meters suitable for evaluating these hazards.

The radiation-measuring instruments needed for the routine protection of those actually engaged in atomic energy work have received considerable attention and are available in relatively convenient form. These instruments are, for the most part, designed to deal with levels of radiation intensity in the general neighborhood of, or far below, the presently accepted "tolerance" magnitude; they are therefore of relatively high sensitivity and accuracy. They are needed in rather small numbers, hence their cost is not a determining factor in design. They are used by people experienced in radiation measurement and therefore

need not be especially rugged or simple. Such devices as the currently available ionization or counting-rate survey meters and pocket electroscopes or ionization chambers are typical of instruments in this class.

An entirely different problem is presented by the radiation instrumentation needed for citizens, rescue teams, and military personnel involved in an atomic disaster of the character discussed above. In such a case, one will have to deal with very high levels of radiation intensity, as compared with the "tolerance" level, and quick action in leaving a heavily contaminated area will be necessary to avert radiation illness or death. It is essential to be sure that one is moving away from contaminated areas to areas where the radiation level is lower. Rescue activities must be conducted with some regard for the lives and safety of the rescue personnel. It will be imperative to determine, by some simple means, which living victims of an atomic disaster have received so large a dose of radiation that their death is inevitable, so that the limited rescue facilities can be concentrated on those victims who have some chance of survival. Recently the Atomic Energy Commission has announced the development of an identification tag that will indicate by change in color when a victim has received a lethal dose of radiation. This should fulfill a most important need if generally adopted, but such devices do not obviate the urgent need for a continuously indicating meter for use by less seriously affected victims and rescue personnel. The movement of combat troops through a contaminated area also requires a careful evaluation of radiation hazards, based upon radiation intensity measurements made at each point to be occupied. Mass hysteria and widespread panic must also be prevented.

The properties of the radiation-measuring instruments needed for the purposes just described are quite different from the properties of existing instruments. Radiation meters for disaster use will be required in large numbers, hence they must be simple and cheap to make. They will be used by people unfamiliar with such technics; therefore they must be extremely rugged, easy to use, and reliable both in what they indicate and in the ease of interpreting that indication. To serve their purpose adequately they should be as simple and common as flashlights, gas masks, or first aid kits, available to every rescue crew, civilian defense team, or squad of troops. Because many of the instruments in a bombed area will be out of commission, either from physical damage or neutron-induced radioactivity of the instruments themselves, emergency stores must be maintained for instant distribution from dispersed depots. In view of the uncertainty as to when and where such stores will be put into use, the maintenance required should be kept to a minimum. Even batteries, which require replacement one or twice a year, should be avoided.

The sensitivity of a radiation meter for disaster use need not be high. Indeed, a device which would give a measurable indication when a small percentage of a lethal dose, such as 50, had been received would cover most exigencies. On the other hand, it is preferable to have a means of estimating in a few seconds or minutes how long a contaminated area can safely be occupied. Even a dose of 50 roentgens may have deleterious effects and should be avoided if possible.

With a more sensitive instrument, the degree of hazard can be estimated from the rate of discharge with negligible exposure of the user, and large areas can be rapidly surveyed in a short time. Operations in a contaminated area for hours or days ahead can be planned only if the radiation intensity is known long before dosages of dangerous magnitudes have accumulated. A sensitivity of the order of 0.1-1.0 full scale, which is easily attainable in a simple instrument, would appear to be a reasonable value, provided the instrument can be recharged at will. With a sensitivity of 1, for example, a full-scale deflection in 1 minute would indicate the relatively high hazard of 60 per hour. An area where such a rate is observed should be immediately evacuated, and any entry into the area limited to as short a time as possible. On the other hand, if only 0.1 roentgen is indicated in 1 minute, operations can be executed at a more leisurely pace. The important point is that the information necessary to evaluate the hazard is immediately at hand and available to those most directly concerned.

One form of radiation meter believed to be suitable in its major features for disaster use is illustrated in figure 1. The instrument comprises essentially an electrostatic voltmeter of low capacity, mounted in a case that serves as an ionization chamber, and provided with a friction charging device. The voltmeter movement consists of a stiff, light aluminum needle, mounted in a simple pivot arrangement with a spiral restoring spring and repelled by a fixed arm at the same potential. The meter movement, including the repelling arm, is insulated from the case. A stop prevents accidental discharging by limiting the motion of the needle. With the dimensions shown, and a light hairspring, the sensitivity of the voltmeter is about 500 volts for 20° deflection, and the moving system has a time constant of the order of a few tenths of a second. Because of the lightness of the needle, the pivot loading is negligible and jewels are unnecessary. For the same reason, the movement is quite rugged and will survive any shock which does not damage the case. Although the deflection of the needle is not accurately linear with voltage, the departure from linearity can be made small by proper design of the instrument, and it is an easy matter to calibrate the scale in roentgens. The radiation sensitivity can be adjusted over a wide range by varying the size of the case or the capacity of the meter, and over a smaller range by adjustment of the hairspring

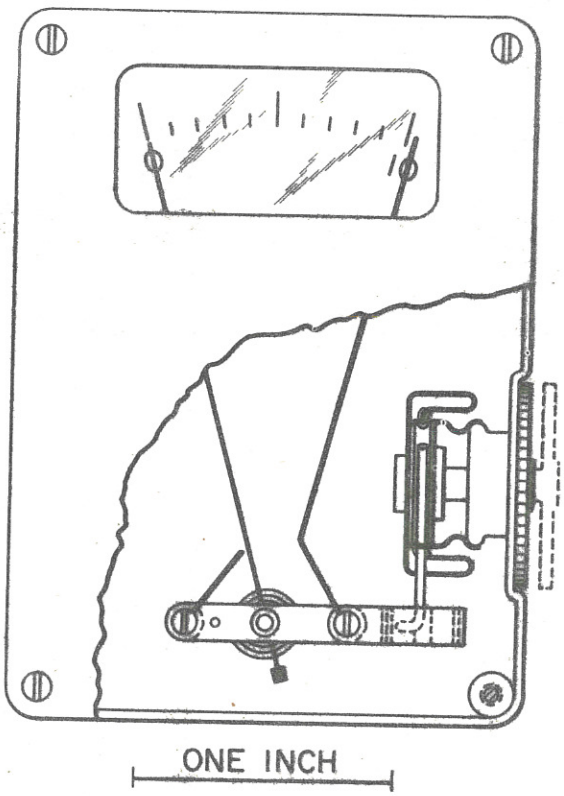

Fig. 1. Pocket-sized radiation meter with friction charging device.

tension or the length of the repelling arm. As a general rule, the depth of the case should be somewhat greater than the maximum travel of the needle; otherwise electrostatic forces between the needle and case will cause low sensitivity near maximum deflection. The efficiency of ion collection is also enhanced by so designing the case that all walls are roughly equidistant from the high potential collecting surfaces.

Aside from the not too stringent conditions on the general design enumerated above, the size and shape of the case may be varied considerably to suit the convenience of the user. The model illustrated is about the size of a cigarette package and would appear to be a practical choice for a pocket instrument. Another version has been made in the form of a pillbox 1.5 inches in diameter and 0.5 inch thick, conveniently carried on the wrist.

An essential feature of these instruments is the provision for recharging. A practical solution of this problem is the friction charging device illustrated, which is of a type that has been used for similar purposes for many years. Static electricity is produced by turning a hard rubber, lucite, or polystyrene drum against a leather friction pad; a metal band around the drum collects the charge and acts as a switch. In operation, the thumb wheel outside the case is snapped outward and rotated. The combination of these two motions engages a tab connecting the collector band to the voltmeter; a further rotation of 1 or 2 turns charges the instrument. When charging is completed, the contact is disengaged by snapping the thumb wheel in against the case. The shaft may be sealed with an O-ring packing to prevent entrance of moisture.

The question of the materials used in the radiation meter requires some consideration. For reliable indication of dosage, particularly of relatively soft x-rays, it is desirable that materials of low atomic number be used. If the instrument is likely to be exposed to any appreciable neutron flux, it must not contain materials which yield radioactive products of long half-life: iron, copper, and silver would be undesirable materials, whereas hydrogen, beryllium, carbon, oxygen, and aluminum would be quite suitable for the purpose.

Although some attempt has been made in the preceding discussion to indicate how a radiation meter might be used in atomic disaster, it is clear that a complete solution to the problem of properly evaluating radiation hazards in such circumstances is a complicated matter. The exact character of the catastrophe will determine the type of radiation present. Thus, in the instant of detonation of a thermo-nuclear bomb, the principal radiation damage may be from neutrons: here one will presumably estimate dosages received by measuring activities induced in various materials at the scene. After the blast, one will be confronted with a wide variety of problems of evaluation. The gamma radiation present is relatively easily measured, and its effects are relatively predictable; beta radiation can be fairly easily measured, for example, by means of a meter provided with a suitable window in the case, and its external effects are

reasonably well known. Such materials as are breathed or otherwise gain entry into the human system present, on the other hand, quite considerable difficulties, particularly if they are long-lived, and if they enter into the body chemistry. Here even very small amounts of material can have effects entirely out of proportion to their activities as determined by a radiation meter. The identification of such substances will ordinarily require especially trained personnel and may involve analytical technics not easily carried out in field operations. The particular case of plutonium contamination, as experienced in the Bikini tests, can be dealt with most simply, since the alpha particles can be detected readily if a very thin window is provided in the case of the instrument. Such a window will, of course, be vulnerable to damage from rough handling and may not be desirable for general use. (Science, 4 August '50, C. C. Lauritsen and T. Lauritsen)

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The Burn Problem in Atomic Warfare: An atomic explosion is accompanied with the release of enormous quantities of kinetic energy, at least 80 percent in the form of ordinary heat, commonly recognized as infra-red, visible and ultraviolet radiation. It is now well known that the temperature in the immediate vicinity of the bomb burst may rise to several million degrees; the biologic importance of the thermal component of an atomic bomb explosion has been largely obscured in the lay and professional mind by the independent fear of the more mysterious gamma and neutron radiations. Therefore, professional interest has been centered on the hazard of gamma and neutron radiation, immediate or delayed. The underwater atomic bomb burst at Bikini immediately followed by wide public discussion of the fearful death that might come from the poisoning of water by long-life radioactive particles seemed to strengthen the concept that those particular radiations were those to be avoided. Radiation hazards are not to be minimized, but the biologic potentialities of the thermal injury (burns) resulting from such explosions, so that disaster plans will consider in proper proportions how much of the total national medical effort should be applied to this aspect of the over-all problem of preparation for atomic bomb attacks.

It is well to consider the nature and magnitude of the "burn problems" following the explosion of an atomic bomb (Hiroshima type) over an American city of 250,000 population. Observations at Hiroshima, coupled with other published data, suggest that the area immediately beneath the air burst (hypocenter) out to approximately 1,500 yards would sustain heavy damage from the combined effects of blast, gamma, and neutron radiation and would also be the zone subjected to the most intense thermal radiation. In the outer zone from 1,500 to about 4,000 yards, attenuation of radiation flux is so great that injury primarily caused by radioactivity may not be an important problem, but radiant heat is still dissipated in such large amounts that severe burns result. Hence, one must expect to find most of the surviving, seriously burned persons in the 1,500 to 4,000 yard zone. It is difficult to estimate from the Hiroshima experience

how many burn casualties would result. It is the author's opinion that although the figure would run into several thousands, the figure still would not be astronomically high. Former predictions may well be too high because they resulted from estimates which assume that an atomic bomb attack would be made on an unwarned population, outside of shelter and lightly clothed. Defense plans should provide this nation with an efficient border radar screen so that adequate and timely warning of most bomb attacks can be given. Complacency toward the burn problem cannot be tolerated, because if any large American city suffers atomic attack, the numbers of burn casualties will tax all preparations authorities are likely to be able to provide.

The flash burn from an atomic bomb explosion in general simply means thermal injury resulting from the absorption of a large amount of radiant energy (infra-red, visible, ultraviolet) in a short period of time. The resulting burn is probably in most respects similar to the ordinary burn; it differs from it mainly in that this energy (same quantity in both instances) is imparted to skin in an exceedingly short period of time. These atomic flash burns likewise resemble ordinary burns as regards depth of skin destroyed. These burns may be superficial resembling sunburn (1st degree) or deeper (2d degree). Japanese observers reported that such burns were extremely painful, the same phenomenon noted in ordinary superficial burns. If more radiant energy had been absorbed, deep burns resulted, with subsequent full thickness skin loss. This deep burn resembled ordinary 3d degree burns: they were painless and healed only if small; if large they healed only after skin grafting. Secondary burns produced by flame damage from spontaneous ignition of clothing or direct contact with flames in escaping from burning buildings were common in Hiroshima experience. Burns with associated injury should be expected in any atomic bomb attack. The associated injury is related to the blast effect of the bomb with multiple lacerations and glass wounds from flying debris and ordinary skeletal trauma (fractures, simple and compound). From a surgical point of view, the seriousness of this associated injury is twofold: (1) Such additional trauma increase the severity and incidence of shock because of accompanying blood loss and (2) there is likelihood of increased serious infection because it may prove impossible to perform definitive surgery, early or late.

In the emergency management of the burn casualty 5 details are highly important. These are: relief from pain, emergency dressing, prevention and treatment of burn shock, salt and water requirements to insure adequate urinary output, and the most feasible antibiotic therapy to aid in the prevention of infection. It is apparent that in any calculation, conservative or otherwise, the requirements for adequate reserves of plasma and/or whole blood would be in such large amounts as to make it almost out of question ever to expect such a supply to be available in any stricken city. <u>It is imperative that search for a safe, effective, easily stored plasma substitute be instituted.</u>

A disturbing feature of all disaster planning for burn care is the seeming complexity of this care even when reduced to the barest essentials. Training of physicians and the public along simple lines in burn therapy should be instituted at once; otherwise the handling of burn casualties after bomb attack will end in chaos and panic with the loss of many lives which might have been saved. The type of trained personnel required for adequate burn care will vary according to the severity of the burn. In the outer zone (2,500 to 4,000), the burns may involve mainly the exposed surfaces of the hands and face unless secondary to ordinary flame. Treatment here may probably properly be delegated to trained lay persons. A simple but effective closed method of treatment designed primarily to reduce pain and prevention of infection can easily be taught. In the intermediate zone, 1,500 to 2,500 yards, highly trained and larger number of persons will obviously be required for persons who have sustained more extensive burns and associated trauma. Trained physicians will be needed in large numbers. Planning should attempt to provide quarters where adequate burn therapy can be given if the necessary trained personnel are available. In the zone nearest the bomb burst, fewer surviving persons will be encountered. The medical care of survivors in this zone must be harshly realistic lest medical efforts lose their effectiveness.

No matter how lightly or how conservatively one views the "burn problem" resulting from the explosion of an atomic bomb the conclusion is inescapable that it will be a stupendous problem. Training and planning should be instituted in vulnerable cities without delay. The members of the medical profession will necessarily be confronted with several thousand burn and other traumatic casualties. Intelligent collecting, sorting out, and evacuation of these casualties is most important in any planning for defense, either local or national. (J. A.M.A., 29 July '50, E. I. Evans)

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The Value of the Bone Puncture for Obtaining Marrow as a Diagnostic Procedure: Examination of the bone marrow used to be an unusual procedure durlife. In many instances it was difficult to arrive at a true diagnosis in various types of anemias as well as other medical disorders, and a definite diagnosis could not be established until the bone marrow was examined at postmortem. Such patients were seen without a clear diagnosis not only during a short sojourn at the hospital, but during many years of observation.

The report of Arinkin in 1927 that marrow could be obtained from the sternum by means of a spinal puncture needle has led to a great enthusiasm for the study of the bone marrow. This procedure has many advantages: it is simple; can be performed in an almost painless manner by the use of novocaine; can be used in infants and children as well as adults; and repeated punctures can be performed to follow the serial changes in the bone marrow under certain conditions

as reported recently in pernicious anemia by Erf and Wimer, following B-12; or in multiple myeloma treated with stilbamidine by Snapper and his co-workers, and with urethane by Loge and Rundles.

Bone marrow can be obtained in almost all cases except those in which there is an increased density of the bone (osteopetrosis), or in cases of replacement of the bone marrow by fatty, fibrous tissue or cancerous metastases. Only in this small percentage of cases is a biopsy of the sternum or of the ilium indicated.

Judging from the large numbers of bone punctures performed since 1929, only a few isolated accidents have occurred. In the author's own unusually large series puncture, such as the sternum, the ilium, and the spinous process, only 1 death has occurred. This resulted from a cardiac puncture. This had already had several punctures in which, as a result of myelofibrosis, marrow could not be obtained. In only 1 case did a complication ensue from puncture of the spinous process: a partial paraplegia resulted from a softening of the body of the vertebra by an abscess. Only a few mishaps have been reported. Two deaths from sternal puncture have been reported by Breitenecker and 1 each by Alder and Hadorn. Meyer and Halpern reported a death as a result of shock and fear.

As a rule, it appears to be difficult to pierce the posterior plate of the sternum. One usually feels a "give" upon entering the marrow cavity, so that with proper precautions and increasing experience the sternal puncture can be considered a safe method.

Site of the Puncture. The 3 main areas of preference are:

1. The first, second, third bone of the sternum or manubrium. The manubrium is preferable in infants and children, as it is more cellular and accidents are less likely to occur if the posterior plate is punctured.
2. The spinous process. The use of this bone was suggested by Heidenreich and Heidenreich, as well as by Loge as recommended by Japanese investigators and Bickel and della Santa.
3. The iliac crest. This area has been used by Nordenson, van den Berghe and Blitstein. In a recent report, Rubinstein indicated that the iliac crest is preferable in suspected cases of multiple myeloma or skeletal metastases.

The spinous process is a good bone to use in most instances, particularly with apprehensive individuals, since the patient cannot see the procedure. The sternum should be used, if the spinous process or the crest does not yield adequate marrow.

Amount to be Aspirated. The site of the puncture should be painted with iodine or some other antiseptic. The skin and periosteum should then be anesthetized with 1 or 2 percent procaine. After a 5 minute wait, the needle should be

inserted with a firm rotatory motion until it penetrates the bone and gives sensation of yielding. The author has used 2 syringes in the aspiration of the bone marrow. With a 20 cc. syringe, he draws up a slight amount of blood and marrow, sufficient to cover the lower plate of the syringe. This amounts to about 0.2 cc. and is used for direct smears and a count of the nucleated cells and megakaryocytes. These smears, especially bone marrow particles, are more important for cellularity and the differential count. Immediately afterwards, with another syringe, 1 cc. of the marrow is aspirated through the same needle and injected into a small test tube containing heparin or oxalate. Some prefer the latter method, especially Reich, Limarzi, and the Mayo group. This method has led to the finding in the buffy coat of the characteristic cells in lupus erythematosus by Hargraves, et al, and in the peripheral blood by Sundberg and Lick.

Marrow Changes Occurring in Various Diseases. In a general survey of the unusually large number of bone punctures from the sternum, spinous process, or iliac crest, it was found that in a restricted number of instances this procedure was of prime diagnostic importance. In others it was of confirmatory value, and in still others was chiefly of value in excluding certain suspected conditions.

A. Puncture of Diagnostic Importance.

1. Metabolic disorders in which the bone marrow appeared relatively normal, but scattered in the smears were prominent large reticulum cells showing various types of stored lipoids.
   a. Gaucher's disease.
   b. Hand-Schiller-Christian disease.
   c. Niemann-Pick's disease.

2. Protozoal Infections.
   a. Kala-azar.
   b. Histoplasmosis.

3. Hyperplasia of marrow cells
   a. Multiple myelomatosis.
   b. Aleukemic leukemia.
   c. Follicular lymphoblastoma.

4. Skeletal metastases.

B. Puncture of Confirmatory Value. While the diagnosis of most diseases of the blood can be made from the history, clinical studies, and especially the blood picture, the puncture is helpful in confirming the diagnosis for repeated examination to show the trend of the underlying condition. Most important are:

1. Disorders of the leukocytic elements, especially the leukemias.

2. The anemias, such as macrocytic anemia, hypochromic anemia, hemolytic anemia, and aplastic anemia.

3. Thrombocytopenia and thrombocythemia.

C. Bone Puncture for Exclusion of a Blood Condition. A majority of the punctures fall into this group. They reveal normal findings which frequently permit one to rule out a suspected hematologic condition. This is of particular importance in certain infectious conditions such as, sepsis, infectious mononucleosis and monocytosis. The marrow is frequently examined in various leukopenic states, such as constitutional, cyclic or accompanying infections, hypothyroidism and hyperthyroidism, as well as various types of anemia to exclude some form of blood dyscrasia. It is indicated in various types of bleeding in order to exclude an underlying cryptogenic leukemia or a genuine hemorrhagic diathesis.

In general, the study of the bone marrow has now become of considerable importance not only as a diagnostic procedure as outlined above, but as an integral part of the routine procedure for a complete investigation of the patient. (Bull. New York Acad. Med., August '50, N. Rosenthal)

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Acute Pancreatic Necrosis: The authors of this article have analyzed closely and thoroughly 25 cases of acute pancreatic necrosis encountered in the Mayo Clinic. A review was made of all cases in which necropsy was performed from 1927 to 1947 inclusive in which the presence of acute or subacute pancreatic disease was demonstrated. Only those cases in which death was due primarily to necrosis of the pancreas were accepted for detailed study. Because the authors were interested only in the more or less spontaneous process, cases of direct trauma were excluded as well as those which were secondary to local or widespread neoplastic disease. The complete clinical records, protocols, pathologic specimens, and histologic preparations of the selected cases were studied in detail. (The entire article is well presented and well worth reading in toto.) The authors concluded from the analysis of the clinical records and necropsy findings in the 25 cases of fatal acute pancreatic disease that:

1. In these cases, no common etiologic factor was immediately apparent. The most impressive finding was the coincidence of proved disease of the biliary tract in 91 percent of cases with calculi present in 78 percent.
2. The disease occurs in either sex, is most frequent in middle life, and is especially common in the obese and in alcoholism. It is often precipitated after a meal or an alcoholic debauch.
3. The onset is usually sudden with severe constant upper abdominal pain, often radiating through to the back. Ordinarily, the pain persists for several hours and often is not relieved by the usual doses of narcotics. Nausea and vomiting commonly occur promptly.

4. On examination early in the disease, patients demonstrate less pronounced findings than would be anticipated because of the severity of the process. Subnormal to normal temperature, low pulse rate, and normal blood pressure are noted initially in most instances. In some patients shock develops early, in others later, and in still others not at all. Moderate to marked epigastric tenderness with only slight to moderate rigidity is usual. Subsequent distention is common and jaundice quite frequent.

5. Conclusive laboratory assistance may be obtained by the demonstration of elevated serum levels of amylase and lipase in almost all cases encountered early. Albuminuria occurs in most patients and glycosuria in up to 20 percent. Dehydration, hypochloremia, alkalosis or acidosis, and hypocalcemia to the point of tetany may develop.

6. Diagnosis, formerly difficult, is possible in most cases as a result of increased knowledge and awareness of the disease coupled with the substantiating procedures now available.

Treatment. Current opinion seems rather unanimous that the mortality rate is considerably lower with conservative non-surgical treatment. This is well established in cases of acute interstitial or edematous pancreatitis and is also evident in acute necrosis of the pancreas. It is generally agreed that the treatment of acute pancreatic necrosis is rarely surgical. It is felt, however, that operation is occasionally necessary if the patient becomes progressively worse while receiving adequate supportive therapy. Whatever surgical procedure performed should be as conservative as possible. Supportive measures include the complete restriction of oral intake, constant gastric suction, intravenous infusions to supply necessary fluids and electrolytes as well as to combat shock, and sedation for the great pain experienced. Inasmuch as morphine has a vagatonic effect, it is advised that demerol be substituted. Ephedrine sulfate, atropine, nitroglycerine, and papaverine hydrochloride have been proposed as useful. Careful watch must be maintained and prompt therapy instituted if dehydration, hypochloremia, alkalosis, acidosis, or hypocalcemia develops. (Am. J. Clin. Path., August '50, N. J. Roberts et al.)

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Dangerous Universal Donors: Hemolytic reactions resulting from transfusion of group O plasma into group A recipients, while not common, have been reported in increasing frequency during the past few years. Reactions of this type are usually not as dramatic or as severe as those resulting from transfusion of incompatible whole blood and in all probability are frequently not detected clinically. The ease with which hemolytic transfusion reactions may be overlooked is best appreciated by realizing that they may occur without producing chills, fever, circulatory collapse, back or flank pain, oliguria, hemoglobinuria, or jaundice. The characteristics of potentially dangerous group O plasma have not been fully elucidated. In the authors' experience, the anti-A antibodies encountered in plasma of "dangerous universal donors" have been

of an immune type, that is, (a) their ability to agglutinate cells is enhanced by the presence of normal human serum, (b) they are difficult to neutralize with soluble A factor, (c) are capable of giving positive indirect Coombs test, (d) act as hemolysins, and (e) fix complement.

The authors have previously reported a severe prolonged hemolytic reaction in a group A (subgroup A_2) recipient who had been transfused with group O blood containing Alpha antibodies of immune type. The present paper presents additional hemolytic reactions following transfusion of group O plasma into group A recipients, and further observations on the problem. It is pointed out that despite well-documented reports of severe hemolytic reactions in group A recipients following transfusions of blood from dangerous universal donors, there remain many skeptics who believe that group O blood can be given with impunity to recipients of all blood groups. It is the hope of the authors that this report will be of further aid in convincing the skeptics that the indiscriminate use of universal donors can have serious consequences, even though in their experience the outward manifestations of hemolytic transfusions have frequently been minimal, especially in recipients who were very ill or under anesthesia. The laboratory findings, however, may be striking and consist of hemoglobinemia, hemoglobinuria, icterus, progressive anemia, spherocytosis, and necrosed, osmotic, and mechanical fragility of the recipient's erythrocytes.

Screening of Universal Donors. The anti-A antibodies in the 4 sera responsible for the hemolytic transfusion reactions reported in this and the preceding paper exhibited immune characteristics, and in 3 of the 4 sera the anti-A titers were unusually high. It appears that a substantial proportion (perhaps 10 to 20 percent) of random group O sera may contain small amounts of anti-A antibody of immune type. These antibodies can best be detected by the ability of the sera, after neutralization, to produce indirect Coombs tests with A_1 cells or to agglutinate A_1 cells suspended in compatible normal human serum. The effect of transfusing group A recipients with plasma containing small amounts of such antibody has not yet been determined. Until this can be done, it appears advisable to screen prospective universal donors by testing their neutralized sera for ability to agglutinate the prospective recipient's cells suspended in their own serum. If the recipient's cells and serum are not available, as would be the case in many blood donor centers, the neutralized group O serum may be tested against A_1 or B cells suspended in compatible normal human serum. The indirect Coombs test with neutralized group O serum would probably be somewhat less useful as a screening procedure because of its greater complexity. There are indications, moreover, that unusually potent Coombs serum may be necessary for agglutination of A cells coated with anti-A antibody.

Limited experience reveals that sera containing large amounts of immune anti-A or anti-B antibody, and therefore most difficult to neutralize with soluble A and B factors, will usually give substantial titers in saline systems. Many of these sera would be eliminated by a screening test of the type used in numerous

blood banks in which serum diluted 1:50, 1:100 or 1:200 with saline is tested with a saline suspension of A and B cells. If group O plasma, which in such a dilution fails to agglutinate A or B cells, is neutralized with soluble A and B factors, the hazard of using universal donors will no doubt be further reduced. Tests of neutralized serum against A or B cells suspended in their own serum, as suggested in the previous paragraph, would serve as an additional precaution which might appropriately be taken in selected cases, especially in those receiving multiple transfusions from universal donors. (Blood, June '50, D. M. Ervin et al.)

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Treatment of Hyperthyroidism: Three relatively safe and effective means now exist for controlling hyperthyroidism: (1) subtotal thyroidectomy after preparation with propyl thiouracil and iodine, (2) prolonged administration of propyl thiouracil, and (3) radioactive iodine.

Sufficient time has not yet elapsed to allow a final appraisal of the last 2 methods of treatment, and it will be many years before one can be certain that they will not be followed by delayed complications. Nevertheless, the immediate results of treatment with radioactive iodine (I^{131}) are so satisfactory, and the method is so simple and apparently so safe, that its use undoubtedly will be extended unless untoward late results appear.

When an anatomic thyroidectomy is performed by a competent surgeon who identifies and preserves the recurrent laryngeal nerve and parathyroid bodies, the incidence of persistent tetany and of permanent paralysis of a laryngeal nerve should be less than 1 percent. The mortality rate should be only a small fraction of 1 percent if all patients whose hyperthyroidism is severe or whose general condition is poor are prepared with an antithyroid drug and with iodine until the hyperthyroidism is completely controlled. But despite this low mortality and morbidity following thyroidectomy, both prolonged treatment with propyl thiouracil and treatment with radioactive iodine are associated with less immediate risk than operation.

It is necessary to draw a sharp distinction between Graves' disease and nodular goiter with hyperthyroidism because the results of their treatment are quite different. If a conventional type of nonanatomic, partial thyroidectomy is performed for Graves' disease, the incidence of recurrence is from 10 to 20 percent in the first 5 to 10 years after operation. Following more radical anatomic operations the recurrence rate may be as low as 3 percent. But after operations for nodular goiter with hyperthyroidism the incidence of recurrent hyperthyroidism is only about 1 percent, regardless of the type of operation performed. Thyroidectomy for Graves' disease is attended by a high incidence, either of recurrence of the hyperthyroidism or of postoperative myxedema depending on the amount of thyroid tissue removed, whereas the incidence of these complications following operations for nodular goiter with hyperthyroidism is

low regardless of the technique employed. Thyroidectomy is therefore a less satisfactory treatment for Graves' disease than it is for nodular goiter with hyperthyroidism.

Propyl thiouracil, if given in doses of 300 to 400 mg. spaced throughout the day, is capable of controlling hyperthyroidism in about 95 percent of the patients with Graves' disease. Unfortunately, only about 50 percent of the patients treated remain well after withdrawal of therapy and there is no way of predicting in which patient the hyperthyroidism will remain in remission.

In many cases long-standing or permanent remissions can be induced if the hyperthyroidism is controlled completely for a year. But, because the recurrence rate is so high, it is not wise to promise the patient a medical cure, and it is preferable to point out from the first that more definitive therapy may be required if propyl thiouracil fails. The rate of recurrence is particularly high in those patients who have large goiters and severe hyperthyroidism, who have severe recurrent hyperthyroidism, or who have hyperthyroidism associated with nodular goiters. Because most patients tire of indefinitely prolonged medical treatment and because prolonged remissions are rarely induced in patients who respond poorly or whose hyperthyroidism recurs after withdrawal of therapy, definitive treatment of hyperthyroidism should not be delayed too long.

Radioactive iodine, if given in large enough repeated doses, theoretically should control all hyperthyroidism regardless of whether it is associated with Graves' disease or nodular goiter. The hyperthyroidism of nodular goiter, however, is much more resistant than that of Graves' disease in which it is controlled by a single treatment in 65 percent of the cases. From two to three times as many treatments and three times as much radioactive iodine are required to control the hyperthyroidism of nodular goiter as that of Graves' disease.

The nodular goiters do not disappear, as the diffuse ones do, but may remain the same size or diminish to one-half or one-third of their original size. Radioactive iodine therefore is not a satisfactory treatment for nodular goiter, but merely controls the associated hyperthyroidism.

Hypothyroidism is induced in about 10 percent of the patients with Graves' disease and in few, if any, patients with nodular goiter, a situation comparable to that following thyroidectomy.

Hyperthyroidism may recur in the first 2 years after treatment in between 1 and 2 percent of the patients treated with radioactive iodine. No untoward side effects other than an occasional transitory exacerbation of the hyperthyroidism have been observed in a series of 400 patients treated with radioactive iodine.

It is apparent that thyroidectomy is more effective than either radioactive iodine or propyl thiouracil in the treatment of nodular goiter with hyperthyroidism.

But the immediate safety, the economy, and the ease of treatment with radioactive iodine would render it the preferred treatment for all patients with Graves' disease if one could be certain that it would not prove ultimately to be carcinogenic. Because of this possibility, it has not been used routinely in patients under 45 years of age. But in older patients, in those with complications which increase the hazards of thyroidectomy, and in those who have recurrent hyperthyroidism, the possibilities of mortality and morbidity should be carefully appraised before operation is undertaken. In selected cases either prolonged treatment with propyl thiouracil or definitive treatment with radioactive iodine may be safer and just as satisfactory as thyroidectomy. Finally, if thyroidectomy is to be employed as the standard treatment of Graves' disease, it is important that its morbidity and mortality be maintained at a level low enough to justify its use in cases in which other methods of treatment are equally acceptable. (Editorial, Surg., Gynec. & Obst., August '50, G. Crile, Jr.)

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Addiction to Analgesics and Barbiturates: Drug addiction is a condition in which an individual has lost the power of self-control with reference to a drug and abuses the drug to such an extent that the individual, society, or both are harmed. Dependence, either physical or psychic, is not an essential feature of drug addiction.

The most important factor which predisposes to drug addiction is a personality disorder. In addition to the personality disorder, contact with a drug which produces mental reactions that are regarded as pleasurable is necessary. Contact with the drug as a result of curiosity about the pleasurable effects is a much more potent factor in inducing addiction than is contact as a result of legimate medical administration.

There is no drug in the morphine series which is known to be an effective analgesic that does not also possess addiction liability. The addiction liabilities of compounds of the morphine series generally parallel the analgesic potencies of the drugs. However, it is possible that some separation of addiction liability and analgesic potency has been achieved in the recently developed compound 6-methyldihydromorphine. N-allylnormorphine does not produce physical dependence in man, but it is not known whether this drug is an effective analgesic. There are also no known compounds in either the meperidine or methadone series which do not possess addiction liability. Addiction to meperidine is fairly common and physical dependence can be developed in individuals who have never been previously addicted to any other analgesic drug. Addiction to meperidine, because of the toxic effects of the drug, is more undesirable than addiction to morphine.

Recent neurophysiological investigations have shown that the spinal cord, and probably other parts of the central nervous system, are involved in physical dependence on morphine. Physical dependence is not entirely due to changes in

the autonomic nervous system. The theory that the manifestations of abstinence are due to the stimulant effects of morphine outlasting the depressant effects is probably not tenable. The most satisfactory theory of dependence at the present time is that certain homeostatic responses, which oppose some of the actions of morphine, are enhanced by repeated administration of the drug. When morphine is withdrawn, these enhanced physiological counter-responses are still operative and, therefore, signs of abstinence appear. The mechanisms responsible for the enhancement of the homeostatic responses are unknown.

It has not been established that partial tolerance to certain actions of morphine persists for long periods of time following withdrawal of the drug. Furthermore, it has not been established that individuals who have been addicted to one analgesic drug will develop physical dependence on another analgesic drug any more rapidly than a comparable individual without addiction experience. There is no real evidence that addiction to morphine produces permanent anatomical damage to the central nervous system. Morphine addiction does not produce any permanent impairment of intelligence.

Treatment of morphine addiction involves withdrawal of the drug followed by a long period of rehabilitative and psychiatric therapy. Withdrawal of morphine is very easy to accomplish provided adequate environmental control of the addict can be achieved. The best and only rational method of withdrawal consists of the administration of decreasing doses of either morphine or some equivalent drug. The results of treatment of addiction, although not completely satisfactory, are much better than is commonly thought.

Barbiturates are addicting drugs no matter how the word addicting is defined. In fact, addiction to barbiturates is far more dangerous and harmful than is addiction to morphine or other analgesic drugs. Barbiturate addiction is apparently increasing in the United States. The clinical picture of chronic barbiturate intoxication resembles that of chronic intoxication with alcohol and is characterized by impairment of mental ability, impairment of emotional control, psychic regression and dangerous neurological symptoms.

Withdrawal of barbiturates from individuals chronically intoxicated with those drugs is followed by a very definite and severe type of abstinence syndrome which is characterized chiefly by the appearance of convulsions and delirium. The mechanism of these symptoms is unknown. Physical recovery from chronic barbiturate intoxication in man is, so far as can be judged by clinical and psychological examination, complete unless the addict incurs an accidental injury during chronic intoxication or during a convulsion in withdrawal. Treatment of chronic barbiturate intoxication consists of a very careful gradual withdrawal of the drug followed by a long period of rehabilitative and psychiatric therapy. (J. Pharmacol. & Exper. Therap., August '50, Part 2, H. Isbell and H. F. Fraser)

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A New Method of Treatment of Affective Psychoses and Psychoses With Depressive Features: At the New York State Psychiatric Institute, a new method of therapy has been devised by the author for the treatment of affective psychosis, and its results were presented at a meeting of directors of psychiatric hospitals held at the Psychiatric Institute.

The new treatment utilizes a solution of ether at various concentrations, 2-1/2 percent to 5 percent or more in glucose and saline, administered intravenously by slow phleboclysis (drip method). The amount of solution injected is generally from 750 to 1,000 cc. The flow of administered solution is regulated from 25 to 30 drops gradually increased to 100 to 180 per minute. The injection lasts between 2 to 3 hours and is administered every day of the week. The complete course of the treatment consists of from 10 to 30 daily injections, which may be resumed if necessary.

This method has been tried at the Manhattan State Hospital in New York City, where the working team consisted of Drs. A. Ferraro, L. Roizin, and P. Carone of the New York State Psychiatric Institute and Dr. Nobe E. Stein of the Manhattan State Hospital.

Forty patients have been treated, 27 of whom belonged to the group of manic-depressive and involutional psychoses. Of this group, 14 left the hospital on convalescent care, 8 although improved remained in the hospital, and 5 were unimproved. To these 27 patients, 13 more were added, including schizophrenic patients and patients from a mixed group. Of a grand total of 40 cases, 20 (50 percent) left the hospital on convalescent care, 11 (27.5 percent) benefited from the treatment, and 9 (22.5 percent) remained unimproved.

These figures are very encouraging and justify extending the investigation of this new form of therapy to a much larger number of cases with definite preference to be given to the depressive states. Further investigation should weigh with more accuracy the number of treatment needed and the possibility of repeated series of injections in the same patients before considering the treatment as adequate for the case.

The percentage of beneficial effects with this form of treatment compares favorably with the results following electric shock therapy. This form of treatment has, however, the following definite advantages over electric shock therapy:

1. The treatment does not entail the elicitation of a convulsive seizure.
2. It is applied in circumstances of pleasant cooperation, the patient developing no anxiety as to its application.
3. In the course of each individual treatment the patient experiences a sense of well-being and he is in touch with the physician at all times.
4. The treatment can be applied in old patients with hypertension, arteriosclerosis, bone deformities, or hernias, none of these conditions constituting counterindications. There is no danger of fractures or dislocations.

5. The treatment has no unpleasant aftereffects; no confusion, no disturbances of memory follow.

6. The treatment does not carry with it the stigma of mental diseases, so dreaded nowadays by the general public, the treatment being received as related to accepted usual medical practice.

In the course of the treatment the physician in charge should control pulse, respiration, and blood pressure. Blood counts are indicated after every few treatments. (Am. J. Psychiat., August '50, A. Ferraro)

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Human Disease Associated with the Coxsackie Viruses: The Coxsackie viruses are recently discovered (see Medical News Letter of 23 September 1949, p. 13) filtrable agents of small particle size characterized by their capacity to cause fatal paralysis and destructive lesions of striated muscle in infant mice and hamsters. Like poliomyelitis viruses they are widely distributed in nature and have been recovered from human pharyngeal swabbings and feces as well as from sewage and flies. They exist in multiple immunological types but differ immunologically from poliomyelitis viruses and do not cause the distinctive signs or lesions of poliomyelitis when injected into monkeys.

On the basis of epidemiological, clinical and laboratory evidence viruses of the Coxsackie group appear to be associated with and capable of causing human disease. They have been recovered from patients during outbreaks of illness diagnosed as poliomyelitis or "summer grippe" and from each of six laboratory workers who contracted infection with these agents while studying them. In some of the patients the development of neutralizing antibodies against the homologous type of virus was also demonstrated.

Illnesses attributable to Coxsackie viruses have resembled not only paralytic and nonparalytic poliomyelitis but also epidemic pleurodynia or mild undifferentiated fevers. An analysis of the clinical features in 14 patients who were studied revealed that all had fever and malaise and all but 2 complained of headache. Abdominal pain occurred in 9 and nausea in 8. Vomiting, stiffness of the neck or back, and pain in the extremities were each noted in 6. Five patients complained of weakness, sore throat, or pain in the neck or back.

The peak elevations of temperature ranged from 100.3 to 104.5° F. Fever lasted from 2 to 10 days with an average of 5.3 days. Other signs of illness were infrequent and transitory. Six patients had hyperemia of the pharynx or stiffness of the neck. Three had abdominal tenderness and 2 had weakness of an extremity. All recovered.

A lumbar puncture was done on 9 patients. Pleocytosis of the cerebrospinal fluid was present in 7. In these 7 cases the leucocytes numbered from 25

to 375 per cu. ml., and, in all but 1 instance, included polymorphonuclears which constituted from 7 to 54 percent of the total.

It is apparent that the clinical features of human disease attributable to Coxsackie viruses are not distinctive and vary considerably. The importance of Coxsackie viruses as a cause of human disease, the relative frequency with which different clinical patterns of infection occur, and the extent to which these agents will be identified with syndromes of previously unknown or uncertain etiology remain to be determined. (Bull. New York Acad. Med., May '50, E. C. Curnen)

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A Rapid Method for Detection of Influenza Virus During Epidemics: A screening method has been employed which enables the laboratory to ascertain the causative agent of an influenza epidemic in one day. Throat washings were obtained, usually during the first 3 days of illness, from patients who were admitted with the clinical diagnosis of either influenza or respiratory infection. The patients first coughed several times and then gargled with approximately 15 ml. of nutrient broth. These throat washings were then quickly frozen and stored at -70° C. until tested. Control throat washings were obtained from 10 persons who gave no history of illness during the previous 3 week period. The throat washings from patients and controls were treated in an identical manner. The throat washings were thawed under running water and 10 ml. removed. The remaining 5 ml. was used for isolation of virus by amniotic inoculation of 13-day-old chick embryos. Sufficient (from 2 to 4 ml.) of 1 percent red blood cells (either chicken or human type O) in buffered saline were added to each throat washing in order to compensate for the hemolysis which sometimes occurred. After standing at room temperature for 1 and 1/4 hours, the material was centrifuged and the supernatant fluids discarded. To the red cell sediment was added 0.8 m. saline, the mixture shaken and incubated in a 37° C. water bath for from 2 to 4 hours with occasional shaking. Following this period of elution, the material was again centrifuged and the supernatant fluids removed to small tubes. Then 0.6 ml of each supernatant was removed and 0.2 ml. placed in each of 3 tubes. To the first tube, 0.2 ml. 1 percent fresh erythrocytes were added, to each of the other 0.2 ml. samples, 0.2 ml. red cells (1 percent) in a 1:50 dilution of specific antiserum was added. The antisera employed were PR 8, Lee and FM-1. These hemagglutination tests were read after 30 minutes and 1 and 1/4 hours. Care must be exerted in the reading of the tests as the amount of virus present is small. The results are more in the order of a weak positive; the complete agglutination seen with allantoic fluids containing virus is rare. Readings after 30 minutes are helpful inasmuch as there is a difference in the rate of settling of the cells. A few preliminary experiments with 0.5 percent red cell suspensions indicate a sharper end point.

When large numbers of throat washings are available, random samples may be screened in order to identify the strain of influenza virus present in the community. Confirmation using established procedures can then be made. The

results obtained by this rapid method were confirmed by established procedures and no false positives were obtained from control material. This procedure is valuable only when a large number of specimens are available. A certain number of specimens containing small amounts of virus will yield negative results by this method and positive results by the standard methods. Non-specific positives are obtained in certain specimens which may be caused by the activity of saliva or other agglutinating agents. (Pro. Soc. Exper. Biol. & Med., July '50, S. S. Kalter)

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Antimycin A, An Antibiotic with Insecticidal and Miticidal Properties: Antimycin A is a crystalline antibiotic isolated from cultures of an unidentified species of Streptomyces. It appears to be an optically active, nitrogenous phenol of the molecular formula $C_{28}H_{40}O_9N_2$. Leben and Keitt demonstrated the antibiotic properties of antimycin against certain phytopathogens and found that it is an extremely potent fungicide, producing inhibitory effects against Nigrospora sphaerica Mason, for example, at dilutions as high as 1:800,000,000. The present paper reports preliminary tests designed to investigate the insecticidal and miticidal potentialities of this material.

The initial trials showed that the antibiotic caused mortality to insects which ingested the material rather than by the contact action of the substance on the exoskeleton. For example, the common housefly Musca domestica sprayed with 10 ppm of antimycin A, showed no adverse effects, whereas 38 percent of the flies allowed to feed on a ball of absorbent cotton saturated with 10 ppm of antimycin A dispersed in water were killed in 24 hours. Similar results were obtained with the large milkweed bug Oncopeltus fasciatus. Specificity was indicated, however, since certain insects, e.g., the German cockroach, Blatella germanica were able to ingest 10 ppm of antimycin A dispersed in water and live as long as those feeding on water alone.

The specificity of action was very apparent in a preliminary trial when the standard test wool fabric was immersed in a water dispersion containing 10 ppm antimycin A and offered to larvae of the webbing clothes moth, Tineola biselliella, and the black carpet beetle, Attagenus piceus. The larvae of the webbing clothes moth ate the test swatches with impunity, while duplicate test pieces inhibited the feeding of the black carpet beetle. Further tests were conducted with this beetle comparing antimycin A with sodium aluminum silicofluoride, which is widely used for fabric protection against insects. The standard wool fabric was immersed and saturated with the test subjects, aired, dried, and tested in accordance with the method set forth by the American Society for Testing Materials (ASTM D-582 45T). The data show that antimycin A will afford the same degree of fabric protection at 1/100 the concentration of sodium aluminum silicofluoride. The protective action appears to be of a repellent nature, as none of the larvae exposed to the antimycin-impregnated wool was dead at the end of the 28-day exposure period.

Specificity of action to Coleoptera and not to Lepidoptera was also indicated in tests with the Mexican bean beetle larvae, Epilachna varivestis, and the Southern army worm, Prodenia eridania. As in the case of the clothes moth larvae, the fourth instar Southern army worm ate treated Wood Prolific Lima-bean leaves with no ill effects. Tests were conducted with the second instar Mexican bean beetle larvae, using antimycin A as compared with methoxychlor (1,1,1-trichloro-2,2-bis(p-methoxyphenyl)ethane), which is currently used for the control of this pest. Antimycin A used at the rate of 25 ppm compared favorably in toxicity with 500 ppm of methoxychlor.

The toxicity of antimycin A is apparently not confined to members of the Insecta, as it shows efficacy for the control of the red spider mite, Tetranychus sp. Antimycin A was compared with di(p-chlorophenyl)methyl carbinol (DMC), which has demonstrated merit and is commercially available for mite control. On the basis of LD_{50} readings, antimycin A appeared to be about 3 or 4 times more effective than DMC. (Science, 11 August '50, G. S. Kido and E. Spyhalski)

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Dermatologic Aspects of Insect Repellents and Toxicants: The protection of the individual, with his living quarters and other parts of his environment, and chemical and laboratory research are important features of the modern program for the chemical control of insects. This program in all its phases is an important part of modern preventive dermatology and of global dermatology. Since many of the developments and their applications in the chemical control of insects involve cutaneous contact, absorption, and penetration of substances employed against the insects, it is well for the dermatologist to be interested in all the collateral features of these programs. Studies of acute and chronic toxicity are necessary.

The entomologist, the toxicologist, and the dermatologist must work together in the development and use of new materials and in the control of use of some of the compounds now employed. The materials now recommended for repellency and toxicant action are of low sensitizing index. However, the features of acute and chronic systemic toxicity through skin absorption must still be considered, for the absence of warning dermatitis may lead to overexposure. Unfortunately, at times new materials are put into use without recommendations of proper agencies. Consequently, many of these newer agents must still be considered investigative materials. The dermatologist must be alert to the dangers of these new materials and must be prepared to consider critically such factors as the compound itself, the vehicle, and the technics of use and abuse. The materials finally available should be used only as recommended. (Arch. Dermat. and Syph., August '50, L. Goldman)

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From the Note Book

1. The first annual Medico-Military symposium for all members of the Armed Forces Medical Services will be held at the U. S. Naval Hospital, Philadelphia, Pa., from 23 to 28 October 1950, inclusive.

2. A special subcommittee meeting of the Advisory Committee on Artificial Limbs was held in Berkeley, Calif., from 24 July through 28 July 1950, for the purpose of making comparative studies on weight-bearing knees now in the advanced development state. A special subcommittee meeting was held in Los Angeles, Calif., the week of 31 July 1950 to evaluate certain upper extremity components and to conduct the planning necessary to begin a thorough study of current harnessing practices, as well as the development of optimum harnessing arrangement. (Div. of Eng. & Ind. Research of NRC)

3. An angiocardiographic study of 53 consecutive proved cases of lung cancer was found to be a valuable and unique source of diagnostic and prognostic information. (Am. J. Roentgenol., August '50, C. T. Datter et al.)

4. On 18 August 1950 23 dental interns completed a one year rotating dental internship and received certificates at the Naval Dental School, National Naval Medical Center, Bethesda, Md. Twenty-one additional naval dental interns also received certificates on the same date at 6 naval teaching hospitals.

5. Investigators report satisfactory results in treating influenzal meningitis with chloramphenicol. (J. A. M. A., 19 August '50, G. W. Prather and M. H. D. Smith)

6. British medical education and the National Health Service were studied by the deans of 3 American medical schools. (J. A. M. A., 26 August '50, H. S. Diehl et al.)

7. The Effects of Atomic Weapons prepared for and in cooperation with the Department of Defense and U. S. Atomic Energy Commission may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., $1.25. (Los Alamos Scientific Laboratory)

8. The frequency of drug psychosis occurring especially from the use of bromides and barbiturates is discussed in the American Journal of Psychiatry for August 1950. (M. Levin)

9. The Secretary of Defense has established a whole blood and blood derivatives program for the Department of Defense. The Director of Medical Services, Office of the Secretary of Defense, controls policies and standards. The Directorate of the Armed Services Medical Procurement Agency is responsible for operations. The Surgeons General have appointed a Joint Armed Services

Blood and Blood Derivatives Committee to execute the program under the supervision of the Directorate. The American National Red Cross is assuming responsibility for recruiting blood donors, coordinating this service with independent blood banks, collecting the donated blood, and consigning this collected blood to the Armed Services.

10. A complete review of antibiotics and chemotherapy appears in Archives of Ophthalmology, August 1950. (J. H. Leopold)

11. Venereal disease education from the patient's viewpoint is discussed in the Journal of Venereal Disease Information of August 1950. (C. W. Buck and G. E. Hobbs)

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List of Recent Reports Issued by Naval Medical Research Activities:

Naval Medical Research Institute, NNMC, Bethesda, Maryland.

An Experimental Study on Refrigerated Skin Grafts Stored in Ten Percent Homologous Serum, 4 May 1950, NM 007 081.10.01.

The Effect of Alcohol Upon Link Trainer Performance, 9 June 1950, NM 001 056.06.01.

An Internally, Electrically-Heated, Sintered Glass Filtration Disc, and a Sintered Glass Support for Fine Wire Heaters or Electrodes, 8 August 1950, NH6-1/A11/MR-50-3.

On Generalizations of the Quasi-Chemical Equilibrium Approximation in Statistical Mechanics, 8 August 1950, NM 000 018.06.02.

The Relation of Specific Gravity to Body Build in a Group of Healthy Men, 19 June 1950, NM 004 006.03.06 (formerly X-191).

Naval School of Aviation Medicine, NAS, Pensacola, Fla.

Beta Particle Standards for Carbon-14 and Other Elements in the Form of Radioactive Monolayers, 23 May 1950, NM 059.16.03.

Naval Medical Research Unit No. 3, Cairo, Egypt.

The Rh Blood Types in an Egyptian Village, August 1950, NM 007 082.08, Final Report.

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Navy Officer Procurement Program for Draft Eligible Candidates: The Bureau of Naval Personnel has announced the programs for procurement of officers that are open for draft eligible candidates.

In the Naval Reserve, applications will be processed for doctors and dentists up to their receipt of notice to report for preinduction physical examinations. After they have received this notice, they must submit a request for immediate active duty if commissioned in the Naval Reserve along with their application. Failure to submit such a request will stop the processing of their applications.

New applications for doctors and dentists may be submitted after they have received their notice to report for preinduction physical examinations, if they are accompanied by the request for immediate active duty if commissioned. In applying for commissions in the Regular Navy, in classifications of doctors, dentists, and medical service corps, applications will continue to be processed until the candidate is actually inducted. (PubInfo, BuMed)

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Length of Stay in Navy Hospitals July 1949 - March 1950: The average length of time that patients stay in a hospital is an important factor in any hospital program. In order to evaluate this factor in Navy hospitals, data have been compiled on the average length of stay of active duty personnel of the Navy and Marine Corps. The Navy hospitals have been combined into two groups, continental and noncontinental hospitals, with the continental hospitals subdivided into two categories, training hospitals and non-training hospitals. Training hospitals are those approved for internship and residency training and are all located within the continental United States.

These data have been derived from quarterly consolidations of the Weekly Report of Patients (NavMed I) submitted by Navy hospitals during the period July 1949 through March 1950, the most current period available. The accompanying table shows the average number of days in hospital per patient for the period July 1949-March 1950, calculated on a quarterly basis. The first quarter covers July-September 1949, the second quarter October-December 1949, and the third quarter includes January-March 1950. These figures have not been adjusted to compensate for interhospital transfers as they are not great enough to exert a significant influence on the computations.

During these three quarters, the average length of stay of active duty patients in all Navy hospitals varied between 36 and 40 days, with a significant increase shown in the second quarter, September-December 1949, of 4 days per patient. This increase can to a great extent be attributed to factors concerned with the initiation of the new retirement procedures and the establishment of Physical Evaluation Boards.

It is interesting to note that the greatest increases in length of stay occurred during the second quarter of the period under discussion. In training hospitals the average stay of active duty personnel increased from 39.3 days in the first quarter to 44.7 days during the second quarter as compared to a rise from 33.8 days to 36.6 days in continental non-training hospitals. There are many factors responsible for the differences in stay between the training and non-training hospitals; however, no attempt will be made in this article to discuss the many ramifications of this question.

In the third quarter, January-March 1950, the average stay of active duty patients in training hospitals increased slightly to 45.4 days, while continental non-training hospitals showed a decrease to an average of 33.3 days per patient. It seems evident from this trend that the effect of Physical Evaluation Board cases are still reflected in the length of stay of active duty patients in training hospitals.

Among the continental non-training hospitals there are two hospitals which have PE Boards functioning and it was observed that in one of these there has been a continuous increase in the average length of stay of active duty patients in each quarterly period. On the other hand, in the remaining non-training hospitals two hospitals showed an increased length of stay per patient in each quarter.

The length of stay for the three noncontinental hospitals remained fairly constant during the period; there was a slight reduction from 22.1 days in the first quarter to 20.2 days for the third quarter. (Statist. Navy Med., August '50)

AVERAGE LENGTH OF STAY OF ACTIVE DUTY PATIENTS IN NAVY HOSPITALS*
QUARTERLY, JULY 1949 THROUGH MARCH 1950

QUARTERLY PERIODS	TOTAL ALL HOSPITALS	CONTINENTAL HOSPITALS		NONCONTINENTAL HOSPITALS
		Training Hospitals	Non-training Hospitals	
1st Quarter	36.3	39.3	33.8	22.1
2nd Quarter	40.6	44.7	36.6	20.4
3rd Quarter	39.8	45.4	33.3	20.2

*Excludes Hospital Ships.

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SECNAV LETTER Op213C/cjh, Serial 1940P21 7 August 1950

To: All Ships and Stations

Subj: U. S. Naval Medical Center, Guam, and Guam Memorial Hospital, Guam, M. I.; Disestablishment of
U. S. Naval Hospital, Guam, School of Medical Assistants, and School of Dental Assistants; Redesignation of

Ref: (a) SecNav Serial 395P24, of 15 Mar 1946
(b) SecNav Serial 168P24, of 23 Apr 1948
(c) SecNav Serial 331P24, of 6 Sept 1949; NDB July-Dec 1949, 49-639, p. 9

1. The following activity, designated by reference (a) is disestablished, effective 1 July 1950:

Guam Memorial Hospital
Naval Medical Center
Guam, Marianas Islands
(Mail Address)
Commanding Officer
Guam Memorial Hospital
Navy No. 926
Fleet Post Office
San Francisco, California 3437-350

2. The following activity, established by reference (a) as modified by reference (c), is disestablished effective 1 July 1950:

U. S. Naval Medical Center
Guam, Marianas Islands
(Mail Address)
Commanding Officer
U. S. Naval Medical Center
Navy No. 926
Fleet Post Office
San Francisco, California 4170-400

The functions of this activity will be assumed by the U. S. Naval Hospital, Guam, M. I.

3. Concurrent with the disestablishment of the U. S. Naval Medical Center, Guam, the following activity, designated by reference (a), is redesignated, under a commanding officer:

From: U. S. Naval Hospital
Naval Medical Center
Guam, Marianas Islands
(Mail Address)
Commanding Officer
U. S. Naval Hospital
Navy No. 926
Fleet Post Office
San Francisco, California 3435-348

To: U. S. Naval Hospital
Guam, Marianas Islands
(Mail Address)
Commanding Officer
U. S. Naval Hospital
Navy No. 926
Fleet Post Office
San Francisco, California 3435-348

This activity is under the military command and coordination control of Commander, Naval Operating Base, Marianas, and under the management control of the Bureau of Medicine and Surgery.

4. The following activities, designated by reference (b), are redesignated effective 1 July 1950, each under an officer in charge:

From: School of Medical Assistants
U. S. Naval Medical Center
Guam, Marianas Islands
(Mail Address)
Commanding Officer
School of Medical Assistants
Navy No. 926
Fleet Post Office
San Francisco, California 7562-400

To: School of Medical Assistants
Guam, Marianas Islands
(Mail Address)
Officer in Charge
School of Medical Assistants
Navy No. 926
Fleet Post Office
San Francisco, California 7562-400

From: School of Dental Assistants
U. S. Naval Medical Center

Guam, Marianas Islands
(Mail Address)
Officer In Charge
School of Dental Assistants
Navy No. 926
Fleet Post Office
San Francisco, California 7302-300

To: School of Dental Assistants
Guam, Marianas Islands
(Mail Address)
Officer in Charge
School of Dental Assistants
Navy No. 926
Fleet Post Office
San Francisco, California 7302-300

These activities are under the military command and coordination control of the Commanding Officer, U. S. Naval Hospital, Guam, and under the management control of the Bureau of Medicine and Surgery.

5. Holders of Basic Naval Establishment Plan, Fiscal Year 1950, delete paragraphs 7246, 7246a, 7247, and 7247a, and delete words "Naval Medical Center" from paragraph 7245b.

6. References (a) and (b) are modified accordingly, effective 1 July 1950.

7. Bureaus and offices concerned take necessary action.

-SecNav. Francis P. Matthews.

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BUMED CIRCULAR LETTER 50-95 30 August 1950

From: Chief, Bureau of Medicine and Surgery
To: All Stations

Subj: Implementation of Basic Policy and Procedures Concerning Ambulances Under Cognizance of This Bureau for All Navy and Marine Corps Activities

Ref: (a) BuMed C/L 48-37
(b) SecNav ltr of 20 June 1950 to Bureaus, Boards and Offices, Navy Department and Commandant, Marine Corps; concerning automotive transportation, vehicles, construction and materials handling equipment: (NDB 50-557)

(c) BuDocks ltr B521B-950-0/brb N33 or 7 August 1950 to all District Commandants, ComMarCorps, ComSerPac, DirLantDocks, DirPacDocks, and ComWestSeaFront; concerning repair limits and life expectancies for general purpose motor vehicles

This letter establishes policies and procedures relative to ambulances under the cognizance of the Bureau. Basic ambulance allowance, by types, assignment, accountability, utilization, maintenance and replacement, required reports, and ambulance service are all covered in the circular letter. Reference (a) is cancelled.

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BUMED CIRCULAR LETTER 50-96 30 August 1950

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Navy Ophthalmic Program

Ref: (a) BuMed Cir Ltr 49-63; 49-407 NDB Jan-Jun 1949, p. 80

1. Paragraph 18 of reference (a) is hereby superseded. The following shall be substituted therefor:

"18. Following is a list of the ophthalmic and spectacle facilities:

SPECTACLE DISPENSING UNITS

NAVHOSP, Chelsea, Mass.
NAVHOSP, Portsmouth, N. H.
NAVHOSP, Newport, R. I.
NAS, Quonset Pt., R. I.
NAVTRACEN, Newport, R. I.
NAVHOSP, St. Albans, L.I., N. Y.
NAVHOSP, Philadelphia, Pa.
SUBMARBASE, Dispensary, New London, Conn.
NAS, Atlantic City, N. J.
NAVHOSP, Annapolis, Md.
NAS, Patuxent River, Md.
NAVHOSP, Portsmouth, Va.
NAVHOSP, Bethesda, Md.
NAVHOSP, Quantico, Va.
NAVHOSP, Camp Lejeune, N. C.
MCAS, Cherry Point, N. C.
NAS, Atlanta, Ga.
NAVHOSP, Key West, Fla.
NAVHOSP, Memphis, Tenn.
NAVHOSP, Beaufort, S. C.
NAVSCH OF AVMED AND RESEARCH, NAS, Pensacola, Fla.
NAS, Memphis, Tenn.
NAVHOSP, Great Lakes, Ill.
NAVTRACEN, San Diego, Calif.
NAVHOSP, Corpus Christi, Tex.
NAVHOSP, Santa Margarita Ranch, Oceanside, Calif.
NAS, San Diego, Calif.
NAVHOSP, Oakland, Calif.
NAVSTA, Treasure Island, San Francisco, Calif.
NAVHOSP, Mare Island, Vallejo, Calif.
NAVSTA, Tongue Point, Astoria, Oreg.
NAVHOSP, Bremerton, Wash.

NAVHOSP, Charleston, S.C. (Naval Base). NAVHOSP, Guantanamo Bay, Cuba.
NAVHOSP, Jacksonville, Fla.

OPHTHALMIC SERVICE UNITS

NAVDISPENSARY, Washington, D. C.
NAS, Norfolk, Va.
NAVHOSP, San Diego, Calif.
NAVTRACEN, Great Lakes, Ill.
Pearl Harbor, Navy #128, SF.
Coco Solo, Canal Zone, Navy #720, NY.
Kodiak, Alaska, Navy #127, PM, Seattle.
Sangley Point, Luzon, P.I., Navy #961, SF.
Guam, M. I., Navy #926, SF.
Yokosuka, Japan, Navy #3923, SF.
USS CONSOLATION (AH-15).
USS REPOSE (AH-16).
USS HAVEN (AH-12).

OPHTHALMIC LENS LABORATORIES

NMSD, River Road, Edgewater, N. J. NMSD, Oakland, Calif."

-C. A. Swanson

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BUMED CIRCULAR LETTER 50-97 30 August 1950

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Submission of Claims on NavMed-U, Report of Medical, Dental, and Hospital Treatment of the Personnel of the Navy and Marine Corps by Other than the Medical Department of the Navy

Ref: (a) Chapter 20, Manual of Medical Department

Encl: (1) Two sample NavMed-U reports
(2) Four sample bills

1. The Bureau of Medicine and Surgery has been experiencing difficulty in processing to a satisfactory conclusion many claims submitted on NavMed-U, for medical, dental, and hospital services furnished members of the naval service by other than the Medical Department of the Navy. The primary cause for delay in settlement of these claims is the incompleteness or inconsistency with which the reports and other papers submitted in substantiation thereof have been prepared. Past instances indicate a lack of proper care and thoughtfulness in the preparation of such claims. There is accordingly set forth below a list of the most common causes for return of claims to the preparing activity:

(1) Failure of activity to submit NavMed-U report.
(2) Items on the NavMed-U not adequately completed.
(3) Certificate on the reverse of NavMed-U report not completed in cases where reimbursement is being claimed.

(4) Failure to provide appropriate explanation in cases where services were received at a place some distance removed from the individual's duty station when the individual is indicated as being on duty at the time services were received.

(5) Failure to provide appropriate explanation in cases where facilities of other Federal agencies appear to have been available but were not utilized.

(6) Appropriate explanation not furnished where services of a civilian physician were utilized and a naval medical officer appears to have been available.

(7) Failure to furnish information concerning time and date individual in an AOL, AWOL or deserter status is taken under naval control.

(8) Authority of the Bureau of Medicine and Surgery not obtained for services of a special nature which, by regulation, require such authority (eye refraction, services of specialist or consultant, special and prosthetic dental treatment, etc.).

(9) Failure to submit bills with claim.

(10) Original of bills not submitted.

(11) Bills not properly itemized.

(12) Erroneous computation of bills.

(13) Bills not properly certified.

(14) Services listed on bills not properly acknowledged.

(15) Failure to submit properly receipted bills in cases where claim for reimbursement is being made.

(16) Failure to submit appropriate explanation in cases where excessive charges appear on bills.

2. These and similar errors or omissions not only necessitate return of claims to the preparing activity for further action, but can be cause for objection by Government accounting officers. This requires additional work and expense on the part of the Bureau before final settlement of the claim can be accomplished. It is therefore the responsibility of every individual preparing claims of this nature to exercise the utmost care and discretion and to follow as closely as possible the requirements of pertinent instructions (reference (a)). Further, by initially submitting claims which are properly prepared, naval personnel requesting reimbursement of funds personally expended will not be subject to undue hardship resulting from delays in receiving their money; and the public relations of the Navy will be enhanced with those individuals or private institutions on whom it must depend for care and treatment of its personnel in the absence of facilities of the Medical Department.

3. For the information of all concerned there are attached two NavMed-U reports which exemplify the complete manner in which this form should be prepared before it is submitted to the Bureau in substantiation of a claim. There are also attached two copies of bills (one paid; one unpaid) which illustrate the form and detail which should be employed to assure that bills are in proper form when submitted to the Bureau.

-C. A. Swanson

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BUMED CIRCULAR LETTER 50-98 1 September 1950

From: Chief, Bureau of Medicine and Surgery
To: All Naval Hospitals

Subj: Hospitalization, retired personnel

Ref: (a) Executive Order 10122, dated 14 April 1950

1. The provisions of reference (a) require that all members permanently retired for physical disability who need hospital care for chronic arthritis, tuberculosis, psychiatric or neuropsychiatric disorder, malignancy or paraplegia, be hospitalized under the cognizance of the Administrator of Veterans Affairs. All such members now patients in naval medical facilities who will require hospitalization for one of these conditions after 1 October 1950 and who desire hospitalization at government expense must be transferred to Veterans Administration Hospitals prior to 1 October 1950.

2. To accomplish the foregoing addressees shall submit the following at the earliest practicable date in the case of each such member who desires hospitalization at government expense subsequent to 1 October 1950.

(a) Veterans Administration Form 10-P-10 (Application for Hospital Treatment or Domiciliary Care).
(b) Letter request from the member concerned that the Veterans Administration provide necessary transportation.
(c) Letter requesting designation of facility prepared in accordance with BuMed C/L 43-136.

3. The above requests shall be directed to the Veterans Administration Regional Office having jurisdiction over the geographical area in which the naval medical facility is located, if the member desires hospitalization in a Veterans Administration facility within the same region. If the member desires hospitalization in a Veterans Administration facility under the jurisdiction of a different Veterans Administration Regional Office, the request should be submitted to the Veterans Administration Central Office, Washington, D. C.

4. Advise all members whose transfer to a Veterans Administration facility must be so effected that if transportation cannot be paid from government funds necessary transportation must be provided by the member himself.

5. Advise those members who do not desire hospitalization in Veterans Administration facilities that arrangements for hospitalization at own expense must be completed prior to 1 October 1950.

-C. A. Swanson

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BUMED CIRCULAR LETTER 50-99 6 September 1950

From: Chief, Bureau of Medicine and Surgery
To: All Naval Hospitals and Hospital Ships

Subj: Report of Patients, NavMed I; Reporting Action Casualties

1. Effective upon receipt of this letter, the following additional information on action casualties (Key Letter "C") shall be designated as part E and reported weekly on the sheet attached to subject form.

Action Casualties (Key Letter "C")

	Total	Navy	Marine	Army	Air Force
Remaining last report					
Admitted - Total					
Received from overseas					
Other admissions					
Disposed of - Total					
Transferred					
Died					
Other disposition					
Remaining					

2. Entries on the line "Received from overseas" shall be made only by hospitals in the continental United States, which shall there record action casualties received directly from overseas. Action casualties received by transfer from one continental hospital to another shall be entered on the line "other admissions".

3. If there is nothing to report on action casualties, the entry shall be simply, E - "Action casualties - none".

-C. A. Swanson

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BUMED CIRCULAR LETTER 50-100 13 September 1950

From: Chief, Bureau of Medicine and Surgery
To: All Naval Hospitals, Continental U. S.

Subj: Section 104 of the Servicemen's Readjustment Act of 1944

Ref: (a) BuMed C/L 44-174
(b) BuMed C/L 46-76

Reference (a) and paragraphs 5 and 6 of reference (b) are cancelled and superseded.

This letter quotes Section 104 of Public Law 346, 78th Congress, approved 22 June 1944, which directs that certain procedures must be complied with prior to discharge or release from active duty of any person in the Armed Forces. In accordance with this section, this letter directs that (1) no person shall be discharged from the naval service or released from active service by reason of physical disability until his right to file a claim for compensation, pension, or hospitalization has been explained (2) When such claim for compensation, pension, or hospitalization is submitted, the pension claim shall be forwarded to the Veterans Administration Regional Office having jurisdiction over the locality in which the individual intends to reside, accompanied by a photostatic copy of the entire health record (less cover) and a certified copy of the following records as may have been completed: (a) Standard Form 88, with dental section completed, reporting the separation physical examination; (b) NavMed-M; (c) Clinical Board report; (d) Final orders discharging or releasing the individual from active service in accordance with Title IV of the Career Compensation Act.

Individuals who do not desire to submit a claim for compensation, pension, or hospitalization should be requested to sign the following statement:

"I have been told that I am to be discharged or released from the naval service by reason of physical disability and have been advised of my right to file a claim with the Veterans' Administration for compensation, pension, or hospitalization. I have decided not to submit a claim for any of those benefits at this time. I understand that my failure to file a claim at this time does not prejudice any right to submit a claim in the future."

Such statement does not constitute a waiver of any rights and should not be referred to as a waiver. The signed statement should be forwarded to BuMed with the terminated health record. If the individual at a later date decides to submit a claim for benefits, the statement will be forwarded to the Veterans' Administration with a copy of his medical record. If an individual, being discharged or released from the service by reason of physical disability, does not desire to submit a claim for compensation, pension, or hospitalization and refuses to

sign the statement quoted above, the unsigned statement shall be forwarded to BuMed with a notation to that effect.

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ALNAV 89 1 September 1950

Subj: Immunization Procedures

Alnav 89. (1) Effective immediately following immunization procedures shall be carried out for all Navy and Marine Corps personnel and others traveling under naval jurisdiction departing for Japan or Korea: (a) Successful vaccination or revaccination against smallpox regardless of date of last previous vaccination. (b) Typhoid stimulating does if more than 6 months have elapsed since completion of initial series or last stimulating dose. (c) Cholera vaccine basic series or stimulating dose if more than 6 months have elapsed since last basic series or stimulating dose. (d) Typhus vaccine basic series or stimulating dose required during interval 1 September until 1 April if more than 6 months have elapsed since basic series or stimulating dose. (e) Tetanus basic series or stimulating dose if indicated as described in Manual Medical Department, article 22-24. Stimulating dose alum precipitated toxoid required if approximately 1 year has elapsed since basic series or if approximately 4 years have elapsed since first stimulating dose. (2) Every effort shall be made to assure completion all immunization requirements prior departure to these areas. (3) This will not be construed as changing immunization requirements for personnel proceeding to overseas areas other than Japan or Korea.

-SecNav Francis P. Matthews

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NAVY DEPARTMENT
BUREAU OF MEDICINE AND SURGERY
WASHINGTON 25, D. C.

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