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PROCEEDINGS

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FIRST CONFERENCE

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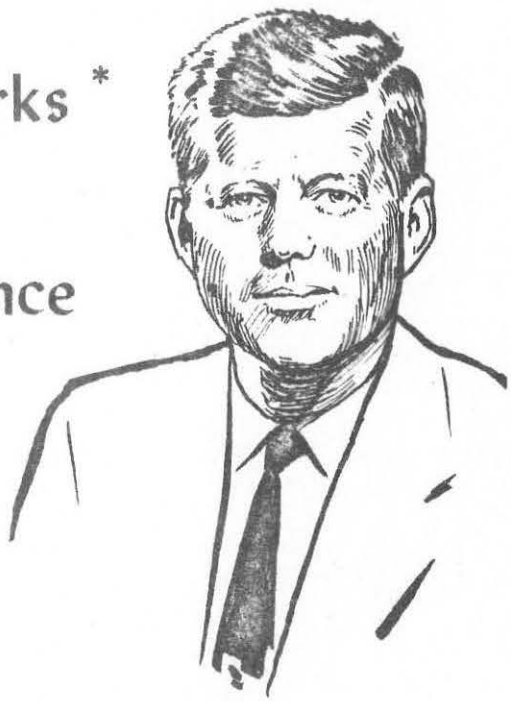
NATIONAL NAVAL MEDICAL CENTER, BETHESDA, MARYLAND

President Kennedy's Remarks * at the Opening of the Surgeons General Conference



It gives me great pleasure to welcome you on the occasion of this First Conference of the Surgeons General of the Navies of the Americas. It is particularly fitting that this exercise in inter-American medical cooperation should have its beginnings at the National Naval Medical Center, an institution conceived and cherished by Franklin D. Roosevelt, a devoted friend of the Navy and a good neighbor of all the Americas.

In his remarks at the dedication of the Center in August 1942, President Roosevelt saw it as an agency in the unending battle against suffering and illness among all mankind. I share President Roosevelt's affection for the Navy, and I share his commitment to democratic progress in the western hemisphere. There are few better fields for international collaboration than the war against disease. Here, all nations can work together without fear of competition; there need be no secrets, no withholding of information, no reluctance in the exchange of medical assistance. All nations can agree on open covenants, openly arrived at in matters of health and medical care.

Each of you here directs one of your nation's largest medical organizations. Your presence at this conference brings together a wealth of medical knowledge, resources, and experience for the common benefit of all Americas, South and North. Each of you has something to offer, something to share, and something to gain. As you meet in different countries in the years to come, your collaboration will forge another strong bond of good will, linking all the nations of our hemisphere. In improving health and

* Pre-Recorded

medical care throughout the Americas, we work towards our common goal, the goal of the Alliance for Progress, the winning of a better life for the men, women, and children of the Americas, for our time and for generations yet to come.

I welcome you all here to Washington and to our country.

Greetings from Admiral Brown

Rear Admiral R. B. Brown, MC, U. S. Navy
Commanding Officer
National Naval Medical Center
Bethesda 14, Maryland

Mr. Chairman, Dr. Berry, Admiral Kenney, Admiral Quinn, distinguished guests: First, I would like to extend to each and every one of you a most hearty welcome to the National Naval Medical Center. We are indeed honored to have you with us for this meeting. Although these words of welcome are to be very brief, I would like to outline for you the make-up of this Medical Center. First, we have the Center Command, which is the coordinating and supporting command for the component units or commands. These consist of the Naval Hospital, the Naval Medical School, the Dental School, the Research Institute, the School of Hospital Administration, the Navy Toxicology Unit, and the Armed Forces Radiobiology Research Institute, which is a tri-service organization and which is just being completed. I have outlined these facilities in order to invite you to visit them if you have any particular interests in seeing any of the facilities or the skills therein. I have seen the formal program and realize that it is to be a very strenuous and interesting one, but I speak for all of the members of the staff when I invite you to visit any of these facilities or the medical officers that work in them. In conclusion, I hope you will make yourselves at home here, and let us help you in any way possible.

Thank you.

Greetings from Admiral Quinn

Rear Admiral John Quinn, U. S. Navy
Director, Pan American Affairs
Office of the Chief of Naval Operations
Washington 25, D. C.

Thank you very much, Commander Schirmer, Dr. Kenney, Dr. Berry. First of all, I want to bring you the greetings and the best wishes of Admiral Anderson, our Chief of Naval Operations. The other officers of his office and those in my own office of Pan American Affairs join me in welcoming you to Washington. We hope that you are not too tired from your long trip and that as the week progresses you will become more rested. We are so pleased that you were able to come.

As most of you already know, this is the third of this type of conference involving the navies of the Americas. At first about a year ago, actually in May of 1961, we had the Directors of the Naval Academies at Annapolis. Those gentlemen gained a great deal, they tell me, from the opportunities of exchanging ideas. Following the Naval Academies the Directors of Naval War Colleges met at Newport, Rhode Island. They were navigators, aviators, engineers, naval officers of the line, who gained a great many points by their opportunities to exchange ideas there. Now, in this meeting, which promises to be the best of the three, we have not only men of the sea--naval officers--but members of the medical profession.

Throughout the world, members of the medical profession seem to have and to enjoy a common understanding and a common language. We in the United States Navy are so pleased that it is possible for you to meet together here. You have such a vast amount of common sense and human understanding, gained from your long studies to the approach of organized medicine. We feel each of you stands a good chance to broaden your knowledge, and we will be ever so grateful for any little

thing that we may have done here at the Center or in the United States to assist you in broadening your understanding. The other two meetings that have been held under the sponsorship of the United States Navy have resulted in as much good from the discussions, exchange of ideas outside of the conference room as inside. That aspect of your coming together this week should also be helpful. The pieces of equipamientos, a little idea here, or a little idea there, you may be able to turn to advantage when you go back home. The opportunity of meeting with other members of your profession will also possibly be used to advantage when you go back home. I do know that each of you can take home a good amount of justifiable pride in representing your navies here.

In a very real way the health of an organization is the strength of the organization. In a community, the health or the illness of a family adds to the strength or the weakness of the community, much as in our own country the health and strength of the Navy adds to or weakens the country. Here, in the western hemisphere, we have a rather unusual situation in which the strength of the free world depends upon the western hemisphere. Within the western hemisphere the strength of the countries depends upon the strength of the navies of the western hemisphere. You gentlemen are in a position to insure the health of the men. You not only are insuring that; you are insuring that it is continuous. You not only assist in pulling a patient through an illness, you are maintaining all of your patients in a high state of health. You are strengthening your navies and the navies are strengthening the western hemisphere, which, of course, is the mainstay of the free world. Your work is fascinating from every angle. Being a naval officer alone is interesting; being a medical naval officer makes it doubly interesting.

I am so pleased that you're meeting now for the first time and have an opportunity to see some of these things, travel a bit; and by this time next week, I hope that each of you will be able to review briefly and say that it was worth my while coming. I hope you have a very safe and successful trip back home; and that when you get there, you will find all members of your family well. Good luck to all of you.

Greetings from Doctor Berry

Doctor Frank B. Berry
Deputy Assistant Secretary of Defense (Health & Medical)
Department of Defense
Washington 25, D. C.

Admiral Brown, Admiral Quinn, Admiral Kenney, and my several friends from Latin America and Canada: It has been my pleasure--my personal pleasure--to have enjoyed the cordial hospitality of some of you and your governments, and it is not only a personal pleasure, but a great honor to be the representative of the Department of Defense to extend to you a cordial welcome here. I'm sure you will have a pleasant visit, although I know that your program is pretty full and will be somewhat hurried.

I have been, as I said, in many of your countries, I have worked closely with Admiral McLean and his group in Canada, representing the Department of Defense; in Mexico, chiefly with our Navy and the conferences on rehabilitation; and with our departmental committee on nutrition for national defense in Colombia, Ecuador, Peru, Chile, Uruguay, and I had a visit of some years to Brazil. So I should like to take this opportunity to thank all of you personally and, also through your governments, for the very cordial reception that they have given to me personally and to the group who were with me. Not only have we visited you in person, but also we have visited many of your institutions, not only Navy, but other defense and civilian medical institutions that worked closely with the Navy. I note on the program here, after the address by Admiral Kenney, that we have a coffee break--"Coffees of the Americas," and I hope that's what we all are: a good blend of physicians and officers of the Americas. Thank you all.

Opening Remarks by Admiral Kenney

Rear Admiral E. C. Kenney, MC, U. S. Navy
Surgeon General, U. S. Navy
Bureau of Medicine and Surgery
Washington 25, D. C.

Dr. Berry, Admiral Quinn, Admiral Brown, and Fellow Colleagues: I want to say at the beginning that it is a distinct privilege for me and all of the members of the Navy Medical Department to have you gentlemen come up here for this week of discussions and conferences with us. To my knowledge, it is the first time--at least the first time for many years--that representatives from practically all of the countries of South America and Central America and Mexico, and our colleague from Canada, have been able to get together around a table such as this and present and discuss problems in the practice of medicine within a naval environment that are, perhaps, common to all of us.

I might digress for just a moment here, since Admiral Quinn is with us, to state that we often have occasions in the practice of medicine when things don't go quite as we have planned them; so it is very consoling to see that in the technical electronic field they also have problems arise with their equipment.

At this time, too, I want to give very full and sincere credit to the Chief of Naval Operations, Admiral Anderson, through Admiral Quinn's office, the Pan American Affairs Division, and Captain Ball and Commander Schirmer, whom you met on the plane, for their fine cooperation in making this meeting possible. Outside of the strictly professional medical matters, which we will discuss and which we have arranged as doctors, many of the facilities and the arrangements which you have already experienced and will experience for the remainder of this week are through the courtesy of the Chief of Naval Operations, and particularly Admiral Quinn, and the people in his

office. I want at this time to express publicly our very sincere appreciation for making this meeting possible.

As was mentioned earlier, we have two things in common that bind us together today. One is the practice of medicine, in which we are all involved. The other is the sea, because we are all members of various navy medical departments. We feel in our Medical Department that the clinical practice of medicine is very little different in a naval environment than it is in a civilian environment. The diagnostic procedures we use are the same as we are taught, and as our civilian colleagues use; the various therapies are the same; the drugs we use are the same; the clinical practice of medicine has very little difference.

But there is a difference in certain of our operational phases of the practice of medicine, in the sense that we have medical departments aboard ship; that we have medical departments with the Marines in the field; that we have a responsibility in the field of research, particularly as it pertains to military problems; it is this difference which justifies having a military naval Medical Department.

Actually, as Admiral Quinn mentioned, the strength of any organization is to some extent related to the health of the people that compose the organization, and I suspect that the support that any Medical Department secures is related to some extent to the emphasis which is placed upon the importance of health of the individual. We have been fortunate, I think, in this country, that there has been considerable emphasis on this aspect of the total Naval operation. And we have not always received everything we have wanted or that we needed, but we have received support in the general field of our operation.

We established certain physical standards that are applied at the time of enlistment or commissioning, and each year, many, many individuals are examined physically and fail to meet these rather rigid physical standards which are required of the individual to come into the service. Once a man is in the service, we must surround him with a healthful environment, and by means of preventive medicine, protect him as much as possible through inoculations and various sanitary measures against the exposure or the contraction of infectious diseases which in epidemic form could be a serious catastrophe in any military organization, particularly at a time when this organization may be involved in a military operation. I know we are all familiar with the history of military engagements that in many times in past years sickness has been much more of a problem for a field commander to contend with than have the battle casualties that his troops have received. We do this through inoculations and careful attention to dietary measures; the sanitation aspect we spread over into the industrial medicine field. Because we realize that we are in a mechanized type of environment, and there is always a possibility of injuries, we go into our industrial plants and ships through our industrial and occupational medicine to protect the individual there against injuries which would be disabling.

Should the individual, in spite of all these measures, become ill or suffer an injury, then we have the responsibility through our hospital system to provide medical

or surgical care for the individual. It is on this level, then, that the practice of medicine in the naval service is very little different than it is in civilian life, and I suspect that you would find that the practice of medicine in this institution here--the Naval Hospital at the Naval Medical Center--probably differs very little from that at Georgetown University Hospital, or at the Washington Medical Center, as far as the application of medical principles are concerned.

Now this is broad, and I think it has to do pretty much with our practice--our professional lives in the naval service. I am sure we have problems which perhaps are peculiar to certain countries, just as I am sure that we have other problems of a professional nature which are common to all of us. I think that one of the purposes of this meeting is to get together so that we can freely and informally discuss these things; not necessarily that a great deal of particular accomplishment will occur today or tomorrow, but at least, it gives us things upon which we can study and work for future years. On that basis, I would like to think perhaps that the goal of this meeting this week up here is to gain an understanding of our various medical departments, their organization and staffing, the responsibilities and the problems that we face in our medical department, and to explore possible means by which we can help each other, whether in a professional field, an organizational field, or a training field. At least we can discuss these things, because I feel personally that no problem can be solved unless, you first identify the problem and discuss it.

Then I think the other by-product, which is very important to me, is the fact that we can get to know each other personally, as I have had the opportunity to meet Admiral Varga in Mexico several years ago. When a name comes up, you remember that you have met the gentleman, that you have talked to him; and I think that has a great deal more impact than when you are corresponding to an individual you have never met. Our getting together this week will be extremely helpful.

I think that of the areas that we will probably be most interested in through this week, at least from the United States Navy standpoint, and from the practice of medicine in a naval environment, the first is the facilities. Obviously, if we are to practice medicine, we must have some sort of a facility in which to practice--in most cases a fixed installation. This means a hospital aboard ship; it means a sick bay; and in countries that have marine units, it means field medicine, the practice of medicine under field conditions. Those are the peculiar aspects, I think, of our practice of medicine within a naval environment.

We have paid in our country much attention to our fixed facilities, our hospitals, of which many are rather new and modern. We have had a great deal of consideration from the Chief of Naval Operations regarding the sick bays that we can install aboard ship, inasmuch as space is a premium in a combatant ship; and it is a real feat to install into a ship a sizeable sick bay for the care of the crew of the ship. We also spend a great deal of time with our field equipment used with our three marine divisions for field medicine. The facilities, I think we all agree, are important.

The second important thing, I think, is personnel. All of us, I am sure, have problems regarding professional personnel. Our number is limited in the sense that the total number of medical officers, dental officers, and nurses that we can have aboard on active duty at any one time is determined by the Chief of Naval Operations and the Chief of Naval Personnel, in consonance with the total personnel plan. We receive our share, so to speak, of the total forces that are available at any one time in the Navy establishment, and that is fair enough. At times, I must admit, Admiral Quinn, we could use more personnel in view of the professional requirements that are placed on us.

But then, once given a finite number of doctors or nurses that we can have on active duty, comes the second problem of the procurement of these individuals. There is a shortage of professional personnel in this country in relation to the population and the demands of the population for professional care, so that we are in a very competitive market, so to speak, for professional personnel. During this meeting other members who are more familiar with the details of this will explain to you how we have approached this problem in this country so that at any one time we will have sufficient professional personnel on active duty to meet our requirements. Of course, once we get these personnel into the service, then very often additional training is required. They are professionally capable almost immediately of treating patients, but there are certain aspects about their endeavor in a military environment that we must train specially. We have a large training program at all levels, from the officer right down into the Hospital Corps levels, for training individuals to do the specific jobs to which they will be assigned, and I think that is extremely important, because I am certain that the quality of our professional care is related very, very much to this training and procurement of the personnel who will work in the facilities which I have described previously.

Then, of course, the third problem--and it is always the thing that we talk of--is funding, because these things that we are talking about do cost money. We refer to the "triad" here in Washington: that with money, people, and facilities we can accomplish anything. The equipment nowadays is expensive. The new techniques that have been developed through the tremendous research in medicine require specialized equipment and special training. To apply all of the newer diagnostic and therapeutic techniques requires considerable support in the field of instrumentation, equipment, and facilities. Given a good facility, given adequate personnel that are sufficiently trained in their specific area of employment, and given support for the equipment, and all of the other things required, then I think we can assure our Navy that we will be able to provide good professional medical care to those personnel that are on active duty.

Now, I suspect what I have said is almost the same as any one of you gentlemen would have said regarding the probable major areas of our interest for improving the services that the Medical Department provide to your Navy.

Now, to digress a minute. So that this meeting will not be all talk, we have arranged throughout this meeting here in Washington for you to see certain institutes and facilities which, I think, will be of tremendous interest to you. We have the

Armed Forces Institute of Pathology, which is an outstanding institute, a tri-service Armed Forces Institute that is under the executive management of the United States Army Surgeon General's Office. We have the National Library of Medicine right next door, which is under the direction of the Surgeon General of the United States Public Health Service. It has just been completed, and probably is one of the most complete medical libraries in the world. We have several new and very interesting facilities here at the Center that have been constructed primarily, I think, in reaction to a type weapon which might be used in any future war--the thermonuclear weapon -and also because the United States Navy is getting more into nuclear propulsion in ships, thereby possibly creating occasions when exposure to radiation is a medical problem. Almost two years ago, we established here a facility which we call the Radiation Exposure Evaluation Laboratory, with a lot of very specialized type of equipment to detect residual radiation--the ionizing radiation effects in humans who might have been exposed to various modalities of radiation exposure.

We also have--almost completed but not yet dedicated--an Armed Forces Radiation Research Facility here at Bethesda, which is probably one of the most unique institutes of its kind, in this country at least. We are able to expose biological material to various modalities of radiation in short but intense quantities.

I think all of you will be interested, not only in hearing what we have to discuss between ourselves here this morning but also in seeing some of these facilities and understanding some of the work they are doing. For instance, I know Dr. Vargas is very knowledgeable about our work in the tissue bank, because he has recently started a tissue bank in Mexico.

I know there are many areas that I have not covered at this time. I wanted to make this especially brief, because as we go along we'll discuss these ideas back and forth here and see what approach might be best.

At this time I would like to introduce Dr. Villafana, whom, I think, most of you met yesterday, whom we are recommending as the permanent Chairman of these meetings. Dr. Villafana has a very fine medical background; his specialty is in public health; he is currently attached to the Patuxent Research and Text Development Station at Patuxent River, where, as I mentioned before, we have a huge area of industrial medicine involved. As you already know, he speaks Spanish very fluently, which I regret very much I do not, and I think Dr. Villafana will be very capable in conducting our discussions. I know you will be free at any time that you have a question, to put it to him in your native language.

As you have already experienced, we are having this translated, and I hope it is coming through successfully so that I know it is much easier for you, and you get more out of discussion if the interpretation is in your own language than perhaps missing portions. Certainly that would be true, I know, of us in the Spanish or Portuguese languages. Don't hesitate at any time throughout our discussions, to ask a question of the presenters. I am sure they would welcome questions either during

the presentation or certainly at the end of the presentation. I want all of you gentlemen to feel that we are here to discuss these things in an informal manner. We want this week at least to identify problems that we can explore--that we can continue to explore--in the established procedures, because I am sure that not all of our requirements or our problems can be solved specifically during the next two or three days. As you well know, there are certain channels that these things must go through sometimes for accomplishment, but I think as a result of our discussions we can get them into the proper channels and see how much we can accomplish.

At this time I would like to turn the meeting over to LCDR Villafana of the United States Navy Medical Department.

Medical Department Organization

Captain H. S. Etter, MC, USN
Director, Planning Division
Bureau of Medicine and Surgery
Washington 25, D. C.

Admiral Kenney, Distinguished Guests: I am very pleased to have this opportunity this afternoon to briefly discuss with you the organization of our Medical Department. I hope you may find useful ideas in these few remarks for application to your own situation.

The Surgeon General of the Navy with his staff consisting of the personnel assigned to the Bureau of Medicine and Surgery is responsible for directing all medical and dental services for the Navy and Marine Corps. This involves the professional responsibility for providing medical care for our active duty Navy and Marine Corps personnel and their dependents and to the extent facilities are available for retired members and their dependents. Care is also provided for on-the-job injuries and illnesses for our civilian employees. Our Medical Officer strength is, however, based on the active duty Navy and Marine Corps total strengths and is presently approximately 3.6 per thousand.

In discharging these responsibilities, as can be seen on this chart, the Surgeon General is directly responsible to the Secretary of the Navy for establishing standards for the prevention and control of disease and for the administration of all professional standards for health and medical matters. In those phases of organization concerning the business administration of medical and dental facilities, the review of the utilization of our facilities and material, the coordination of material matters and the coordination of civilian personnel matters the Surgeon General is responsible to

the Executive Office of the Secretary. This side of the chart represents producer logistics. The other side of the chart represents consumer logistics and it is seen that the Surgeon General is responsible in the military chain of command to the Chief of Naval Operations for Naval Command matters, the development of Medical Department plans and policies, the recommendation for physical standards for the naval service, the review of military personnel needs for the Medical Department and the development of the medical portion of over-all naval logistic plans.

The organization of the staff of the Bureau of Medicine and Surgery that has been developed to supervise these responsibilities was depicted to you on a chart this morning. You will recall that there were six senior administrators to assist the Surgeon General--The Deputy and Assistant Chief and Assistant Chiefs for Personnel and Professional Operations, for Planning and Logistics, for Aviation Medicine, for Dentistry and for Research and Military Medical Specialties.

They, in turn, are responsible for the supervision of the operation of those field activities for which the Bureau of Medicine and Surgery exercises management control--our medical centers, U. S. Naval hospitals both in this country and overseas, U. S. Naval dispensaries, naval medical research commands, dental clinics, preventive medicine and disease vector control units, and medical department schools. Each of these various activities has an officer of the Naval Medical Department as its commanding officer or officer-in-charge and funds for all facets of their operations are provided by the Bureau of Medicine and Surgery.

You will recall from another chart this morning that the Bureau also exercises technical direction for medical matters over a large number of other Naval activities. These include station hospitals and dispensaries, all shipboard medical facilities and all medical units with the Marine Corps. Medical Department personnel and professional guidance are provided for these activities but funds for their operation and management control are exercised by another bureau of the Navy Department. This next chart shows the other management bureaus. For example, the Bureau of Ships provides the management control for all of our Naval shipyards. The Naval dispensary, as one of the departments of the shipyard, is under the direction of the shipyard commander. This dispensary provides medical and dental support services only for personnel attached to the shipyard. Similarly, the bureau of weapons provides management control for all Naval air stations. The station hospital at an air station provides hospitalization only for the air station personnel to the extent of their capability. Since they are relatively small, all medical specialty care cannot be provided by the station hospital and many patients are transferred to U.S. Naval hospitals for extensive or prolonged hospitalization when required. It can therefore be seen that U. S. Naval hospitals provide support for many Naval activities in a given geographical area while station hospitals and dispensaries provide only limited and local support.

It is pointed out, however, that all U. S. Naval hospitals do not provide all types of specialized medical care. To provide the best professional care and to best

utilize the talents of highly trained specialists, certain Naval hospitals have been designated special treatment centers, have been equipped and staffed accordingly, and when indicated Naval patients are transferred there. For example, patients requiring open heart surgery, neurosurgery, plastic surgery, neuropsychiatric care, etc., are transferred to the centers so designated, for this particular type of care.

To facilitate the administration of the many widely scattered facilities in the Naval shore establishment the U.S. has been divided into a number of Naval Districts. These geographical divisions each have a senior naval line officer as the District Commandant. On his staff is a senior Naval medical officer, the District Medical Officer, who is responsible for broad policy guidance for all medical matters within the District. The next chart shows these districts. All of our programs for personnel of the Naval Reserve are also supervised at this level.

I would like to next briefly discuss the organization of the Medical Department for support of the Naval operating forces. At the present time we provide Medical Department personnel and technical direction for approximately 900 shipboard medical facilities. These vary in size from the large aircraft carriers with 2 medical officers, 1 Medical Service Corps officer, 29 Hospital Corpsmen, 2 dental officers and 7 dental technicians to the smaller ships such as minecraft with only 1 Hospital Corpsman trained for independent duty assigned.

The newest aircraft carriers to join the fleet have the most modern medical and dental facilities that can be incorporated into a combatant ship. The sick bay has two general wards with a total of 68 beds, two isolation wards with 4 beds each, two quiet rooms with a total of 10 beds, and an NP quiet room (a total of 86 beds). A diet pantry is available to facilitate food service. The clinical spaces are a surgical dressing room operating room with complete sterilization equipment, physiotherapy room, an x-ray room with a 100 MA unit and a 15 MA portable unit with darkroom facilities, pharmacy, clinical laboratory, EENT treatment room and aviation examining room with eye exam range, and administrative and clerical spaces. Medical supplies are stored in several storerooms in different sections of the ship for dispersal.

The dental facilities are composed of four dental operating rooms, with x-ray facilities, a prosthetic laboratory, and administrative spaces.

In addition to the ship's medical staff mentioned a few moments ago, when the air group is embarked, the group flight surgeon and several Hospital Corpsmen join the staff.

In the normal day-to-day operations the sick bay functions just as does a station hospital in any military installation. In addition to the routine care of the sick and injured, sanitation inspections, etc., a vigorous program of training is a continuing action. Training of medical staff in casualty handling is emphasized. The entire crew is trained in self-aid and buddy-aid with the first aid supplies that are available to them

in combat conditions. This training program is pursued especially during shipboard battle problems when personnel are at their battle stations. The medical aspects of atomic, biological and chemical warfare are also stressed. Casualty handling and first aid treatment is simulated during battle problems.

During flight operations, the squadron medical personnel are stationed on the flight deck and in an emergency dressing station in the immediate vicinity of the flight deck.

Since a combatant ship is extremely compartmented for damage control purposes and for dispersal purposes, the medical organization of this ship for battle is quite different. The sick bay is designated as the midship battle dressing station. In addition, there are two other primary battle dressing stations, one forward and one aft, each fully equipped for surgery and there are four secondary dressing stations. The material in these stations are maintained ready-for-use at all times but only used in battle or an emergency. Medical personnel man these stations during battle and a Hospital Corpsman, with equipment, is assigned to each of eight damage control repair parties. To provide the material for personnel use in self-aid and buddy-aid, there are approximately 150 first aid boxes located throughout the ship. Directional markers, indicating the routes to dressing stations, are painted throughout the ship.

By contrast, a small ship such as a destroyer has a very small sick bay with a staff of two Hospital Corpsmen. Medical supplies are also dispersed, however, vigorous training programs are conducted and good medical support is provided.

Although excellent medical care is provided for our ships it is primarily planned for emergency and short-term care and to support the ships in battle. Those cases requiring long-term or specialized care and elective surgery are transferred to our Naval hospitals ashore.

Before concluding these few remarks, I would like to briefly review our relationship to the Department of Defense. The policy for the Army, Navy, and Air Force Medical Services is fixed by the Deputy Assistant Secretary of Defense (health and medical). In keeping with these policies each service makes maximum use of the facilities of the others where appropriate for hospitalization, training, epidemiological surveys and other programs. Cross-servicing is used in areas where one service can plan its facilities and staffing to take care of the hospitalization needs of others as well as its own. In this way maximum utilization of all of the services' medical resources is achieved.

In summary, I have reviewed the relationship of the Navy Medical Department to the Secretary of the Navy, to the Chief of Naval Operations, and to the Department of Defense, I have attempted to outline its organization for the administration of its own activities and finally its responsibilities for other Naval medical activities, including shipboard facilities. If there are any questions, I would be pleased to try to answer them.

Medical Officer Procurement

Captain R. L. Christy, MC, USN
Neuropsychiatry Branch, Professional Division
Bureau of Medicine and Surgery
Washington 25, D. C.

Admiral Kenney, distinguished guests, I believe that medical officer procurement problems are, at one time or another, a source of difficulty for most services--the length of education that civilians demand for medical care, the civilian opportunities--certainly have all contributed to this. Each of these factors, in one way or another, has required special handling, either by advanced rank or special pay or other types of incentive; and I recently learned that, even back in Roman days some 2,000 years ago, the physicians for the Roman Navy received extra pay. Where these incentives have not been used or where they have proven inadequate, services have had difficulty in one form or another. I understand that, for example in Japan, there are no special incentives for physicians, and they are only up to 40 per cent of their needs. Certainly, I think the American Navy--the American Armed Forces--and Great Britain, have had to use various types of incentives. Admiral McLean mentioned subsidies; if I understood him correctly this morning, as far as education is concerned, I understand that the British Navy still is only up to 70 per cent of its requirements, and has recently again increased the incentives. Here in America, we have also had our difficulties for one reason or another with the changes in World War II, Korea, and all; possibly some of the factors that have proven to be important in our studies, and our attempts to solve these problems, may be of use to others of you in problems you still may have, or be familiar to you as ways in which you have solved some of your problems. In 1953, we were losing large numbers of physicians and dentists from the Armed Forces: Navy, Army, Air Force; and the Navy first started a study which was later, with the full support of the Chief of Naval Personnel and the Secretary of the Navy, moved on

over into the Department of Defense and became the 1956 Career Incentive Act. I would like to cover just a few of the high points in this and bring it up to date--and emphasize it. May I have the first slide? (It is a little bit on the light side.) "The Navy's positive program for meeting its medical problems." Next slide, please. As I mentioned, commencing in 1953, the loss of Navy doctors reached prohibitive proportions, causing lowered combat readiness and serious reduction in care of Naval personnel and their families. This presentation will describe the problems, and the effective remedial measures that were taken to solve the problem. Next slide, please. "The Navy Doctor: Physician and Officer." As you will note, in 1956, we had 3410 Navy doctors. We have about that many now, as Admiral Andrews mentioned this morning, 3412, although there has recently been some relief from a ceiling that was imposed at that time, so that we have a few more. These doctors were necessary to provide medical care for approximately the same number--5 per cent less, as far as the active duty personnel are concerned, 65 per cent increase in the 81,000 retired personnel, and about a 40 per cent increase in the dependent load. They still staff 782 medical facilities ashore, afloat, and overseas, and serve the various medical specialties peculiar to military medicine: aviation medicine, submarine medicine, nuclear problems, research, and so on. Next slide. One of the solutions, of course, often brought up is to use civilian doctors. This wouldn't work too well in the United States, because civilian physicians under Civil Service and the Veterans Administration are generally paid higher than the military physicians, and neither is too competitive with civilian private practice. But on the other hand, we do need experienced medical officers on ships and in overseas positions, and if those officers could look forward only to sea duty and foreign duty, I am sure we wouldn't have too many of those. So with rotation, we do need military doctors and cannot replace them with civilian doctors, at least in any great number. Next slide, please. As I mentioned, the preliminary studies by the Surgeon General, by the Chief of Naval Personnel, and the Secretary of the Navy, and later the Department of Defense Career Incentive Task Force, noted that all in all the Navy doctor appeared to be "low man on the totem pole," due to such factors as greatly retarded promotions, unfavorable conditions of service, serious disparities in pay and decreasing extent of supplementing his benefits. By the last was meant, of course, the fact that originally retirement and medical care and some of those things were much more an incentive to service career than they had become of recent years, where these same benefits were quite standard for most industries and so on. As far as unfavorable conditions of service are concerned, due to the volunteering of many doctors during World War II and in Korea and entering under the doctor draft, the supply of physicians available to enter the services has been so reduced that the numbers available to the service had to be reduced independent of requirements. This involved losing reserve specialists and in many instances having to move a regular in. To staff that service means that he had been moved with his family within a year and eighteen months. It became a revolving problem; it just tended to compound itself. The greater the shortage, the more moves; the more moves, the more people resigned--the greater the shortage. Next slide, please.

With respect to promotions each service has a somewhat different system. The Navy doctor during the Korean War was serving as a JG for three years, whereas his con-

temporaries in the Army and the Air Force were promoted to Captain (equivalent to Navy lieutenant) after one year of service; this was certainly a negative factor from the Navy's standpoint; and similarly they were being promoted to higher grades--to the next higher grade--more rapidly in the Army and the Air Force. As far as the line is concerned, from the early 20's up to World War II, the Navy physician and dentist received three years of constructive service in recognition of his advanced professional education. During the mass mobilization, with millions of men to promote, to keep track of, the so-called running-mate system was abandoned, with the result that, instead of a physician's getting three years of constructive service or counting internship which was credited up until the early 30's, it would have been four years' constructive service, and in some instances he received essentially no constructive service. He was running with someone who had just graduated from college. As a result, 800 of our regulars resigned at the end of the war. I won't say this was the whole factor, but certainly it was relevant to our problem. Next slide, please.

Here is another factor, which is difficult to explain to many line people--they really don't appreciate the fact that the cost of education, and the delayed education, really exercise quite an influence on the physician's income. The Institute of Life Insurance did a study to show that education had an advantage--to show that a person with an elementary education would earn in his lifetime about one-third as much as a person with a college degree, or a person with a high school education would earn about two-thirds as much. In working this out, they showed that the civilian practitioner would earn fifty per cent more in his lifetime than the college graduate. But on the military rank and pay scale in effect at that time, the military medical officer didn't do any better than a college graduate, and, of course, this was certainly influencing our problem of obtaining and retaining enough physicians in the service. Next slide.

In 1947 because of this, when we were losing so many officers, the so-called hundred-dollar doctor's special pay was authorized, and this remained the source of friction sometimes with some line people who haven't understood it. They thought those doctors were getting all of this money; but with the five years' delay in education, starting at this point, using the line payscale at that time, where he comes out on this line the physician, even with a hundred dollars a month, never caught up. Now we were able to point this out and show it in 1956, so in the 1956 Act with adjustments for constructive service and for pay purposes, the line pay has now come up along this line. The physician still starts late, but he ultimately does catch up about 16 years out of medical school--about the time some of the line officers wouldn't even be eligible for voluntary retirement. And of course, he still is not in an excellent competitive position--certainly with the civilian practitioner or civilian competitor, if you will. Next slide, please.

And so in civilian private practice the average physician can pay off his educational debts and equalize his cumulative earnings with his college graduate contemporary about ten or eleven years earlier than he can under military promotion and pay scale. This disparity is too great; and the other things which are important, which I will name in a minute, just will not solve the problem. Next slide, please.

You can see the effects--this is right after the war--the great loss, partly, certainly of people who wanted to get home and settle down right after the war, but we lose 800 here. We integrated all the reserves. The residency training program started; this was certainly coming into full emphasis at that point, and we were on the positive side of the balance--the hundred dollars extra pay, some readjustment of this loss of credit during the temporary promotions during the war and the Korean War, but the disparity was still too great. And, so again, we were losing, as were the other two armed services. The 1956 Career Incentive Act came in which adjusted the constructive service to give full credit for the years spent in basic professional education, and which adjusted the pay for longevity, so to speak, so that the doctor was not starting behind; he had a longivity-service status while he was in school. Then, with the additional incentive, too, as I say, to equalize the pay in 16 years, we moved into a very positive side, but again I should emphasize that it is a multiple thing. Credit for constructive service and for education, financial compensation for education, residency training so the individual can improve himself professionally, all of these have to work together in balance. If any one of them gets too far out, then we begin to have problems of procurement and retention. Next slide, please.

And this is still a problem. We had the large numbers which you notice there--approximately two thirds of them are regular officers by reason of being in residency training with obligated service and all. Some three fifths of them are under an obligated-service status, so that we had a small group that are eligible to retire, another group that have no obligated service left in residency training. This group really is an unknown potential as far as career motivation is concerned, depending upon how the civilian economy and the other attractions might be; and then this group is the reserves coming and going every two years. We do have a problem, when the competition offered by civilian life becomes too great, with retaining adequate numbers of this group. Next slide, please.

This slide summarizes really the complex problem of medical officer procurement and the interrelationship of these factors. First of all, professional opportunities are very important to the physician. Professional training, in-service residency: we have about 389 people in in-service residency training at any one time. Area planning, residency deferment program: individuals are deferred for one to four years usually to complete training in civilian life and then they enter the service as specialists and perform very essential and valuable service to us for that time. There are about 525 people in that group, coming into the service for two years. Military specialty training, aviation, submarine, preventive medicine, field medicine, and nuclear program research are also important factors in professional training. As we lost so many physicians and yet had long lines of dependents, doctors began to work longer hours and had to rush through examinations of patients; they lost all sense of satisfaction and some of them felt that, if they were going to have to see patients this fast, this was going to be something they would just like to get away from professional

supervision and leadership by older physicians who can help the young doctors, more certainly needed to be given, and was given, to try to help the doctor identify with the service--not to be just a physician, if you will, in a uniform, practicing in a hospital, but to know something of the mission of his service. We feel this is an important thing, both from a career incentive standpoint for the doctor, and as regards taking care of the patient. An opportunity to attend professional meetings and study groups in his specialty is another thing which was emphasized by most of the physicians we talked to--certainly, adequate income and promotion opportunities. We are a part of the military. Certainly we need to be somewhere near comparable-age contemporaries, and also have some recognition of the time spent in education. And certainly there is a problem of paying for this long and expensive education. Recent studies indicated that the expense of four years of medical school in the United States was almost $12,000. About one half of the medical students were in debt upon graduation. The average of their debts was over $3,000. Twenty per cent of them had debts of over $4,800. Along with inadequate military pay and promotion scale, they, of course, had no opportunity to liquidate their debts, and this was, of course, an anti-career incentive. The Civil Service and the Veterans Administration have had a chance and time to promote a little more rapidly in their attempts to keep up with civilian practice competition...The military hasn't necessarily used this and this has made if difficult at times for military physicians who are more or less tied to or connected with their line running mates or other officer group contemporaries. And as I mentioned, having rank commensurate with professional age; we certainly cannot over look the influence of the fact that many of the people entering the service in general come in under the Selective Service Law or at least under its influence. Although most doctors are over 26, which is the upper age for the general draft, our need is handled by the special doctor draft, independent of that age group. So that this certainly has to be an influencing factor in these other programs. As far as our special procurement program is concerned, we have an inactive medical student program and also dental student program which allows for the commissioning of the medical students in any of the four years. There are about 900 young medical students in that program. There are approximately 235 of those who have the opportunity to come upon active duty for some periods, several weeks to a month or two, during the summer; 170 of them in clinical assignments; some 65 in research assignments, so they get some familiarity with the Navy--get interested in certain programs--and then from medical students who have not yet applied, approximately 200 a year are brought on active duty in their senior year and receive full pay and allowances of an ensign for which they owe three years of obligated service. Now they can serve off the two-year draft obligation in that three years. If they go on into Navy residency training programs and so on, which I think will be discussed in more detail tomorrow by Dr. Bond, they would incur other obligated service. So in summary, I would stress again that the professional opportunities, training, professional assignments, reasonable income to compensate for the long and expensive education and to take care of the family, the influence of the doctor draft, and these special procurement programs: the medical student program, the residency training and internships--all have been necessary in our experience to handle our medical procurement problems. Thank you very much.

Inter-Navy Standardization of Medical Supplies

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Distinguished members of this conference and gentlemen: To standardize any item of materiel means to make all copies of that particular item the same as a chosen prototype of model. Therefore, when we speak of the standardization of medical supplies, we refer to the production of each piece of medical equipment or each drug or other expendable materiel as being in conformance with a selected pattern. This would, therefore, imply that like items would be interchangeable in toto or by component parts. Standardization could be partial in that only certain key component parts would need to be standardized for purposes of simplifying replacement procurement--or standardization could be only in the manner of packaging to simplify ease of handling--or standardization could be just in labeling, as by using a specific color or color combination for simplicity in identification.

This matter of standardization and methods of accomplishing it are known to all of us, for we each do it to a more or less degree within our individual services or between services within our own countries. Already there are many fine examples of standardization of certain medical supplies between two or more countries operating closely together for a common cause, such as mutual defense. One classical example of this is found in the nations bonded together in NATO (that is the North Atlantic Treaty Organization).

In this era of constant threats to international peace and the banding together of friendly nations in a common defense, there must be standardization of many procedures, techniques and materiel. To not do this would seriously hamper the much needed

smoothness, coordination and speed of action of the forces cooperating in their common defense effort. If hostile action arises, the forces must have flexibility to permit one participating nation to aid its brother nations--as for example, a force of one nation hard hit by a common enemy might well need emergency reinforcement of medical personnel. Often this could be more rapidly accomplished by importing just the medical personnel and relying on the use of medical supplies already at the site. Here standardization would preclude loss of time for the doctor to acquaint himself with available tools. On the other hand, this besieged force of the one nation might need emergency reinforcement through medical materiel resupply from an allied nation. Here standardization would again be paramount so that the doctors and their assistants could immediately and knowledgeably utilize the supplies just as if they were their own originals. Also the equipment of the one country would need to compliment that of the other so that equipments from the two forces might be used together. For example, the needles of one country would need to fit the syringes of another.

While standardization of medical supplies is very important to all branches of the armed services of allied nations, it may be considered to be even more so in the instance of naval forces. This is based on the realization that in a task force at sea, comprised of ships of two or more allied nations, the ships are less able to each depend upon its respective homeland for medical logistical support. Rather, they must, firstly, be capable of assisting one another by cross-servicing within the limitations of the task force and, secondly, if medical assistance beyond the capability of the task force is required, the commander of that force should be able to seek that help, be it personnel-wise or supply-wise, from the nearest allied nation capable of responding. At a time like this, the receipt of standardized supplies, familiar to doctors of all nationalities involved, will truly be a godsend.

To accomplish this highly desirable state of flexibility between the medical teams of our nations, we would have to each achieve a reasonable level of standardization in peacetime and indoctrinate our medical people in the use of their materiel. Because of variance in our languages it would be paramount that each label and instruction brochure be printed in all pertinent languages to permit thorough equal intelligibility. This could easily be aided by coding or color labeling. For example bottles of anesthesia gases could be promptly identified by a system of coloring all oxygen bottles green, all ethylene bottles violet, all carbon dioxide bottles grey, etc.

To standardize in the fashion I've briefly alluded to, does not mean that all copies of a like item must be manufactured or procured in a single place. Each nation should be free to do its own manufacturing or to procure wherever it chooses. It would merely be necessary for the nations to agree on a set of specifications for any given article and then each would adhere to these specifications in his future manufacture of procurement. Yet the materiel would be readily interchangeable and understood by the doctors, nurses or assistants from any one of the nations, regardless of its origin. In the case of standardization between smaller countries with

limited production capability, it might be wise for one to tool up for manufacturing one item for several nations, another to tool up for a different item and so on.

While we might all readily agree that standardization of a great many of our commonly used medical supplies is highly desirable, we would also have to recognize the fact that considerable periods of time would necessarily elapse before we could achieve an optimum level of standardization, manufacture, distribute, and, very importantly, actual experience through usage of the items, by our respective medically trained people.

To the uninitiated, it would appear quite simple for doctors, regardless of nationality, to quickly agree on prototypes of medical supplies--for sick people are much the same the world over and our doctors are, for the most part, trained to treat the ill and injured with reasonable uniformity. However, we have all learned that where one service within a single nation has been using an item satisfactory to its needs but different in design, configuration and specifications to that of other services, there arises a natural reluctance of one to forego using his as the prototype in favor of the equally good model of a sister service. This requires give and take, compromise, and frequently swallowing of one's service pride in favor of unity, and time. Above all, it takes a clear unprejudiced vision and a sincere desire on the part of the officers concerned to set aside some of their pride, all of their deliberate obstructionism and any unwillingness to compromise for a common good. As this barrier does exist within any single nation, so will it be of similar or even greater magnitude in the deliberations of a comparable group of international medical planners. Therefore, vital as standardization is, before attempting any such program, the delegates to the standardization conference and their superiors back home, must all be dedicated to the belief that this amalgamation will be beneficial and that accomplishment of the mission will be for the good of all regardless of personal or provincial prejudices. They must realize that such a program takes much time to arrive at fruition--and that time to prepare for our common defense may be more limited than most realize.

Now let us assume that such a group of dedicated medical people did get together and arrive at acceptable terms for specifications on many of the commonly used medical materiel. Let us further assume that each country then officially ratified these specifications, one by one. We then may face a serious economic problem in many cases where one or more of the countries holds a sufficient stockpile of certain of their old items as to preclude procurement of new standardized types. Even though we realize the advantages to accrue from each of our nation's early achievement of maximum outfitting and experience with standardized medical materiel, none of us are economically able to scrap large stockpiles of good non-standard materiel merely for the sake of standardization. Nevertheless, this matter of existing stockpiles should not be a deterrent to progress--because eventually the old supplies will need to be replaced and if the machinery for standardization has been set-up, replacement items conforming to standard specifications can be procured. Eventually we will then be stand-

ardized. Of course, we hope any common enemy will not attack at any time or will at least hold off hostile action until after this standardization is accomplished.

I would now like to cite for you just a partial list, as examples, of medical supplies I feel would be highly desirable to have standardized for cross-servicing between allied nations:

Medical Syringes
Medical Syringe Needles
Blood Transfusion Equipment
Patient Evacuation Tags
First Aid Kits
Litters or Stretchers for Use Aboard Ship or in Aircraft
At-Sea High-Line Transfer Gear and Procedures
Medical Gas Cylinders and Valves

And many others which I shan't bore you with at this time.

The important thing for us all to remember is that time-wise it may be later than we think and, therefore, if the need for standardization exists, the sooner we get on with the job, the sooner we will all achieve the ultimate.

Gentlemen, I strongly urge that in any joint naval effort our nations engage in, we, as medical people, lead the way in standardization to permit our respective services to work as one, to provide our forces with the best possible medical support.

Thank you.

Organization of and Provision for Dental Services

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Washington 25, D. C.

The U. S. Naval Dental Corps was established 50 years ago on the 22d of August, 1912. Its primary function is to provide such care as will prevent or remedy disease, disabilities and injuries of the teeth, jaws, and related structures which may directly or indirectly interfere with the performance of military duties.

The distribution of the fleet and shore stations is world wide. Wherever there are naval personnel there is a capability to provide dental care--in the Atlantic, in the Mediterranean, in the Pacific, in the Orient, even in Antarctica.

Let me try to describe the administrative organization that provides our world wide dental care. Within the structure of the Bureau of Medicine and Surgery is the Dental Division, one of the five divisions in the Bureau.

The functions of the Division are: (1) to establish professional standards and policies for dental practice, (2) conduct inspections and surveys for the maintenance of such standards, (3) initiate and recommend action pertaining to complements, appointments, advancement, training, assignment, and transfer of dental personnel and (4) serve as the advisory agency for the Surgeon General on all matters relating directly to dentistry.

The Dental Division is composed of the Chief of the Division who is also the Assistant Chief of the Bureau of Medicine and Surgery (Dentistry); the Inspector General, Dental; the Assistant Chief of the Division; and five branches. The Chief of the Division is responsible for the performance of all the functions of the Dental

Division. He is assisted by the Inspector General, Dental, who plans, coordinates, and conducts dental surveys. He conducts special investigations and maintains liaison with the Naval Inspector General and the Inspector General of other Bureaus. He ranks next to the Assistant Chief of the Bureau of Medicine and Surgery (Dentistry), and Chief, Dental Division, and in the Chief's absence acts with full responsibility and authority for him. The duties of the Assistant Chief of the Dental Division are the projection of the policies of the Chief. In the absence of both the Chief and the Inspector General, he becomes the Acting Chief of the Division. The Professional Branch advises on the establishment of professional standards and policies for dental practice, the development and coordination of training programs for both dental officers and dental enlisted personnel. It also develops dental statistical data for the use of the Dental Division. The Planning and Logistics Branch advises the chief of the Dental Division on matters related to dental finance, materiel, logistics, organization, and planning. The Personnel Branch advises the Chief of the Dental Division on the requirements, qualification, procurement, assignment, and distribution of dental personnel. The Reserve Branch advises the Chief of the Dental Division on planning, coordinating, and directing of those aspects of the Naval Reserve Program which are the responsibility of the Bureau of Medicine and Surgery. The Research Branch acts as the advisory branch on research matters which pertain to Navy dentistry. This Branch also maintains liaison with the Research Division of the Bureau of Medicine and Surgery and with the Office of Naval Research and other offices and agencies that have an interest in naval research. This central control organization transmits its policies and instructions through a professional control organization.

Our organization is divided into three main sections--the fleet, --the shore establishment, --and the Marine Corps. Each section has a representative of the Dental Division to carry out the Bureau policies. Both the Atlantic and Pacific Fleet had a Fleet and Force Dental Officer. Within each naval district is a District Dental Officer. The Headquarters, Marine Corps staff has a Staff Dental Officer. It is through this professional control organization that the Bureau of Medicine and Surgery's policies are filtered to every ship, every hospital, every U. S. Naval Dental Clinic, and every Marine Corps activity.

Projected are figures which illustrate the professional accomplishments of the Corps during the period of one year. Approximately 7,500,000 dental treatments are provided to our patients every year. This is accomplished by the means of 4,500 dental officers and dental technicians of which approximately 1,700 are dentists and the rest enlisted technicians in approximately 350 facilities spread out through the world.

Where is this treatment accomplished? Well, in ships at sea, with Marines in the field, and at small remote areas with trailer units, and within our naval hospitals.

Where do we get our dental officers? Generally, original appointments in the Dental Corps are made in the grade of Lieutenant from men who are graduates of United

States civilian dental schools. Most of these original appointees are between 21 and 32 years of age; however, a limited number of qualified older civilian dentists may be appointed. The grade in which they are appointed is determined by the professional age experience, and specialist background of the individual. Once, commissioned as a dental officer, educational opportunities are afforded at many installations throughout the Navy, as well as at civilian institutions. Symbolic of our training programs is the U. S. Naval Dental School at the National Naval Medical Center.

Every effort is made to utilize the latest teaching methods and equipment. As I mentioned previously, all dental officers come into the Naval Dental Corps as graduates of civilian dental schools.

In order to maintain the finest quality of professional treatment, our dental officers are rotated through various training programs. At the U.S. Naval Dental School, 28 officers per year attend the General Postgraduate Course. This course is designed to broaden the knowledge and increase the clinical proficiency of dental officers of the Regular Navy. Emphasis is placed on basic science, theory, and the practice in clinical dentistry, dental research, naval dental administration, and leadership. The course is 10 months in length. In another program, recent graduates are assigned to a rotating dental internship of 12 months' duration which is conducted at naval hospitals.

Once having completed the General Postgraduate Course officers may be assigned to residencies or specialized courses in the dental specialties either in civilian institution or naval activities approved by the American Dental Association.

Another program is that of extension training or correspondence training. The U. S. Naval Dental Corps has been a leader in the development of officer extension course (correspondence type) programs. The purpose of this program is twofold. First it affords an opportunity for individual study for professional advancement by all officers of the Dental Corps and especially to those at distant or remote stations. Secondly, it serves as an indoctrination into the responsibilities of the administration of a dental facility. Other training is available in civilian schools and in the staff and administrative schools of the Armed Forces.

Our dental assistants are trained within our own service schools. Their training covers the broad range of instruction from those who have recently completed their recruit training to those who are seeking a career as a dental technician. There technicians are taught procedures in assisting the dental officer in patient care, the maintenance of dental records, the accomplishment of emergency dental treatment, and first aid procedures in mass casualty situations.

Once he completes training he is permitted to perform an oral prophylaxis provided a dental officer is present.

After having graduated from the basic course, selected technicians are taught dental prosthetic laboratory procedures in courses which emcompass both basic and advanced study.

As the technician advances in his career, opportunities are provided for advanced instruction in administrative procedures.

Still other dental technicians are given the opportunity for training in a 10 month course in dental repair. Such training provides the Dental Corps with technicians who install, maintain, and repair dental equipment around the world.

Other opportunities are available to our dental officers. For example, in research, the fundamental policy of the Bureau is to encourage and support research and development which is directly related toward the solution of problems affecting the health, safety, selection, efficiency, and combat effectiveness of military personnel. Although there is no fixed apportionment of basic, clinical, or applied research, the staff of Navy Dental Research facilities are particularly well qualified to understand and solve clinical dental research problems affecting Navy personnel.

The first objective of Navy dental research is the development of dental health programs which support specific operational requirements determined by the Chief of Naval Operations. These require studies in such areas as cold weather, submarine, aerospace operations, field operations, bacteriological warfare defense, and the training and care of mass casualties. These problems range anywhere from the cold of Antarctica to the heat of the desert.

This is the story of the U. S. Naval Dental Corps and its first fifty years of progress.

Aviation and Space Medicine

Captain Frank B. Voris, MC, USN
Headquarters, National Aeronautics and Space Administration
Washington 25, D. C.

Admiral Kenney, distinguished delegates: I don't plan to go too much into space medicine itself. I believe it might be well if I tried to orient you to what our national manned space program is about, its objectives, the mission profiles, and perhaps talk a little about the medical support we give the national manned-space program.

I hope that at the end of this discussion I have engendered enough questions in your mind. I know I will leave a great deal unanswered, but I hope that we can engender a question and answer period to the point where we bring out ideas and points that are of vital interest to you, so I am going to depend upon my question and answer period to be a rather important segment of this presentation.

You hear the words Mercury, Apollo, Gemini, all representing certain phases of the national manned space program. Project Mercury is our first venture into space; it uses a ballistic type of vehicle; it was originally planned to make a total of three orbits around the earth with a safe return or water impact landing. We have altered that now to extend through six orbits which we plan to have in the next flight--as you know, we have accomplished the three orbital flights. We have planned to go from the six orbit to the 24-orbit flight. There is very little difference, except in the storage of fuels and oxygen and a few other vital factors in the Mercury program to extend the capsule from a three-orbital capability through a 24-hour capability.

Project Mercury was essentially a project to test engineering design, to test engineering theory, and secondarily to place the man in the capsule to see how he

performs and reacts, to give him the required environment and keep him so that he can perform at his highest proficiency and return safely. As I said before, Project Mercury is well on its way to being phased out. We have been extremely successful so far.

The next move or the next idea that presented itself was to go around the moon. In this we decided to use a rather large single booster system called the Nova system and first orbit the earth with a man in it for a number of days, then throw a probe shot up a hundred thousand miles and bring it back for reentry tests, and finally, to circumnavigate the moon, take pictures of the dark side and return, this being manned flight. Apollo was now going more to the manned emphasis and less to the automatic and engineering system. It was going to test engineering features, but it was truly a test of man's capability and man's ability to withstand the stresses of space travel so that we could extend our frontiers farther and farther beyond the moon into our planetary system.

The President announced about a year and a half ago that our goal would be to place man on the moon within this decade. This was not the original profile of Project Apollo. However, it was tacked on to Apollo, so now the ultimate profile of Project Apollo will be to land men on the moon, have them explore the surface of the moon in rather a limited fashion, and to return to earth. This is its ultimate or final goal.

Looking over our time scale, we saw that the development of large booster systems takes a good deal of time and a good deal of money; we began looking around for a rather more rapid way of doing things; in other words, to bring about the manned lunar landings sooner. National prestige demanded it, and perhaps national economy would require it. We have in the various planning stages and in development the various Saturn family of boosters which are not the tremendous multi-million pound thrust vehicles that the Nova was originally planned to be, but somewhat smaller vehicles. They are at the intermediate stage between the present Atlas and Titan missile and booster systems and the Nova systems. We could come to bear upon putting people into space with the Saturn systems two or three years earlier than with the Nova system, so we conceived of a rendezvous system in which we would place two or three varying vehicles into an earth orbit, rendezvous them in space, dock them, bring them together, and then with this increased capacity, go to the moon and return. This looked very promising, but we also looked around to see if we could not practice the rendezvous system. This requires training; it requires techniques that have never been utilized or even conceived before. So to bring to bear the lunar landing phase earlier, we decided to utilize existing propulsion or booster systems to practice rendezvous systems to prove it out. If we can do it with our earlier systems, fine; then we have the techniques for the Saturn systems. If we cannot do it with the earlier systems, we will bring to bear all our efforts on to our large single booster systems--the direct approach. To this end we have created Project Gemini. Project Gemini is a rendez-

vous system; it is a test and a development of techniques and the training of men in the rendezvous system in which we will place a Gemini capsule which is essentially a Mercury capsule, somewhat larger, with two men in it, on top of a Titan Two missile. Alongside of it on an adjacent pad, we will place an Aegina vehicle which is a thrust vehicle; it is a locomotive; it's a truck, as it were--a space truck. We will place that on top of an Atlas booster. We will fire off the Atlas booster with this truck on top, place it into orbit about a hundred to 150 miles above the earth, and after the first orbital go-around, or within the first orbital go-around, whichever is feasible, we will calculate the orbital characteristics of this piece of equipment, fire off the Titan Two with the two men and the Gemini capsule aboard it, hopefully, within five seconds of the time that we are supposed to do it, place it within 20 miles of the other in essentially an identical orbit. If they are placed within 20 miles of each other, the men within the Gemini capsule themselves can maneuver the two pieces of equipment, the truck and their command modules, together, dock them, and connect them up automatically. They can then change their orbital flight, extend it further out, maneuver their ship any way they want to. They now have a power source. This is not a vehicle to go to the moon. It is a vehicle to practice rendezvous, to train the pieces of equipment--to develop equipment, and to train crews. It will be a flying test bed for the man-lunar landing vehicle--the Apollo vehicle. It will be so constructed in modular forms that each piece of equipment, each sub-system, can at any time be removed from one vehicle and a newly-developed sub-system or system put in its place; a new piece of electronic gear a new piece of a life-support system, a new way of supplying oxygen may be developed. We can take the original piece out, replace the old piece, and we have essentially a better system. These are the concepts of Mercury, Apollo, and Gemini. Gemini is the intermediate step between our first Mercury flights and the ultimate man-lunar landing. Now, man's role is becoming more increasingly important to our manned space projects. Project Mercury was a fully automatic project. We have proven that by using chimpanzees and bringing them back. We do not predicate any more manned space flights on successful animal flights: man will be the animal. The reason for this is that we are reducing the automatic systems to a minimum; we are introducing the man's capability into the systems so that he becomes a part of the machine; the machine becomes more reliable, more accurate, and we hope, much more successful. The redundancy of automaticity along with man has caused Project Mercury headaches. It is difficult to put up a fully automatic piece of equipment, as we learned with Glenn's orbital flight, as well as Carpenter's orbital flights, and even that of Enos, the chimp. We had to cut Enos' flight short to two orbits because the automatic systems began to fail us. If Glenn's system had gone completely automatic, he would have had to be returned to earth on two orbits instead of three. We do not have the capability of extending long orbital flights or long spatial flights without man in it at this time, and we don't foresee it. Man's capacity within our future space vehicles will be that of a jet pilot today. Certain segments of his flight will be programed automatically but a great deal of this flight will be manually, physically, and mentally controlled by the astronaut himself, thereby giving greater capability, greater reliability. Man's ability in space is as it is on the ground: he is the finest machine we can find.

Now, our problems in space are many. We just don't put a man in a capsule as we do sardines in a can and seal him up. We have to supply him with his earth environment. This is the first time that man has been required to carry his full and complete environment with him throughout his entire excursion. Even in your highest jets you are able to scoop air out of the atmosphere outside and compress it and give him his environment. In space, we have literally and absolutely nothing that man can utilize, with the exception, perhaps, of the energies from the sun which we use for power, but to support his life as we know it, we have nothing up there. In submarines we can utilize the water. In jet aircraft, as I say, we can utilize the air and many other things, but in space there is nothing, so we have to give him everything. We have to supply him with oxygen--a good supply of oxygen--and we cannot dump it overboard; we cannot afford to carry that much with us and waste it, so we have to recirculate it; we have to take the carbon dioxide out or remove the moisture; we have to condition it in such a manner that it cools. These capsules are hot inside. His body generates heat, and his equipment generates heat; the sun beating on it creates heat within the capsule. We have to have an environmental system that cools, purifies, dehydrates, and recirculates the air to him. Not only that, we are complicated with the fact that he has to have protection against explosive decompression or rapid decompression, so we put him in a cocoon, completely sheathe him in an air-impervious envelope. He must also then have a tremendous amount of air circulating through this envelope to keep him from stewing in his own perspiration. We have to revitalize the air just as I have described for the environmental system of the capsule itself. So sustaining the man with his life support systems is quite a problem. Now, we use compressed air in bottles at the present time--7,000 pounds per square inch. We give him five pounds pressure to 100 per cent oxygen. We have not fully made up our minds whether we are going to go to seven pounds pressure with half nitrogen and half oxygen or utilize the five pound, 100 per cent oxygen. We do know that under certain conditions, such as acceleration and using 100 per cent oxygen and positional restrictions that we have in the capsules, people are liable to develop an atelectasis. With this in mind, we are doing a great deal of research as to how to prevent atelectasis, how to overcome it if we do get it, and the effects of other gases on the system, using, perhaps, argon, perhaps helium, which create a considerable communications problem, but nevertheless, we are looking into a number of drugs to keep the alveoli open. This is only one of many problems we have with our systems. Incidentally, the Russians use a full 14 pounds with an atmosphere that is slightly enriched with oxygen; in other words, they use an earth atmosphere environment in their capsules. We are concerned with rapid decompression in that we might develop air embolisms if we went to that system. If we had a rapid decompression and our full pressure suits took over to, say, even five pounds per square inch, that is such a rapid decompression that developing air embolism would be a rather serious and perhaps fatal event. We also have to conserve weight, and in doing this, we of course must think of the integrity of our capsule. Lower pressures give us an advantage in using a lighter weight, and the integrity of our capsule is a little bit better, we feel, than using the full force atmosphere of 14 pounds per square inch.

We have the problem of acceleration, so we place the man on his back to reduce the effect of acceleration. I am not going into that; I am sure it is very apparent to all

of you. But we must protect the man from the accelerations for a long period of time so that he will be able to function to override this automatic system when he reenters. We put him in a molded couch so that he takes the impact of the acceleration forces throughout the entire surface of his backside. He suffers very little, if any discomfort. We have an energy-absorbing type of material underneath the couch so that if he has an inadvertent hard landing, either on water or on land--and the mercury capsule is capable of landing on land--the energy above 20 G's is absorbed by the honeycombed type of energy-absorbing material between the couch and the lower deck of the capsule.

Acceleration proves another problem, and I get out on a rather left-handed matter in that periods of weightlessness have caused us some concern. This is not dissipating, but it is becoming reduced by the fact that the Russians now have successfully spent a great deal of time in space in a period of 72 orbits--the total for one man in which he did not, as far as we know, suffer any untold effects from weightlessness.

We were concerned about disorientation and a number of other things, particularly air sickness, or mal-de-mer, that Titov complained about. We have not been able to prove anything like that with Glenn or Carpenter. We put them through extensive head movements and exercises to produce nausea and discomfort and disorientation. They were unable to produce it. We have not had any reports from the Russians, but Titov's experiences have caused us a little concern. However, the concern about weightlessness is: what will be the changes in the body systems over long periods of weightlessness. Periods of two, three four weeks. We still don't know. One of the serious things we are looking at, or one of our worries, is what will the cardiovascular system do in adapting itself to functioning in a ---G field. Will it adapt itself to the point that we can turn around and retrofire or re-enter, during which we are going to have long periods of high acceleration forces? Will it so adapt itself that it cannot re-accommodate itself to these forces and possibly be injurious to the man, keeping him from performing, or perhaps causing death? These are things that can only be proven by space flight unless we find some other way of creating true weightlessness on the ground or within our atmosphere. This is a concern that, as I said, will not be dissipated until we get an orbiting laboratory.

Incidentally, weightlessness is a state in which I think that I might describe to you. Many people don't quite understand why a person only 100 miles up is weightless, yet when we throw probes up 70-200,000 they will turn around and come back. You are not outside the gravitation of pull when you are up 100, 150, 200, or even 500 miles. But the orbital speed into which you are thrown--say at 100 miles up you are going 17,500 miles an hour--the orbital speed tends to throw you away from the earth and gravity will pull you towards the earth. They are equalized so that you are kept at a constant speed and a relatively constant distance over the surface of the earth. If at any time Mother Earth's gravity should cease, you will fly off in a straight tangential line in the direction that you are going. Gravity negates speed and vice versa. Now, to show you how delicate this speed is, this rate of 4-5 miles a

second: with retrofire we slow down our capsules only 350 miles an hour from the total of 17,500, which is a rather small percentage, yet this is enough for gravity to take over and let this capsule start to re-enter; then of course, it will slow up some 1,300 miles an hour within a period of three minutes.

We have problems other than weightlessness; one is food and water. To date this has not been too much of a problem. We have been experimenting with it in flight and, of course, on the ground. But we feel that we are going to have to train our future astronauts on a rather rigid dietary regime. One is that, at the present time, we can pack essentially a picnic lunch--sandwiches, a piece of chicken, and perhaps milk--and this is all he needs. However, we haven't done that. We have put food in tubes; we have developed bite-sized types of food that do not crumble and we try to test the men in their drinking and eating capabilities. They have to drink through a closed system as you can't pour water in a weightless state. If it escaped and became suddenly moved about, it would completely cover the interior of the capsule in droplets. So we have to handle food with care. This is not going to be too much of a problem. In our future space vehicles we even hope to use food and water as radiation protection by placing it within certain areas within the capsule so that it will protect our people from bombardment of heavy nuclei and other penetrating radiation hazards. Food will be developed to simulate food on earth. We don't think that we can put men into space with food that is too unlike what they are used to eating on earth.

The same is true of resting in a weightless condition. We feel that we are going to have to strap the man down if he is going to lie down to rest. Of course, there is no "down," but he will want to stretch out. So by getting up on his Apollo seat, he will move into another compartment or another section and want to stretch out, and we will have to strap him down, first, to keep him from floating away, and second, to give him a sense of support, a sense that he is resting because he's used to climbing in bed and feeling that bed and feeling his body being supported by that bed; psychologists tell us that we may not get the proper rest if we don't have that same sensation and feel. Therefore, we are devising means that contain the man on a flat surface so that he feels as though he is terrestrially bound in his bed.

Now, our food problem is not going to be too much of a trouble. It requires care and requires a lot of caution in the way the man eats. He can't bolt his food; he must be careful how he handles it. He cannot drink excessively. We have found that in certain short periods of weightlessness there is a great deal of regurgitation, if there is even a sudden roughness or a sudden small bump against the upper gastrium or the abdomen. If he is full of fluid, he is apt to regurgitate it. He could well aspirate it if his helmet is down or if he is in a position in which he can get the vomitus away from his face. It won't go away unless it is propelled away.

The thing that gives us concern, and this is rather delicate, is the collection and the storage and the treatment and management of the wastes. This is no easy problem. Take a man completely sealed in a full-pressure suit; he is in a weightless state; he is in a couch that if form fitting; he is in cramped quarters, particularly with project

Gemini--and you figure out a way to collect his fecal material. Now we pipe away his urine, but he has an uncomfortable sheath over his penis; he has problems. These are problems that take a lot in ingenuity, and a lot of thinking, and a lot of delicate manouvering to support the man.

The last, and by no means the least, hazard I want to bring up is the hazard of radiation. I bring this up last because this is going to be our least hazard. We essentially don't have any radiation hazard in Project Mercury. Although this next flight is supposed to be up where the disturbed Van Allen Belts may give him a little radiation exposure, we don't anticipate that this will cause any trouble. Project Gemini is not supposed to reach the lower limits of the geo-magnetic radiation hazard fields, so we must look toward Apollo. Our flight plan for Apollo is to go straight through the Van Allen Belts, so there is very little problem of radiation. Once beyond the radiation belts, however, we are going to be sitting ducks for any major solar flares and the heavy nuclei from the galactic sources or from the stellar sources. We must protect him passively, and in doing that we utilize everything we can. We will take his waste material and put it up in front of him to prevent these heavy nuclei and the solar flare radiation hazards from reaching him.

For future interplanetary travel we are looking toward our electromagnetic production, such as the earth has from its geo-magnetic fields. The radiation particles are trapped in the geo-magnetic fields and form the Van Allen Belts. We hope to be able to create a bipolar electromagnetic field about the capsule so that it is a little earth in itself. It has its little Van Allen Belt surrounding it. We either trap or divert the radiation particles and thus protect the man.

We have further problems, however, when we put the man on the moon. When we have taken him out of the capsule, he must have his entire life-support system with him. He will not be attached by an umbilical cord to the vehicle. He will carry his oxygen that will purify itself, that will dehumidify itself, that will improve itself. He must have radiation protection, because radiation is rather high there and although he can stand a certain amount of it with protection, we are developing and building in radiation protection in his extra-vehicular suit. He must have protection against micrometeorites. The heat of impact from a small micrometeorite may well set off a flash fire within his suit of 100 per cent oxygen that can burn him completely. He must be able to handle the rough terrain, possibly the dusty or the rocky terrain that he is going to be on, dry without any atmosphere. He must be able to withstand extreme temperatures--both hot and cold--which are on the surface of the moon. We must select a landing that is in the proper spot. He must be able to maintain his balance. With a sixth gravity he will theoretically be able to carry six times as much as he does, but there is a question of balance, of being able to cope with a sixth of gravity, not being used to it. Then on his excursions around the moon he must establish a small base there and prepare his vehicle for return to earth. So these are going to be busy people.

Now our original Apollo concept, up until recently, was that we would go to the moon and circle the moon and then land our entire module. Two men would get

out and explore the moon; one man would get back in, fire off, and get back home at 25,000 miles an hour. We have now changed this concept to what we call the lunar excursion vehicle, in which we now hope to use a single advanced Saturn booster; put into a lunar orbit a command module with what we call a bug or the lunar excursion vehicle on the side. While in a lunar orbit, two men would then transfer themselves from the command module into the lunar excursion vehicle. The lunar excursion vehicle would go to the surface of the moon. One man would get out and explore, get back in, and fire off, and rendezvous with the command module that is still orbiting the moon; then the three men would return to the earth. That is essentially our man-in-space program to date and a few, very roughly, of the problems that we are trying to handle.

We are doing a tremendous amount of work in advanced systems to support men in space over long periods of time, such as fully closed ecological systems in which we don't lose an atom--not a molecule. We utilize his waste materials; we take the carbon dioxide and create oxygen and carbon; we synthesize the carbon with the hydrogen that we get back from the water in making oxygen; we use the fuel cells of hydrogen and oxygen that create the water. These fuel cells will run the auxiliary pieces of equipment within the capsule. We then synthesize the methane CH_4 into formaldehyde, into edible sugars. We will grow our own foods; we will have to later on. We will synthesize our foods photosynthetically and chemically.

Now, I would like to review hastily what we do in Project Mercury. This involves a large segment of the medical population of the armed forces. We go to the armed forces because they are readily available and can be ordered anywhere at any time. We have on our recovery forces alone and our tracking forces 68 doctors, 28 hospital corpsmen, and five or six nurses. They are formed into teams; they are aboard ships; they are at three local hospitals in the various strategic positions throughout the world that are capable of doing definitive surgery, if need be, for the astronaut. We have two doctors with each of the 17 tracking stations throughout the world to check on the man's physiological and psychological responses and to judge whether he should go on passing back information to Mercury control center. We have a team of about 10 or 12 of the best specialists within the services standing by at Patrick Air Force Base, and the minute the man is off and they see he is going to make a third orbit, they sit and wait; they are prepared. The plane is fully equipped and prepared to go to any one of these hospitals that we have spotted out to the man himself, if needed. Fortunately, we have not needed them. This is just a portion of the amount of support that we give the NASA through the military. It is a tremendous amount of effort. These people go out and wait and wait and wait. They have spent weeks in training, come back to their station, are ordered out again, come back; it is quite a sacrifice to the services to support NASA in the manned-space flight program.

Long Term Blood Preservation

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INTRODUCTION

The long term preservation of living tissues is now a reality. Suspended in a state of ametabolism at low temperatures, blood, bone marrow, sperm, and certain homogenous glandular tissues, have been successfully maintained in "cold storage" for varying lengths of time. In the case of blood, the storage time has been extended to five years.

The military need for blood is an obvious one and the creation of the capability for stockpiling of blood for major catastrophes when communications and donor panels are disrupted is of increasing importance. The time limit of 21 days on A.C.D. blood in times of combat has resulted, in the past, in severe logistic and transportation problems with much wastage. The present popular guerilla warfare has magnified these problems particularly in areas where civilian donors are unavailable or infected with malaria. Rarely, in guerilla warfare, can the commander predict when his troops will be committed. He needs a method of blood preservation that is adaptable to storage in a forward area for on call usage.

DISCUSSION AND METHOD

Research in long term blood preservation has followed three basic lines in an endeavor to avoid damaging ice crystal formation in the carrying of tissues to low ametabolic temperatures. Dehydration of the cells as advocated by Merryman, rapid

freezing being attempted by the Linde Oxygen Company and the fractionation glycerolization method. All three directions of research have been supported by the Office of Naval Research and the Bureau of Medicine and Surgery.

The method of long-term blood preservation used at the U. S. Naval Hospital, Chelsea, Massachusetts, employs the Cohn fractionator, a specialized centrifuge which separates the erythrocytes from plasma and from other cellular elements. At the same time this fractionator allows for the replacing of the intracellular water with a 50% glycerol solution. The erythrocytes, protected against the damaging effects of freezing by the glycerol, are bagged in a plastic envelope, and frozen to a -80°C for storage in an ametabolic state. The frozen blood can be stored either in mechanical refrigerators as we do in our blood bank, or packed in dry ice for temporary storage or transportation. When blood is needed, days or years later, the frozen units are thawed in a 37° water bath; the glycerol is removed again by using the Cohn fractionator, and washing with decreasing concentrations of glycerol.

The deglycerolized erythrocytes are resuspended either in their own plasma, which was frozen as a separate unit after the original separation, or in a 5% serum albumin menstruum. Blood so reconstituted may then be safely kept in the standard blood bank refrigerator at 4°C for at least twenty-one days. The process of glycerolization, freezing and deglycerolization does not alter the grouping, typing or cross-matching reactions. Routine methods are employed; all units are grouped and typed before and after freezing.

The details of this glycerolization and deglycerolization process have been previously reported by Haynes et al. It should be re-emphasized that the entire process is in a closed system, where sterility is rigidly maintained. This has been substantiated by over ten thousand cultures of bloods so processed, without a single incidence of contamination which could not be explained by a break in technique which was obvious to the operator at the time.

The use of disposable plastic bags and tubing exclusively has greatly facilitated the closed and sterile handling of the blood while decreasing the space required for frozen storage.

BIOCHEMICAL AND SURVIVAL STUDIES

In vitro biochemical studies on processed red cells support clinical conclusions that the cells maintain the functional and metabolic characteristics of freshly collected blood.

SLIDE I

Survival

Blood Category	Average 24 Hour Survival	Average Half-Life
A.C.D. (Fresh and Bank Blood).....	91.3%	29.9 Days
Deglycerolized Blood.....	92.6%	30.9 Days
Deglycerolized Blood Stored at 4 Degrees Centigrade for 12 Days.....	77.8%	24.3 Days
Deglycerolized Blood After Repeated..... Thawing and Freezing.....	85.0%	16.5 Days

In vivo survival studies were performed using radioactive chromium CR_{51} tagged erythrocytes of 200 units glycerolized and frozen from one to forty-four months, aliquots of which were infused into health "volunteer" recipients. The survival of tagged erythrocytes was measured at one to four day intervals for the next two months. The results obtained are compared to fresh A.C.D. blood run concomitantly as a control study.

Slide I illustrates the twenty-four hour survival and half-life times are comparable to, or even a little better than that for A.C.D. preserved blood. Other chromium studies indicate that an average of 82% of the original cells taken from the donor actually reach the vein of the recipient. Most of the 18% loss of red cells is due to mechanical factors during the processing rather than hemolytic loss, and it appears to be independent of the storage time factors. This loss, we feel, will be substantially reduced by current design modifications of the mechanical equipment.

It is to be noted that there is no critical temperature in this method of blood preservation. The minus 80°C was selected because it happens to be the approximate temperature of dry ice and alcohol. Actually most metabolism of the erythrocytes stops at below minus 40°C, and it takes eight hours for the blood mass to reach the ambient temperature. Further, we have found that thawing of the glycerolized units for one day and then refreezing them, even when repeated several times, results in a satisfactory yield. A temporary power failure does not harm the bloods in storage.

These studies would indicate that red cells glycerolized, frozen and deglycerolized, function in the recipeint's circulation as normal viable erythrocytes.

CLINICAL OBSERVATIONS

We would like to stress that all of these studies reported today are on blood stored by the fractionation glycerolization method. Data is not as yet available on blood

stored by the fractionation glycerolization method. Data is not as yet available on blood frozen by other means.

The Blood Research Laboratory at the U. S. Naval Hospital, Chelsea, Massachusetts, has become an integral part of the Blood Bank of the hospital. As of 1 July 1962, a total of over 3,000 bloods had been given to over 1000 patients. Of this number 85% of these transfusions have been to patients with acute blood loss from hemorrhage or as replacement therapy at surgery. During the past two years, the Frozen Blood Bank has supplied 50% of the bloods needed by the hospital. Had this been run on a full clinical level without a concomitant research project, the two Cohn fractionators could easily have supplied the full needs of the hospital of approximately 2,000 units a year.

Although the red cells may be resuspended in their original A.C.D. or heparin plasma which has been frozen with them in separate bags in tandem, three-fourths of the transfusions at the hospital have been electively administered with the red cells resuspended to volume in a 5% serum albumin medium. This medium contains, in addition, sodium chloride, potassium phosphate and glucose.

SLIDE 2

Resuspension Medium*

	Final Concentration
Albumin	5%
Sodium Chloride	0.12 M
Dextrose	0.4%
Potassium Phosphate, monobasic	0.0025 M

*For packed red cells use 60 ml. per unit of red blood cells. For whole blood replacement use 250 ml. per unit of red blood cells.

Detailed osmotic evaluation and observations on patients have shown that this media functions most satisfactorily as a volume expander and is an ideal vehicle for the red cells. They may be stored in it at 4°C for 14-21 days.

The advantages of this blood over standard bank blood are many. It contains no preservatives. Because the cells are thoroughly washed in processing, metabolic residue and the cellular debris of the buffy coat have been removed, and as a result, urticarial and pyrogenic reactions are not seen. Individuals who have become sensitized to A.C.D.

blood through multiple transfusions are able to take the red cells resuspended in the serum albumin without any reactions whatsoever.

Slides 3 and 4 demonstrate a typical observation. As can be seen from the temperature curves, this patient had repeated high temperature elevations with each transfusion of A.C.D. blood. When he received frozen blood resuspended in the serum albumin menstruum, there was no febrile reaction whatsoever.

Because these reactions do not occur, we have been able to speed up the time of transfusion, and there is seldom any reason for a transfusion to take longer than ten minutes.

The simple buffer system allows for easy regulation of the pH, and has very little effect on the recipient's pH. The basic menstruum allows itself to be tailored to suit the patient's specific needs. Fibrinogen and thrombin and other blood fractions may be added as needed. The electrolyte pattern may be altered to the individual requirements. As an example, by eliminating potassium from the resuspension media, we are able to produce a unit of blood with a serum potassium level of less than 1 milli-equivalent per liter which is ideally suited for exchange transfusions in infants, for massive transfusions, and particularly for transfusing uremic patients in renal shutdown, with massive transfusions without fear of cardiac arrest.

This low potassium blood, however, must be used within 24 hours whereas normally the red cells resuspended in serum albumin may be kept at 4°C under normal blood banking conditions for at least fourteen to twenty-one days.

With these characteristics, deglycerolized red cells in the serum albumin menstruum suggested itself as an ideal prime for the extra-corporeal pump. To date this blood has been used four times, with complete satisfaction, in our pump oxygenator which employs a Kay-Cross disc oxygenator and non-occlusive DeBakey pumps. The glycerolized cells in heparinized plasma have been used as a prime in six cases, and these studies are being pursued with increased interest at this time. Using frozen blood for open heart surgery now allows us to perform the operation at the time best suited for the patient, rather than basing the time upon the availability of walking blood donors. One adult patient stockpiled his own pump prime.

Frozen red cells resuspended in 5% albumin solution have been used in over 650 surgical and traumatic cases, all of which were carefully observed both in the Operating Room and on the Intensive Care Unit. The majority of these patients received less than four 500-cc. units. However, in all cases it functioned in sustained volume replacement and gas transport equally as well as would have fresh whole blood or frozen cells in frozen plasma.

Because this blood is completely devoid of the fibrinogen, platelets, white blood cells and other clotting elements contained in whole blood, we were concerned as to

what might happen in individuals requiring massive replacement.

SLIDE 5

Massive Replacement with Red Cells in Serum Albumin

Number 500-cc. Units Given	Surgical Cases	Medical Cases	TOTAL
5	8	1	9
6	10	0	10
7	4	0	4
8	2	1	3
10	2	1	3
11	1	0	1
			30

This tabulates the cases in the last year in whom massive replacement was necessary. It does not include the four cases with extracorporeal circulation or 22 exchange transfusions for erythroblastosis and purpura in which red cells in serum albumin solution were used. In several of the 30 cases we were able to study the coagulation profile and the hemogram, both pre- and post-infusion, in detail. These data reveal that in spite of what amounted to ar 80% exchange transfusion in some instances, the platelet and white cell count actually rose to exceed the pre-infusion level, and a drop in bleeding time occurred. In no case was there evidence of bleeding tendency or tissue oozing, either during the operative procedure or during the post-operative period. This has been most graphically seen in the thoracic cases; these cases have been characterized by a minimal amount of blood drainage from their chest tubes. To date, the bleeding problems commonly encountered when A.C.D. blood is used for massive transfusions have not been observed in our cases.

The observation that there is a rise in white blood cells and in platelets when the red cells and serum albumin are used instead of whole blood has been used clinically in the treatment of idiopathic thrombocytopenic purpura and in leukopenia by deliberate exchange transfusions with therapeutic response.

The preservation of whole blood is now a reality, and has functioned for the past three years at a full clinical level at the U. S. Naval Hospital, Chelsea, Massachusetts. At the present time at this hospital, we have a stockpile of 600 units of blood which is soon to be expanded to 1,000 units. This stockpile is adequate enough to take care of a minor catastrophe in the Boston area, and demonstrates the feasibility of stockpiling of blood for mass casualties. The 600 units of blood, in reality, constitute 600 donors waiting patiently to provide blood at any hour of the day or

night, year in and year out.

The stockpiling of rare types at Chelsea is now routine, and we are storing at least ten units of each of the very rare types of blood which are being flown into us from donors all over the United States. This blood is available to anyone in the world who needs it, without charge, providing this need is first cleared through the American Association of Blood Banks.

The real advantage of this process, however, is that it allows a Blood Bank to be what the name implies, a place where the patient will store his own blood for future use or elective surgery. At the present time at our hospital, when a patient is scheduled for an elective procedure, he or she puts down a unit of blood on the initial visit, and then one 500-cc unit every three weeks on subsequent visits until the required pre-operative stockpile is attained. The surgery is scheduled 30 days from that date.

The apparent safety of autotransfusion and the potential benefits of receiving one's own blood stored during a period of health, and being returned during a period of illness are evident; with autotransfusions it would appear that the single transfusion would be advantageous.

BIOMECHANICAL CHANGES

Although this laboratory method is now working at a full clinical level at the U. S. Naval Hospital, Chelsea, Massachusetts; before it is available for general use a simple, semi-automated and economical fractionator must be developed. At present we are testing the first design and are pleased and confident after the initial runs.

Slide 6 shows the Cohn fractionator now in use and its use requires some technical training.

Slide 7 illustrates the storage room for 1000 units of frozen blood.

Slide 8 shows the automated conversion of the Cohn Fractionator being developed by Arthur D. Little Co. of Cambridge, Massachusetts. The entire process of glycerolization and deglycerolization will be done by automation using a disposable plastic kit. Slide 9 illustrates the hope that one bag will be used for the entire process from donor to recipient.

CONCLUSION

The preservation of whole blood is now a reality, and has functioned for the past two years at a full clinical level at the U. S. Naval Hospital, Chelsea, Massachusetts.

The red cell resuspension in a serum albumin medium in preference to plasma has been shown to be adequate for blood volume replacement even in massive transfusion, and many new advantages are becoming evident.

Engineering changes now in progress will make the storage of blood practical and economical.

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Organization and Function of the Naval Medical Research Institute

Captain J. R. Seal, MC, USN
Commanding Officer
Naval Medical Research Institute
Bethesda 14, Maryland

Good morning. This afternoon you will visit the Naval Medical Research Institute. I will be extremely brief and attempt to introduce you to only the Institute and give you a little background information which you should have before your visit. It will not be possible in your short time to take you through the entire Institute. We did want you to know that there would be far more than you will see. The Institute is the largest and oldest of the twelve medical institutes or laboratories supported by the Bureau of Medicine and Surgery. It combines both military and civilian scientists, and its essential mission and functions are shown in this slide.

In this slide, if you will direct your attention to the scientific department, you will see that the Scientific Division is organized into 13 major areas: Aviation Medicine, of which you will see only the low-pressure chambers this afternoon, where there is some work going on in terms of anoxia and acid base balance. Bioenergetics Division, we will have to pass up; Biophysics Division, where vibration studies are being carried on, we will have to pass up. There are several Chemistry Divisions which we shall see. You will pass by the Clinical Investigation Division this afternoon--see some studies in lipid metabolism and muscle, strictly under conditions of starvation.

You will also see a heart-lung machine which was developed by the experimental surgery group in collaboration with the Naval Research Laboratory. The Dental Division will have two exhibits available to you, one on dental problems in people

who are removed from normal naval dental care and another one on the use of demineralized bone and reconstructive surgery. We will not be able to show you anything in the Microbiology and Para-pathology Division. I would like to say that tomorrow we will see somebody in the Para-Pathology Division and probably begin some laboratory studies on a drug which may afford up to seven months protection against malaria with a single injection.

The Stress Physiology Division provides the next speaker. Captain David Minard will talk to you on "Prevention of Heat Casualties in Military Personnel," and you will also visit his laboratories this afternoon. The one additional laboratory you will visit this afternoon is the recompression chamber and a diving tank where there are some studies going on in emersion diuresis, the exchange of water through the skin. This is in connection with survival at sea. May I introduce Captain David Minard, who is the Head of the Stress Physiology Division, to talk about the prevention of heat casualties.

Heat Stress in Military Training

Captain D. Minard, MC, USN
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Extremes of temperature are among stresses of the physical environment which may impair health and efficiency of men in training or in combat operations. The problem of heat stress differs in its solution from that of other physical stresses because its control in natural environments, such as are encountered in jungle and desert warfare, depends largely on acquired heat tolerance which is better known as heat acclimatization. This is a true physiological adaptation, acquired through continuous or intermittent exposure to heat, resulting in progressive improvement in the capacity of men to work in the heat as a result of more effective heat transfer from the body core to the environment.

Heat stress is a combination of environmental heat load and rates of metabolic heat production which result in a strain on physiological mechanisms of thermo-regulation.

The total heat load which must be dissipated if the body is to remain in heat balance is thus composed of two major components; the first is the environmental heat load, an environmental heat load is said to occur if the combination of high temperature, high humidity, the presence of radiant heat, and lack of wind interfere with heat dissipation from the body by radiation and convection at high levels of air temperature and radiant heat, the body may actually be heated by convection or radiation.

The second major component of heat stress is the metabolic heat load: Under resting conditions the average man produces about 100 KCal/hr. This may increase as much as 10 times for short, energetic, bursts of work. For steady work, as in

marching, heat is increased from 3 to 4 times over the resting rate.

The maximum heat load which a man can tolerate is dependent on the duration of the exposure. There is thus an inverse relationship between intensity of heat stress and tolerance time. This is of utmost importance in evaluating effects of heat stress, either in training operations or in combat.

Slide 1 represents various levels of environmental heat stress encountered in natural environments, in hot industries, and in military operations. These levels of heat stress are depicted on a conventional psychometric chart. This psychometric chart represents air temperature along the horizontal axis. Wet bulb temperature (which is a function of dry bulb temperature and humidity) is represented along diagonal ordinates. As one proceeds upward along the line of constant dry bulb temperature, the relative humidity increases from 0 to 100%. As one proceeds horizontally across the chart, the dry bulb temperature increases, but the water content of the atmosphere remains constant while the relative humidity decreases. Various humid climates of the earth are in this region of the chart. Hot dry climates are in this region.

Heavy lines, which are somewhat greater in slope than the wet bulb lines represent lines of equal effective temperature. According to proponents of this index of heat stress, all points of air temperature and humidity along a given line of effective temperature are said to have the same sensory effect, either thermal comfort or of thermal discomfort. It is also said that combinations of temperature and humidity, with wind of constant velocity, which have the same effective temperature impose the same degree of physiological strain. There is disagreement on this point but it is convenient to use lines of effective temperature on a psychometric chart to illustrate levels of heat stress which are important in military training.

Three zones of heat stress are marked out. Below ET 78 is the zone of thermal comfort in which heat balance in resting men is maintained by vasomotor regulation alone. Above ET 78 is the zone of evaporative regulation. As one proceeds to higher levels, increasing quantities of sweat must be secreted and evaporated to maintain thermal balance. This is the zone of evaporative cooling. It is also known as the zone of compensated heat stress. ET 85 represents the upper desirable limit for vigorous exercise in unacclimatized recruits. ET 88 represents the upper desirable limit for vigorous exercise in recruits in later weeks of training. In a recent test of shelter habitability a group of 100 men lived under resting conditions at levels of heat stress between 85 and 90 for a week before telling signs of stress began to appear. ET 92 represents an upper desirable limit for men performing light work for 4 hours. Conditions between ET 88 and ET 92 are regarded as normal in engine rooms of ships. Tolerance time becomes progressively less as one proceeds upward and to the right in this chart. At ET 100 tolerance time is less than one hour in men standing or sedentary. The extreme upper limit which we have studied is ET 100 which we observed in the engine room of a cruiser of the United States fleet during a period when the ventilation was shut down. Under these conditions men standing or doing light work can remain only about 20 or 25 minutes before signs of impending collapse are observed.

Thus heat stress levels encountered in military training and combat operations may range all the way from levels at which resting men may remain for a week before deleterious effects appear to those in which incipient collapse is evident in less than half an hour.

Thus in attempting to predict whether heat stress will interfere with personnel effectiveness in a military operation, the medical officer must attempt to answer four crucial questions:

First, how much heat stress exists? Recall that the intensity of heat stress depends on the sum of the environmental heat load and the rate of metabolic heat production.

Second, how long will the exposure last? The tolerance time is inversely related to the intensity.

Third, who is being exposed? There is a wide individual variation in heat tolerance. Individual factors which improve heat tolerance are: First and foremost, acclimatization, this can be acquired only through repeated exposures to heat during the immediate past. Significant levels of acclimatization can be acquired in as short a time as one week. Next, physical fitness which is second perhaps to heat acclimatization as a major individual factor which provides heat tolerance. Third, Body Habitus; the ratio of body surface to weight is an important factor. The stocky mesomorph or rotund endomorph is usually less tolerant to heat than the ectamorph or asthenic type who enjoys the advantage of a large surface area in relation to his body weight.

Water and salt balance. Losses of water and salt in the sweat must be replaced. We feel that the dogma of water discipline should be applied only in case water shortage dictates the need for water rationing. Inadequate replacement of water leads to failure of body temperature regulation and increases the incidence of heat casualties.

Clothing should be appropriate to the climate. Present combat uniforms are generally not suitable for operations in hot climates. Protective clothing and body armor greatly increase heat stress in hot climates.

Skin Hygiene. Extensive heat rash or sunburn leads to injury of the sweat glands. A reduction in the number of normally functioning sweat glands impairs the all-important function of body cooling by evaporation of sweat and may lead to one form of heat exhaustion.

Thus we have asked how much heat stress? How long the exposure? Who is being exposed? and now we come to a final question. What is his task? It is obvious that heat stress whose duration is long enough to incapacitate a susceptible individual reduces his performance to zero. It is not so obvious that lesser degrees of heat stress

or heat stress of the same intensity but of shorter duration may seriously interfere for some time with the efficiency of a man performing his task before he is actually incapacitated. By the same token a level of heat stress which acts long enough to cause heat incapacitation in a few susceptible individuals may seriously interfere with efficient performance of less susceptible individuals in the unit.

Present techniques of warfare depend less on brute manpower and more on a few individuals who are skilled in operating complex weapon systems, communications and vehicles. It is important to know that the performance of skilled tasks such as those requiring mental alertness and vigilance deteriorates at lower levels of heat stress than tasks requiring less training.

Thus the major cost of heat stress is measured not so much in the reduction in strength which results from heat casualties but rather through lowering of the combat effectiveness of the unit as a whole.

Incidence of heat casualties in the Navy and Marine Corps:

Although various types of heat illness are recognized as preventable disorders, cases continue to occur in the United States Navy and Marine Corps units both in the continental shore stations, overseas, and afloat. The seasonal incidence of such casualties is shown in the next slide. It is noteworthy that the peak incidence occurs in June approximately a month before the peak in summer heat which occurs in late July. This clearly indicates the importance of acclimatization. Susceptibility is higher early in the season before maximum physiological acclimatization has been reached.

The distribution of cases between Navy and Marine Corps personnel is seen in Slide 4. The maximum incidence of heat illness occurs in Marine Corps elements. The higher incidence in overseas units in the Marine Corps is a result of casualties which occur in unseasoned units stationed in cool climates such as Okinawa, while conducting combat exercises in hot climates of the Philippine area in March and April. A realtively low incidence occurs in Marine Corps recruits. This is because of control measures which have been effective in reducing heat casualties in recruits introduced in 1956.

The classification of heat illness used by the Armed Services of the U.S. includes the following categories:

Heat Stroke represents less than about 10% of all casualties. Although of low incidence, heat stroke is a serious problem because it carries a high mortality. By providing early diagnosis and prompt treatment, the medical staff at The Marine Corps Recruit Depot, Parris Island, South Carolina, has reduced the mortality rate

for heat stroke to zero, despite occurrence of more than 20 cases in the past 6 years.

Heat exhaustion constitutes over 85% of heat casualties occurring in training and other operations. The mortality rate is essentially zero, but the high incidence presents an important medical problem in diagnosis and treatment. The majority of cases occur in unacclimatized trainees during the first three weeks of training. Dehydration and salt deficiency are important etiologic factors.

Heat Cramps results from pure salt deficiency. It is low in incidence and can be prevented by adequate replacement of salt lost in sweat. Unacclimatized trainees require more salt than those later in training. The most satisfactory procedure is to supplement salt used on food at mealtime. Taking of impregnated salt tablets is one method for supplementing salt intake.

Heat rash: Unremitting exposure to heat, when combined with inadequate facilities for personal hygiene, results in the skin being continually wet with sweat, and this leads to heat rash. Although the majority of such cases are treated as outpatients, the high incidence of this disorder increases sick call attendance. By interfering with sleep, heat rash seriously affects efficiency of the unit. Resulting injury to sweat glands may lead to more serious heat illness.

Prevention of heat Casualties

Recruit training

In the year from 1950 to 1953, the incidence of heat casualties in Marine Corps recruits in summer training at MCRD, Parris Island, S.C., was higher than in any other category in the Navy or Marine Corps. Thus, in 1952 there were 400 cases of heat illness, which constituted 2/3ds of all cases reported in that year. Between 1950 and 1953 there were five deaths from heat stroke.

In 1956 a preventive program was introduced at the Marine Corps Recruit Depot, Parris Island, based on a new index of environmental heat stress. This index was designed to integrate air temperatures, humidity, wind movement and radiation into a single value. Three instruments are used: a shaded dry bulb thermometer, a wet bulb thermometer and a black globe thermometer. Readings are weighted and the weighted values are added to give the index, which has come to be known as the Wet-Bulb Globe Temperature Index. At Index levels of 85 and above strenuous training is curtailed in unseasoned recruits during the first 3 weeks of training. Between the third week and the tenth week recruits continue routine training until the Index reaches 88. In the last three weeks of training, recruits are now permitted to drill and perform routine physical training until the Index reaches 90.

Other key elements in the preventive program are:

(1) Period of graduated physical exertion during the first week.

(2) Emphasis on high levels of physical fitness.

(3) Adequate intake of salt and water.

(4) Special training platoons for obese recruits and others substandard in physical fitness.

(5) Indoctrination of recruits and instructors in the essentials of hot weather hygiene.

(6) Effective support from the Training Command.

As a result of these measures there has been a striking reduction in the incidence of heat casualties in recruits at Parris Island during the five year period since the program was introduced. In the years 1952-53 the average weekly incidence per 10,000 recruits during summer was 39. In the five year period from 1956-60 the rate has remained at 4.3, approximately 1/10th the previous level.

Combat training:

The modern concept of limited war visualizes the rapid transportation of highly trained combat units from their home base to trouble spots anywhere on the globe. The capability of transporting large groups of men, in a matter of hours, from a cool climate in temperate latitudes to hot deserts or jungles in equatorial zones poses the problem of exposing unacclimatized, albeit highly trained and physically fit units, to levels of heat stress to which they are unaccustomed. Events from the recent past underline the serious impact which such a sudden exposure to heat stress may impose on fighting efficiency. In July 1958, three Marine batallions were landed in Lebanon. Effects of heat stress were widespread in these units. Fortunately, there was no hostile action ashore otherwise the added heat load imposed by combat activity would doubtless have increased the incidence of heat casualties.

It has recently been reported in the 23 July issue of the London Times that during the British operation in Kuwait in July 1962 units from Kenya, Aden, and the United Kingdom were landed in Kuwait to oppose moves by Iraq to occupy this Kuwait. This article confirms rumors that significant numbers of unacclimatized British troops from the U.K. were incapacitated by heat. It is stated in this article that 10% of the units from U.K. became heat casualties. By contrast the incidence of heat casualties in units from Aden and Kenya were negligible. The article further states that the medical officer who had studied heat stress experimentally in unacclimatized units in Aden, estimated that if units from cool climates had been required to engage immediately in combat, that at least 50% of unacclimatized combat personnel would have been incapacitated by heat. Food, uniforms unsuitable for hot climates, and the imposition of water discipline by misguided line officers were additional factors which contributed to deleterious effects of the heat in Kuwait.

Studies conducted by the Navy and Army in 1959 demonstrated clearly that the rapid transfer of unacclimatized paratroopers from a cool climate to a tropical combat area results in dehydration, salt deficiency, and serious impairment of combat effectiveness. Acclimatized troops who had been in the area for several months showed no evidence of physiological strain or performance decrement.

(1) In conclusion: Heat casualties in recruits can be reduced by preventive measures based on reducing metabolic heat production during periods of intense environmental heat.

(2) Sudden transfer of unacclimatized combat units from cool to hot climates may seriously impair combat effectiveness and thus jeopardize the success of the military mission.

Current Problems in Naval Preventive Medicine

Commander J. W. Millar, MC, USN
Director, Preventive Medicine Division
Bureau of Medicine and Surgery
Washington 25, D. C.

The preventive medicine program of the Navy is administered by the Preventive Medicine Division of the Bureau of Medicine and Surgery. The Division develops and administers programs for the prevention and control of communicable diseases and for the maintenance, protection, and improvement of the health of naval personnel; coordinates and evaluates research projects pertaining to preventive medicine; and collects and evaluates epidemiological and medical intelligence information. The Division consists of sections concerned with communicable diseases, environmental sanitation, disease vector control, and tropical medicine. Policies, regulations, and informational material are prepared and distributed by the Division. Liaison is maintained with the other military services, and with other governmental and international agencies concerned with problems affecting health.

The responsibility for carrying out the preventive medicine program lies with the commanding officers of the various ships and stations through the medical departments of these activities under the supervision of the naval district, fleet, or area commander. Specialized services in epidemiology, entomology, microbiology, industrial hygiene, and health education are available to activities both ashore and afloat from Naval Preventive Medicine Units located on the east and west coasts of the United States; Naples, Italy; and Pearl Harbor, Hawaii. These laboratories provide assistance, advice, and training in preventive medicine procedures and methods beyond the capabilities of the activities requesting their services.

Communicable diseases still present significant problems to military populations despite their decline as major health problems in many countries. Among these diseases the acute respiratory diseases, enteric infections, tuberculosis, venereal disease, and malaria are real or potential hazards to military operations.

The incidence rate of acute respiratory diseases, which include influenza, streptococcal diseases, and pneumonia, in military recruits is approximately ten times greater than that of the general military population. These diseases interfere with the recruit training program. Some of these diseases can be prevented or controlled by immunization or prophylactic antibiotics, but for many the etiology is unknown and no practical preventive measures are available.

Tuberculosis is still a health hazard in the United States Navy even though the annual incidence is relatively low. Outbreaks of disease and infection occur in groups of men living in close contact with each other, such as aboard ships. The Navy has been tuberculin testing all new recruits since World War II. All active duty naval personnel receive a photofluorographic chest x-ray examination annually. Only about 5 per cent of our recruits have a positive tuberculin test at the time of entry into the service. Because of this low proportion of positive reactors, the tuberculin skin test becomes a valuable tool in case finding, contact studies, and detection of infection. A recent outbreak of pulmonary tuberculosis in a destroyer-type ship emphasized the importance of epidemiologic studies of every case reported and the value of the skin test. It appears that most cases of tuberculous disease occur within six months of conversion of the skin test from negative to positive. Therefore, the Navy now prophylactically treats all persons known to have converted with isonicotinic acid hydrazide for a period of one year. Contact examinations of reported cases has been intensified and include periodic skin testing and clinical and x-ray evaluation of positive reactors. The use of BCG vaccine for our personnel would result in the loss of a valuable diagnostic and epidemiologic tool; in view of the conflicting opinions of its value and the relatively low incidence of tuberculosis in the Navy, BCG vaccination is not used.

The acute diarrheal diseases are always a potentially serious threat to military operations should they become epidemic. Modern sanitation practices involving water and food supply and sewage and waste disposal has controlled many of the more serious diseases of this group. Typhoid vaccine is effective in reducing morbidity from typhoid fever. The efficacy of cholera vaccine has not been established. Under field conditions environmental sanitation standards may break down, leading to serious epidemics. Troops in the field must be well indoctrinated and supervised in personal hygiene and elementary sanitation if disaster is to be avoided.

Of the parasitic diseases malaria is of greatest importance. Preventive measures are directed toward vector control, individual protection against mosquitoes, and chemoprophylaxis. The development of insecticide resistance is a continuing problem.

The United States military services have recently instituted the use of a combined chloroquine-primaquine tablet for malaria chemoprophylaxis. Each tablet contains the equivalent of 300 mgms of chloroquine base and 45 mgms of primaquine base. One tablet is taken once a week while exposed to the risk of malaria and continued for six weeks after exposure has been terminated. Theoretically, this regimen should provide true prophylaxis rather than suppression of clinical malaria, since primaquine acts on the prepatent exoerythrocytic stages of the parasite. The occurrence of chloroquine resistant strains of falciparum malaria in Colombia, and more recently in Thailand, indicate that continuing efforts must be directed in research on malaria therapeutics and prophylaxis.

Special naval preventive medicine problems exist in relation to environmental factors peculiar to military and naval operations. Heat stress and cold injury are important hazards in desert or arctic operations. The closed environments of the nuclear submarine and space capsule require special attention to adequate oxygen, elimination of wastes and toxic material, heat balance, etc. Technological developments in weapon systems have increased the multiplicity of occupational hazards. These special areas, although part of the preventive medicine program, are under the cognizance of other Divisions within the Bureau.

Welcoming Remarks

Rear Admiral L. D. Coates, USN
Chief of Naval Research
Washington 25, D. C.

It is a rare and special privilege to be able to address a group of the highest ranking naval medical officers in the Western Hemisphere. As a surgeon-general, each of you has the greatest responsibility in your own navy for providing your men with the best medical care and facilities that your country can offer. It is a responsibility that makes the post of surgeon-general a crucial one in the successful operation of any navy. Judging by our own surgeon-general, Admiral Kenney, the type of man who fills such an office combines the highest ideals of the medical profession with the deepest appreciation of the traditions and challenges of navy life.

I am particularly pleased to address you since only last month I paid a visit to Argentina and Brazil to present a series of lectures on naval research to the navies of those countries. My visit there confirmed an impression I had already received from the scientists on my staff that some of the most rapid progress in biological research is being made in Latin America. I also learned that we have a number of problems in common, and I came away with a new insight on how the navies of the United States and Latin America can gain a great deal from cooperative research. It is obvious to me that we all can gain valuable knowledge from each other, especially in the medical and biological fields.

First, in my brief talk today I would like to impress on you the important place of the bio-medical sciences in the U. S. Navy's broad program of research, and then I would like to point out how progress in the practice of naval medicine depends heavily on a steady flow of discoveries from basic research in the biological and other scientific disciplines.

In the U. S. Navy there is a close working relationship between the Bureau of Medicine and Surgery, which is responsible for the research and development leading to improvements in naval medical and dental practices, and the Office of Naval Research, which is the principal research arm of the Navy. In ONR we are primarily concerned with research which extends knowledge of fundamental life processes, with the ultimate objective of providing this knowledge to help solve problems with which the Navy may some day be confronted.

These problems revolve around our desire to protect naval personnel from the stresses imposed by new weaponry, vehicles and unusual environments. The combat effectiveness of the Navy can only be assured if its men can function efficiently while exposed to such stresses. Also, the design of advanced ship types, aircraft, and weapons requires in part a basic understanding of the men who will operate these vehicles and equipment. In other words, we are concerned with what might be called biological engineering in which the new systems are designed to fit the human operator, taking into account his needs and capabilities.

These are the same problems faced by all navies, large or small, all over the world. Moreover, most of these problems are unique to naval operations. For example, only submarine medicine deals with the problem of men working and living together in a completely closed environment for extended periods of time. Diving medicine is concerned not only with rescue and salvage operations but also with the underwater swimmer who is playing an increasing role in naval operations.

In its efforts to maintain a strong program of Navy-oriented research, the Navy, through the Office of Naval Research, has entered into a partnership with scientists at universities and research institutions throughout the world. At the same time, we foster close cooperation and liaison between the Navy M.D.'s and the scientists in the naval laboratories and at universities.

There is no question that this approach to naval research produces results. One example is the new field of cryobiology, the study of the behavior of biological systems at low temperatures. With the Bureau of Medicine, the Office of Naval Research, the universities and, in this case, private industry, working together, we have been able to define the major factors affecting the freezing and thawing of whole blood. This has permitted us to develop techniques for the long-term, perhaps indefinite preservation of whole blood by freezing at liquid nitrogen temperatures. When needed for transfusions, the blood can be thawed and reconstituted to virtually its original state. When these techniques are perfected, it will end the periodic search for blood donors of a certain type and make blood of all types immediately available from stock. Moreover, it will lead to the development of means for preserving indefinitely tissues other than blood and aid in improving our methods of transplanting tissues. The critical need of such developments should be obvious to all nations of the free world, which continually

face the potential problem of mass casualties.

Marine biology is another important area of research, especially as it relates to the protection and survival of personnel. This includes the Navy's shark research program where we are learning how to control and repel sharks by studying this fish under natural conditions. By studying calcium and shell forming marine organisms which produce and form calcium and shell deposits, we may also gain valuable clues on how bone and teeth are formed in humans.

Biomedical research, however, cannot and must not be conducted in a vacuum isolated from the other basic sciences. The Ph.D. and the M.D. are finding that they must work together as a team to reach mutual objectives. Medical research not only draws on biology but also on physics, chemistry, psychology, electronics, mathematics, and metallurgy, among other sciences. Radio telemetry utilizing new miniaturized devices is providing us with new details on the behavior of living organisms whether they exist in the ocean depths, fly through the air or function inside the living human body.

Occasionally we find that basic research completely unrelated to medical science leads to an important new development in medical therapy. One recent example is the medical application of the 160 million electron volt cyclotron at Harvard University built with Navy funds and supported by the Navy for the conduct of basic nuclear research. Neurosurgeons at a leading hospital became convinced that the proton beam of this cyclotron can be used to treat a deep-seated brain tumor since the largest concentration of radiation is at the end of the beam and can be focused on the tumor. It has already been successfully demonstrated that brain tumors, otherwise inoperable and terminal, can be treated with this technique.

In another case collaboration between a naval engineer and a neurosurgeon has just recently resulted in a simple, effective surgical technique for obliterating anuerisms of the brain. The new procedure utilizes a high velocity, recoilless air gun devised and built by an engineer at the Naval Research Laboratory here in Washington. This instrument propels a quarter-inch long shaft of hog bristle into the deformity, causing the blood in the interior to clot and permanently close the opening.

At the beginning of my talk I noted that the United States and Latin America have much to gain through cooperative research. This has been demonstrated in the past several years by our cooperative programs in oceanography, marine biology and meteorology with the navies of some Latin American countries. One such program involves the study of the Antarctic, in which the Navy of Argentina invited the U.S. Navy to send scientists to accompany the Argentine Navy in its Antarctic Scientific Campaigns. Out of this has come the discovery of a new antibiotic derived from a marine organism that inhabits that region. It is clear that this potentially powerful and valuable new drug would not have been discovered without an inter-american cooperative research effort.

I am convinced that there are many more discoveries awaiting us. What is needed is a concerted, organized effort in biomedical research carried out by the navies of the Americas. Therefore, I propose that an Inter-American Conference on Naval Biomedical Research be called to develop plans to activate a cooperative research program.

By working together, all of us are certain to learn new and more efficient means of protecting and maintaining men under the great variety of conditions encountered by naval forces. Furthermore, almost any important results in biomedical research will be useful not only for the navies of the free world but will also benefit all mankind. For example, the Navy's long experience in dealing with closed environments in submarines has made a vital contribution to the design of manned space craft.

The navies of the world have much to contribute to the future, but that promise can only be fulfilled if we work together united by our common interests and mutual goals.

Training Resources

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Gentlemen: It is a very great honor for me to be here today to make this presentation to you. I will try to cover in a very general way the training programs which we have for Medical Corps, Medical Service Corps, Nurse Corps and Hospital Corps.

Following my remarks Commander Bird will describe the Audio-visual Training Aids which we have.

Perhaps some of you can tell us of other types of training which you have in your countries that we have so far overlooked and might be useful to us.

Training for officers of the Medical Corps can be categorized as Undergraduate Education, Internship, Residency Training, Advanced Degree Courses, Military Medical Courses and Short Courses.

The Undergraduate Program consists of the Ensign Medical, the Clerkship and the Senior Medical Student Program. As soon as a student receives notice that he will be accepted into the next convening class in a civilian medical school, he is eligible to apply for a commission as Ensign in the Naval Reserve. This commission entitles him to serve either Clinical or Research Clerkships on full pay and allowances during vacation periods from his school. He is also eligible to apply for the Senior Medical Student Program and if he is one of those selected he serves on

active duty during his last year of medical school drawing full pay and allowances of his rank. In return for this sponsorship of his senior year he is obligated to serve on active duty for 3 years following completion of his internship. He may elect to serve his internship in either a civilian hospital or in the Navy.

Our Navy has internships in 13 of our naval hospitals. They are all rotating in type, 12 months in duration and are fully approved by the Council on Medical Education and Hospitals of the American Medical Association.

Residency training is offered in all the recognized specialties and sub-specialties, either in naval hospitals or in civilian institutions. Eight naval hospitals are approved for residency training covering most of the specialties. Civilian training is utilized only for those specialties in which we do not have approved programs of our own or the existing programs are not sufficient to train the numbers of specialists needed for staffing purposes. Neurological surgery and Children's Orthopaedics are two examples in which we utilize civilian training entirely.

For residency training in a naval hospital the medical officer agrees to obligate himself for one year of service for each year of training received and for Navy sponsored civilian training he agrees to serve 2 years for the first year of training and year for year thereafter.

Advanced degree courses are available only in civilian institutions. Medical officers may apply for courses leading to Master of Public Health, Doctor of Public Health and Doctor of Philosophy degrees. The Doctor of Philosophy programs are usually in radiobiology, physiology, biochemistry, or some related biomedical field. The Master of Public Health program may be pursued in conjunction with a civilian residency leading to certification by the American Board of Preventive Medicine either in Public Health or Occupational Medicine, or in conjunction with an inservice residency in Aviation Medicine which also leads to certification by the American Board of Preventive Medicine, in Aviation Medicine.

The Military Medical Specialties are Aviation Medicine, Submarine Medicine and Field Medicine. Training in Aviation Medicine begins with assignment to the U. S. Naval School of Aviation Medicine, Pensacola, Florida. The course is 6 months in duration, 4-1/2 months of which are devoted to classroom work in aviation physiology, cardiology, ophthalmology, otolaryngology, neuropsychiatry and related subjects. The final 6 weeks are spent in actual flight indoctrination. Successful completion of the course leads to the designation of Flight Surgeon and graduates receive the extra pay allowances for duty involving flying as a crew member. Following a tour of duty as a Flight Surgeon the medical officer may elect to go into a clinical specialty or he can apply for further training in aviation medicine either as an aviation medicine resident or as a student naval aviator. In the latter category he pursues the same course

as a naval aviation cadet and upon completion of training is designated a Naval Aviator. The aviation residency consists of 1 year in a civilian university to obtain a Master of Public Health degree and 2 years of residency at the School of Aviation Medicine. Submarine Medicine comprises 2 general programs, the conventional submarine program which is 30 weeks in duration and the nuclear submarine program which is 50 weeks in duration and includes training in radiobiology and experience with nuclear power. The course in Field Medicine is 3 weeks in duration and leads to assignment with Marine Corps units. This specialty offers training in the various facets of field medicine in order that rapid and efficient medical care can be carried out in the field. It includes combat first aid, emergency surgery, sorting (triage), control and evacuation of casualties, and preventive medicine and field sanitation.

Attendance at Short Courses, both civilian and military, is authorized for our medical officers to augment residency training, to keep trained personnel abreast of new developments in their field and to keep medical officers informed on military subjects such as Atomic, Biological and Chemical Defense, Management of Mass Casualties, and so forth.

Training for Medical Service Corps officers is in the administrative, military, or allied science field. The U. S. Naval School of Hospital Administration, National Naval Medical Center, Bethesda, Maryland, offers a 10 months' course for those officers whose duties will be in supply and administration. Courses are conducted in conjunction with George Washington University and credits towards a degree are awarded for those successfully completing the course. Graudates of the course may apply for further instruction leading to a degree in hospital administration, business administration, hotel management, institutional management, or comptrollership. In the military field MSC officers are assigned to the Junior Course, Marine Corps Schools, Quantico, Virginia and the Command and Staff Courses, Naval War College, Newport, Rhode Island, as well as the Navy Management Course at the Naval Postgraduate School, Monterey, California. In addition, they attend various short courses on military subjects. The Medical Allied Sciences cover a broad range of disciplines, and training is provided mostly in civilian institutions and usually at the graduate level. Examples of courses taken are: microbiology, radiobiology, virology, physiology, psychology, chemistry and biochemistry, physics and biophysics, and hospital pharmacy. At the undergraduate level courses are offered in food service management and sanitary science. The students incur a period of obligated service determined by the length of the training program.

In furtherance of their educational development, MSC officers make frequent use of part-time out-service training, which is also available for all other Medical Department personnel. The Bureau of Medicine and Surgery provides 75 per cent of the cost of tuition, books and fees for personnel taking these courses in accredited civilian institutions, provided the courses taken are directly related to

their Medical Department duties or are a necessary part of a program leading to a degree which will increase the individual's effectiveness in his duties.

NURSE CORPS TRAINING

The Student Nurse Education Program is divided into the Nursing Education Program and the Navy Nurse Corps Candidate Program. The Nursing Education Program provides an opportunity for enlisted women of the Navy to be selected for participation in civilian schools of nursing leading to a baccalaureate degree. Participants receive pay and allowances of our enlisted Grade E-3. Upon graduation they are commissioned in the Nurse Corps and serve one year for each year of education received. Participants for the Navy Nurse Corps Candidate Program are recruited from qualified senior students who are already enrolled in an approved school of nursing. These students also receive the same pay and allowances as those in the Nursing Education Program and upon completion they are obligated to serve on active duty for a minimum period of 2 years.

For Nurse Corps Officers the program provides for continuing education and training both in naval hospitals and in civilian institutions. The training in naval hospitals is accomplished by teams which go to the various hospitals and conduct workshops and seminars on topics related to the Nursing Service. Nurse Corps officers who are qualified registered nurses but do not have an academic degree are selected for full-time duty under instruction at civilian universities for periods of up to one year in order to complete their education and receive their baccalaureate degree. Part-time duty under instruction includes taking of courses on off-duty hours that are pertinent to nursing and that lead to a degree.

HOSPITAL CORPS TRAINING

Basic Hospital Corps School is now 16 weeks in duration and is designed to prepare Hospital Corpsmen for duties normally encountered in their first enlistment and is weighted heavily toward nursing care of patients. Advanced Hospital Corps School, also referred to as Independent Duty School, prepares career Hospital Corpsmen for the more responsible duties required of Petty Officers and particularly for the assignment to duty independent of a medical officer. The Technician Schools lead to the rating of technician in one of the medical specialties such as x-ray technician, laboratory technician, neuropsychiatric technician, etc., or in one of the military medical specialties which correspond to the military medical specialties of the medical officer, namely, Aviation Medicine, Submarine Medicine and Field Medicine.

In closing, I would like to say a few words about training for medical personnel of other countries. It has been a great source of pride with us to have naval medical officers and enlisted personnel from other Navies participate in our training programs. We have been happy to have medical officers participate in our formal courses on exactly the same basis as our own officers. In the clinical areas it has been necessary

to designate the visiting medical officers as observers rather than as residents. The necessity for this has been that to be effective our training in clinical specialties must be approved by the Council on Medical Education and Hospitals of the American Medical Association, and to maintain this approval we must not have any doctors on our staffs as interns, residents or staff members who are not graduates of U. S. medical schools unless they have taken and passed the examination of the Educational Council for Foreign Medical Graduates. We therefore designate them as observers and the only difference in their training is that they cannot assume direct responsibility for patient care. We hope that these medical officers who have served with us as our shipmates have found the time spent here professionally rewarding. We know that quite often we learn from them as much or more as they learn from us. Medicine has always had an international aspect and the sharing of different technics and developments has been very beneficial. I am proud to say that I believe we as doctors, nurses, scientists and technicians, find it easy to understand each other, and that we can contribute much towards international goodwill.

Thank you.

Audiovisual Aids to Communication

Commander E. W. Bird, MC, USN
Head, Audiovisual Training Section
Bureau of Medicine and Surgery
Washington 25, D. C.

Certainly, this conference has demonstrated the importance of and the need for better communication. This is particularly true on an international basis where we already have a serious language barrier. Audiovisual methods, and particularly visual, can help us. We do not have to translate pictures. In our Medical Department we have for many years used the motion pictures as one of our best aids in medical training. Each year we produce some twelve to twenty new training films on all aspects of medicine; subjects include shipboard sanitation, surgical procedures, first-aid, and aviation medicine. Any of these are well suited to be used by the medical departments of other navies.

During the past few years, we have been developing the use of television as a training aid. We now have a television network linking six hospitals here in the Washington area, and more than 1000 hours of training programs were broadcast over this medical network so that training presentations could be viewed simultaneously at all hospitals. We have now introduced the use of the television video tape recorder which allows us to visually record such training presentations. Here is a minute sample of such a presentation. If you will listen to the speaker, you will note the sudden shift from English to Spanish, and this is important to note. (Video tape segment)

Video tape is a wonderful thing; on a roll such as this we can record up to two hours of material, we can replay it as desired, and finally we can erase it and reuse it for a different program. We have set at your place a list of the medical presentations we have recorded in the past few months. The remarkable thing about video tape,

from the standpoint of this conference, is that we can simultaneously record three different language sound tracks together with the picture on the same tape. Therefore, there is no problem to providing both a Spanish and a Portuguese interpretation on each training program as it is being made. You have just seen and heard an example of how this would work in the short segment shown. By pressing a button on the machine, the narration can be changed from English to Spanish or any other of the recorded languages.

We can further transfer a presentation recorded on television to standard motion picture film. As an example of this technique, I will show you a one minute segment of a video-tape recording of middle ear surgery followed by a motion picture recording of the same picture. (Video tape segment) Now we will look at the motion picture recording. (Motion Picture segment) Here is another sample of a film transfer of a television training presentation. (Motion Picture segment) Here is a short sample of one of our current standard training films suitable for many training purposes, and which can have a Spanish or Portuguese soundtrack added; this is a training film to instruct our hospital corpsmen in Emergency Childbirth Delivery Procedures. (Motion Picture segment)

It is believed that these techniques have much to offer in international communication. Even this morning on our interhospital medical television network, a lecture in the Spanish language is being broadcast to all of our hospitals.

As you may be aware, this entire conference has been recorded on video tape. During the coffee break we will be showing some of it. If any of you desire to see any portion of this conference, you can return here after lunch, and the television engineer will be happy to reshow any segment.

A Proposal:

* AN AGREEMENT OF CONFORMANCE AND UTILIZATION BETWEEN THE AMERICAN NAVIES IN ORDER TO CONSTRUCT AND ENDOW NAVAL HOSPITALS STRATEGICALLY LOCATED FOR THE MEDICAL CARE OF NAVAL PERSONNEL AND THEIR FAMILIES (DEPENDENTS)

Miguel Angel A.
Commander, Colombian Navy
Surgeon General

INTRODUCTION

During wars, infections, diseases and wounds badly cared for or treated produce more deaths than actual combat.

The man who feels that he is protected by a good Medical Service and knows that his family is well cared for and attended, maintains the highest morale in order to complete his mission during peacetime as well as in war.

The rapid advance of the sciences in all the fields of Medicine and Surgery, require permanent information and a constance sustenance and renovation of the diagnostic equipment, treatment and hospital facilities.

The economic difficulties of our countries in order to improve and maintain up-to-date this class of equipment, require the support of countries economically much stronger and with the latest scientific facilities.

The communist menace each day grows much stronger against the American countries, by imposing its politics of being permanently prepared to give timely logistic assistance from all points of view, including the specialty of conserving health and life.

* Translated from Spanish

ANTECEDENTS

1o) The fundamental propositions of the Organization of the American States (O.A.S.) are:

To maintain Peace.

To promote the well-being of Man.

2o) The United (Joint) Inter-Americas for Defense have been created in order to study the media of defense of the American Continent.

3o) In the orientations of the United (Joint) Inter-Americas for Defense, the concepts are:

One of the military measures, in order to attain its objective, is that of: "To orient the development and modernization of the Armed Forces, by standardization of the organization, instruction, training, procedures, materials and equipment."

4o) In the General Military Plan for defense of the American Continent of the United (Joint) Inter-Americas for Defense, it is stated in Chapter VI "Military Measures:"

"The development and maintenance, by the respective member nations, of military services, sufficiently organized, equipped and trained for combat, within their individual and collective possibilities, with sufficient standardization of doctrine, methods and materials capable of augmenting the flexibility of their (military services:vs) utilization in all foreseeable circumstances in which they possibly would be required."

5o) In the same Military Plan, in Chapter VII, it is stated: "Complimentary Measures:"

"To develop the general technico-scientific capacity, based on the individual effort of the countries, for mutual assistance and for the active inter-exchange of informations of this nature."

6o) In Annex No. 6, "Logistics," of the same Military Plan for the defense of the American Continent, it is stated in Chapter III, "Basis for the Logistic Planification, Article a):"

". . . It is indispensable that cooperation be tightened between the American States in order to attain a more efficient logistic support in collective actions. The logistic system, susceptible of being employed, especially in support of coordinated collective actions, will be according to the form in which the participating states will consider convenient."

Article d):

"In case of a general war, the resources of the United States of America will be severely compelled to provide sufficient logistic support by its appropriate military services."

7o) In Chapter IV, "Recommendations," of the same Annex, Article(g), it is stated:

"That preferred attention shall be given to the development of an adequate system of military bases in order to support the plans for defense of the maritime traffic and of the areas of strategic importance."

And Article(j):

"That it be obtained, for the efficient logistic support in joined operations, an adequate standardization of war material and equipment in the Naval Forces and of the facilities for its maintenance and production."

8o) In the Military Plan of the United (Joint) Inter-Americas for Defense, it is stated that the focal areas in which the Continent could possibly be divided are thus:

North Atlantic, Caribbean Sea and Gulf of Mexico, South Atlantic, South Pacific and North Pacific.

9o) In all the orientations and Military Plans of the United (Joint) Inter-Americas for Defense, there is nothing given about the important plan for the "Care of Man," at least from the point of view of his health and of the necessary care in case of illness or wounding/injury.

10o) The Naval Operations undertaken conjointly--those that have been realized and those factors feasible of being realized in the future, as much in Peacetime as in the case of an Extra-Continental Aggression and for the protection of Maritime Traffic, they (the Naval Operations) should be able to give some indications as to whether or not there exist rapid modes of evacuation of the sick or wounded to distant zones that have complete hospitalization facilities, or the necessity for the existence, in strategic places, of better facilities than those that we now possess, which could be achieved successfully with the construction and greater endowment of Hospitals for our Navies.

RECOMMENDATION

The anterior considerations have been considered by the Colombian Navy:

"THE NECESSITY OF AN AGREEMENT BETWEEN THE NAVIES OF THE CONTINENT FOR THE CONSTRUCTION AND ENDOWMENT AS MUCH IN EQUIPMENT AS WELL AS IN TECHNICAL PERSONNEL OF NAVAL HOSPITALS STRATEGICALLY LOCATED IN THE CONTINENT FOR THE CARE OF NAVAL PERSONNEL AND THEIR FAMILIES (DEPENDENTS) OF ALL THE PAN-AMERICAN NAVIES.

"THE CONSTRUCTION, ENLARGEMENT AND MAINTENANCE OF THE EDIFICES WILL BE DONE BY THE REGIONAL NAVIES. THE ENDOWMENT OF EQUIPMENT FOR DIAGNOSTICS, TREATMENT CENTERS AND FIELD HOSPITALS, THEIR MAINTENANCE AND RENOVATION, WILL BE DONE BY THE NAVY OF THE UNITED STATES OF AMERICA. THE NAVIES WILL GIVE MUTUAL FACILITIES FOR THE TRAINING OF THEIR PERSONNEL AND THE STANDARDIZATION OF THE TECHNICAL AND ADMINISTRATIVE SYSTEMS."

Discussions and Proposals

Admiral Kenney: "I agree very much about the standardization of certain items of medical equipment. I realize, too, that the art and the technique of practicing medicine varies in different countries, just as in this country. So there should be no attempt in standardization to impose one type of practice of medicine throughout all the countries. In our own Defense Department it has only been in about the last ten years that we have standardized to any great extent equipment between the Navy, Army, and Air Force in our country. I know through the NATO organization and through SHAPE that the standardization is a long and tedious process. We probably should try to identify certain items of equipment which would have a common use aboard ship or with troops in the field, which we might commonly use in time of conflict as a starting point. Perhaps, we should leave highly technical patient-treatment equipment until later." Following some additional discussion, Admiral Kenney concluded with the following statement:

Admiral Kenney: "Gentlemen, I have been taking some notes during the discussion because I believe the goal of this meeting is beginning to crystallize a little more; the things that we talked about earlier as to what might actually be accomplished as the result of this meeting. I want to go back briefly, because I think what has happened in our Navy is the thing that must happen in your navies in regard to medical care. We compete with other programs in our navy, just as the Bureau of Weapons and the Bureau of Ships and others do. I think that first you must generate within your own navy, your chief of naval operations--your secretary of marina--a desire for improved medical care. I don't see how we can accomplish much anywhere unless the naval administration recognizes the requirements for medical care and accepts it as a need so that it can be identified as part of your program. Whether this is in the field of medical research, whether it is in the field of improved sick bays aboard ships, whether it is in the area of better facilities, whether it is in the area of more medical personnel and better training; I believe this should become a program and a policy within each of your individual navies. I think that once this policy is established we must each year identify areas of medical activity that we feel are important. Each year all of these will not be accepted. There are some things each year that we feel would be very desirable, and yet within the total naval effort of each year cannot be accomplished. We try to identify over a ten-year period, stage by stage, year by year, the things we think we need; whether it is in the area of new hospital construction, equipment, or whatever it is. Of course, we have always worked on the principle in this country that the medical care available to the serviceman should be at least as good, if not better, than the medical care which is available to the general population of the country. We have always used that as a basis. Our hospital operation, our public health within the service, our public health preventive medicine programs, our industrial medicine programs have all been designed to some extent to compare favorably with similar programs in this country that are available in civilian communities. I also feel that we already have generated in the world, not only in the United States Navy but in other navies, a great deal of knowledge

about certain stresses and certain things to which a serviceman is exposed. There is really no need in the field of research to repeat a lot of fundamental information that has already been developed and generated. We heard much about heat stress; we certainly know very much about public health control of infectious diseases; we know much about public health control of these infectious diseases. We are learning much as far as the treatment of wounds is concerned. These things are documented. We know medical capabilities that exist now, we know the things that we are capable of doing if given the proper support. I think an expressed policy of this meeting is that all of us are desirous to improve medical services to naval personnel that are in our navies, and that we recognize that much needs to be done in most of our countries to more fully reach this goal. Each of you must get more recognition within your total naval program. When you gain this recognition, then we already have in being certain machinery through our Military Assistance Program, through our MAAG's , through our missions, through our naval attaches, and I think through the inter-American defense board. I think we have already the channels, once these requirements are identified and accepted locally, to see who can contribute most. In some cases, maybe some of our requirements in the field of preventive medicine can much better be conducted in your countries. I think that once we point out that the goal of all is improved medical facilities, whether they are in Argentina, Brazil, Chile, or elsewhere that we should be able to get recognition for the need. I think all of us are faced, just as we certainly are in this country, with many areas where improvement is needed. We have hospitals in our country that we are trying to replace with permanent construction. We have facilities that need improvements. We have areas of new equipment that we are trying to get that are available right now on the market that we haven't yet installed into our naval hospitals; so I think we have the same problem to a certain extent that you have. We can go through all of our plants and find many areas where we need more personnel. Many times we need more dollars in certain areas to operate the facility to the extent that the workload demands. But what we try to do is to really identify as a package our medical problems so they can be priced out as to the dollars required, the number of people required, the equipment required, and then see how much of that we can acquire in any one year. We never get it all, just as I am sure you don't.

I would think a real accomplishment of this meeting would be the introduction of a proposal that we all desire to improve the quality of medical care which we are able to provide to the military to the naval personnel. We recognize that at the present time all of us have shortcomings; whether it be facilities, buildings, hospitals, equipment, or personnel. We feel that only by bringing up and constantly emphasizing our needs and our requirements to our separate navies that we can then commonly and jointly find out who can make the greatest contribution to our deficiencies. Now, it is quite possible that one country may have most of their shortcomings in the area of facilities; it may be that they may desire a more modern hospital, for instance. In another country it might be the personnel with the proper training and qualifications to meet our requirements. In another country it may be mostly equipment. And I think in each country these requirements must be identified. You may have the same difficulty we have, since we are competing medically each year with other vital naval elements such as ships, ammunition, and electronic equipment that goes aboard ship. All of these things are

desirable to build up a strong navy.

I think we must bring up the point that, in addition to modernizing ships and preparing the ships to function more effectively that the health of the individual personnel that go into that ship is also important, and that we can't spend all of our attention to hardware, to the ship, to guns, and to ammunition, without recognizing that all of that is of very little avail unless you have a healthy crew to put aboard that ship. This is the approach we have taken in our country in the Navy, the Army, and the Air Force. I think history has shown many times that in some wars disease actually produced more casualties than did the battlefield. And certainly whole armies have been practically paralyzed at times, not because of casualties but because of disease. I have been aboard ship, and I know what an epidemic aboard ship can do. It is a catastrophe aboard ship. I think we do have machinery, and perhaps Cdr Schirmer can even talk about this a bit, of trying to see how we can help each other in acquiring those things that we need most. I am going to let Cdr Schirmer talk about this. I think the question arises now what can we accomplish as a result of this meeting towards helping each other meet some of these deficiencies so that we end up in four, five, or six years with better medical departments, better equipped, better staffed, and better able to contribute to the overall effort. Do you have any comments Cdr Schirmer?"

Cdr. Schirmer: "The only thing, Admiral, would be that this is not a project which is going to be solved overnight. It is going to require programing within the country concerned if any of this is going to be subsidized by the Military Assistance Program. Therefore, it reverts right back to your own chief of naval operations or your minister of marina who will work with the Chief of the Military Assistance Group within each country, if you have one. They will write requirements into the country's program, and it will go to our people in the Canal Zone who program for the entire area, and then on up to the Department of Defense for final approval. As Cdr Angel here pointed out, there is very little reason that medical equipment should not be included in the country's programs, as is hardware, ships, tanks, guns. Medical equipment can be programed, but I don't think anybody has, to date, tried to insert it into the Military Assistance Program. It can be done. All you have to do is establish the need within your own navy, show your own navy what you need for improvement of your medical facilities, and then it can be worked into the Military Assistance program."

Admiral Kenney: "I think one of our major problems is to get medical requirements inserted with a high priority. So many other things are taking priority that medical matters don't come to the fore. We could, in retrospect by going down to our missions in these countries, suggest that this is a possible field of mutual support that we haven't explored very fully before, because it has never really become a part of the Military Assistance Program. We could encourage their assistance with the responsible secretary of marina or the chiefs of naval operations to give a little more view to the medical requirements."

Following further discussion regarding a possible conference proposal, Admiral Kenney made the following comments:

Admiral Kenney: "I wonder if we could have representatives from the different countries work on a summary or a proposal which we could agree upon. As a final effort of this meeting, what we need mostly is more recognition by our naval authorities of the need and the desirability of improved medical facilities and medical care. The technique of acquiring this, once we can get this desire established,and then the technique of actually doing this will take time. We have to identify the various needs. Admiral Quinn is here, and he may have some ideas as to how best to effectively do something instead of just talking to ourselves."

Admiral Quinn: "Well, as you all know, you are going to be together for the next two days so the committee could actually work up the final summary, and it could be approved in Chicago, and it wouldn't have to be done right here."

Following these comments, it was decided that continuing discussion on the conference proposals and summary statements would be continued during the trip to Chicago. Discussion then turned to the desirability for subsequent conferences and the selection of the next meeting location. Considerable discussion was held regarding the next meeting site. Argentina and Mexico entered strong pleas that their countries should be the next location. Following some discussion, the question was put to vote, and the majority voted for Mexico as the site for the next meeting. The official conference at the Naval Medical Center was then informally adjourned with the understanding that committee work and discussions would continue towards drafting the final summary proposals of the Conference.

Admiral Kenney called upon Admiral Quinn for any final closing comments:

Admiral Quinn: "Thank you very kindly, Admiral. Gentlemen, in my final remarks I would like to be brief. I can tell you sincerely that we in Admiral Anderson's office and our own office in Pan American Affairs are just so pleased that you have been able to come and sit down and discuss some of these things of common interest. I know too that they are going to be pleased over there in the Pentagon when they are told that you have agreed to the desirability of having another meeting. We certainly wish you every success in your future cooperative efforts.

General discussion and committee work was carried out during the following two days leading towards the summary statement and proposals of the First Conference of the Surgeons General of the Navies of the Americas, and it was approved by all of the Conference delegates.

This official statement follows:

RESOLUTIONS OF THE FIRST CONFERENCE OF SURGEONS GENERAL OF THE NAVIES OF THE AMERICAS

The Chiefs of Medicine of the Navies of the Americas meeting in their First Conference consider that the primary mission of their Medical Departments is to promote the maintenance and improvement of the health of the personnel of their respective navies and agree that they will:

1. Emphasize to their Navy Departments the importance of naval medicine for the maximum support and development of their organizations.

2. Request of the proper authorities the extension of Mutual Assistance to the field of medicine in the same manner that is being used for purely military purposes.

3. Determine the requirements in the field of medicine for the Navies of the Americas in order to achieve effective utilization of Mutual Assistance.

4. Stimulate the development of industry in medical equipment and instruments and pharmaceutical products throughout the Americas.

5. Contribute to the education and training of Navy Medical personnel through the exchange of same among countries of the Western Hemisphere.

6. Establish joint basic research in bio-medical and allied sciences for the exchange of resulting scientific information among participating countries.

7. Exchange among participating countries administrative information as well as any other type which might prove of common interest.

8. Appoint a committee to work toward criteria for the standardization of Navy Medicine throughout the Americas in the fields of education and training, procedures, materials and equipment. The country to provide the chairman of this committee will be elected by vote and in turn will select three countries each of which will provide one member to the committee.

9. Support a quarterly newsletter, contributed to by all members, and to be published and circulated by that country in which a conference has last been held.

10. Communicate the resolutions of this first conference to those countries of the Americas which have not participated and ask their concurrence to the same.

11. Convene annually the Conference of the Surgeons General of the Navies of the Americas.

Concluded in Agreement

Argentina, RADM C. F. Cuenca

Brazil, VADM W. Pires

Chile, RADM L. Noziglia

Columbia, CDR M. Angel A.

Ecuador, LCDR G. Arosemena

Mexico, RADM R. Vargas S.

Paraguay, CAPT A. Munoz

United States, RADM E. C. Kenney

Venezuela, LCDR T. Monroy P.