THE FUNCTION OF THE MILITARY ORTHOPEDIC HOSPITAL.

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The data upon which this paper is based were obtained by the writer as the result of an extensive personal study of a score of operative clinics in various war hospitals of France and a careful survey of similar hospital facilities in England and Canada. In the summer of 1916, the writer was invited by the French War Office to visit France to demonstrate his surgical methods in her various war hospitals, and during this visit he was given exceptional and unlimited opportunity for an intimate study of the very problems with which our own Government will be confronted upon the advent of American troops on the firing line in France.

There are many aspects of the situation, of which the following are of vivid interest: 1. Intensive specialization of surgical practice has been developed and stimulated by the present world war. 2. The value of specialized hospitals for the efficient application of special surgical procedures is inestimable. 3. Specialized orthopedic hospitals are absolutely indispensable when it is considered that a large percentage of the base hospital cases which will be returned to the United States for further treatment will be bone, joint, tendon, and nerve injuries. 4. It can readily be appreciated that many of the soldiers suffering from crippling injuries will be permanently debarred from the pursuit of their previous occupations, and unless reeducated and fitted for remunerative work of a new order, will become a burden upon the State. We are there-

fore face to face with a very serious sociological and economic situation. If we are to discharge our duty as guardians of the public health and follow the standards of foresight and ability displayed by our country's President and by the various arms of our military service, we must intelligently and promptly prepare to restore our crippled American soldiers to the highest degree of efficiency possible.

Closest attention is invited to the following details of the situation: 1, a medical and surgical "clearing house" hospital; 2, a classification of orthopedic conditions as recognized by the Canadian Government; 3, muscular reeducation of the crippled soldier; 4, qualifications of a plant for a military orthopedic hospital; 5, the necessary elements of an ideal orthopedic war hospital; 6, the estate of Mr. Charles D. Freeman at Colonia, N. J., which he has tendered to the United States as an orthopedic war hospital.

A medical and surgical "clearing house" hospital.—The establishment of a medical and surgical clearing house hospital at the chief port of entry to this country and in its metropolis, seems imperative. Here the cases may be sorted out on the basis of their surgical and medical requirements and sent to the special hospital best designed for the treatment of their several needs. This has been arranged for by the Columbia War Hospital.

A classification of orthopedic conditions as recognized by the Canadian Government.—The demand for a purely orthopedic military war hospital is apparent when we consider that from seventy to ninety per cent. of the wounded returning from this war will have orthopedic lesions coming under the following heads, as shown by statistics of the European battlefields, according to the Canadian Military Hospital Commission of Orthopedic Conditions: 1. derangements and disabilities of joints, simple and grave, including ankylosis; 2, deformities and disabilities of feet, such as hallux rigidus, hallux valgus, hammer toes, metatarsalgia, painful heels, and

flat and claw feet; 3, malunited and ununited fractures; 4, injuries to ligaments, muscles, and tendons; 5, cases requiring tendon transplantation or other measures for irreparable destruction; 6, nerve injuries complicated by fractures or stiffness of joint; 7, certain complicated gunshot injuries of joints; 8, cases requiring surgical appliances.

This list is the index to the classes of cases which the Canadian Government requires shall be entirely committed to the care of the orthopedic surgeon in the military orthopedic hospitals.

Reeducation of the crippled soldier.—Of equal importance with the physical reconstruction of the soldier's deformities is the vital problem of his reeducation, both psychological and vocational. This aspect of the situation is of paramount importance from a sociological, governmental, and personal standpoint. That the infirm soldier who has been injured while fighting to uphold his country's honor is a dependent upon the State until his remunerative powers are partially or completely restored, is selfevident. The decision as to the particular vocation for which the individual soldier is to be reeducated is of such importance that it should be rendered by a board of examiners—a vocational bureau—after due consideration of the merits of the case.

The peculiar psychological attitude of these injured men requires close attention. A soldier who has been injured while fighting for his country often feels that the burden of his future maintenance and of his dependents will necessarily fall upon the State. From long reflection upon his injuries he has been brought to believe that he is unable to resume his former occupation and he is certain to become introspective, unhappy, and dissatisfied with his lot, and with this mental obliquity is a burden to society. Dependence and idleness are the natural foes of ambition and productive labor. The problem of reeducation is very broad. Its solution involves functional and vocational reeducation, and

in the process the distorted psychological state becomes automatically dispelled.

Functional reeducation comprises the restoration to a normal working condition of joints whose movement is restricted by adhesions, of tendons shortened by adaptive contracture, of muscles weakened by atrophy and disuse, the coordination of muscular movements, and of the greatest importance, the use of artificial limbs, particularly complicated artificial hand and fingers. This functional or therapeutic reeducation should be executed by means of hydrotherapy, electricity, and massage. Special apparatus and training by individual instructors to encourage physical movements and mental processes disturbed by injury or shock, are equally necessary. Psychotherapeutics can also be administered during orthopedic convalescence under the direction of a psychologist appointed for the hospital for the treatment of psychoneuroses, hysterical paralyses, tremors, etc.

Having secured the confidence of the soldier and otherwise restored his mental equilibrium, and having trained his reconstructed limbs to the highest point of efficiency, he must now be prepared for some remunerative employment. In determining the occupation for which he is best suited, the mental adaptability and capacity of the individual must be considered, as well as the particular infirmities which he has sustained from injury or disease contracted on the battlefield. As has been said, this question is of such vital importance that it should be decided by a board of examiners after very careful consideration. A vocational bureau working in connection with the hospital may arrange courses leading to remunerative occupations of which the following are examples: Care and operation of automobile; general course in electricity; machine shop practice; telegraphy, traffic orders, train rules; testing of cement and steel; cabinet making, wood turning, construction carpentry; commercial courses, bookkeeping, typewriting, shorthand; courses for

those wishing civil service preparation; power machine operating; shoemaking and repairing; drafting, architectural and mechanical; plumbing and steam fitting; pottery making; painting and decorating; lettering; designing and illustrating; clay modeling; steam and gas engines; short courses in chemical analysis; assaying and milling, for former miners especially; poultry farming; flower growing; sanitary inspection; and other courses to be added later.

Qualifications of a plant for a military orthopedic hospital.—To meet the needs of the crippled soldiers adequately, as outlined in the preceding pages, a plant to be suitable for a military orthopedic hospital must possess the following qualifications: It should be located in the country away from the noise and confusion of the city. The country site should, however, be near an important portal of entry and easy of access by transportation lines from the clearing house hospital of the metropolis, following the precedent of France, England, and Canada. It should be back in the interior far distant from a possible firing line, where the facilities for food supply, sanitation, and transportation are of the best. In the case of our own particular problem in this country, the site should be selected on a large artery of travel, near an important portal of entry from abroad. It should have extensive acreage to allow expansion to meet the complicated requirements of such an institution. Its altitude must be sufficient to insure good drainage. Accessibility to reliable gas, electricity, and water mains is indispensable.

The necessary elements of an ideal orthopedic war hospital.—The patients to be treated in such an institution are necessarily chronic cases, and hence an abundance of fresh air, sunshine, and the quiet of the country is ideal. In a general way, the main building must be spacious, the beds so arranged that each patient receives an adequate amount of air. It must be high studded, with numerous large windows, and be provided with ample veranda space

which may be utilized by wheeling chairs or beds from the wards to it. This latter feature is extremely important, because many of these patients have major injuries of the bones or joints and in some instances cannot be moved from their beds for a period of months. The hospital should be thoroughly equipped with modern, up to date materials of every description. It must have a traction fracture table, an electrooperative bone outfit, and various materials for splints, braces, etc., such as plaster of Paris, steel, aluminum, aluminum bronze, Monell metal, etc. It must be supplied with adjustable superstructures to go over the beds, controlled by traction with pulleys, weights, counterweights, etc., in the position of neutral muscle pull for fractures. These have proved of inestimable value in the French war hospitals. The best is one devised by Dr. Joseph Blake, used by him in the American Hospital at Ris-Orangis. An outfit for applying the Carrel-Dakin solution to wounds, and a thoroughly up to date x ray equipment with a suitable localization outfit for the detection of foreign bodies, bullets, shrapnel, etc., are essential. A room should be equipped with Zander's, or other type of apparatus, for the mechanical correction of restricted motion, exercise, etc., in selected cases, and there should be a gymnasium with selected types of apparatus. A large athletic field is a feature which has proved to be important in similar institutions in France and Germany. Here the favorably progressing patient can recover his agility by playing football, handball, throwing the discus, putting the shot, and innumerable other games productive of a *mens sana* as well as a *corpus sanum*.

The reeducational department requires the services of those versed in the art of psychotherapy and muscle training, as well as artisans for each of the special vocational branches already enumerated. A factory for braces and artificial limbs should form an integral part of the institution. In England and Canada attempts were made to have this work done

by contract with independent manufacturers. It was soon found, however, that some of these concerns were offering rewards to the soldiers for requesting their particular make of apparatus. The preparation of amputation stumps and the manufacture, application, and use of apparatus and artificial limbs to fit these stumps should all be correlated under the immediate supervision and guidance of the surgeon. It occasionally happens that a stump is too conical or the bone too directly beneath its bearing surface, so that after a patient has worn an artificial limb for some time it may be necessary to perform some plastic procedure to render the apparatus efficient. A splendid artificial limb is useless unless its possessor can use it freely and painlessly.

Stirred by a fine patriotic fervor and actuated by motives of intense loyalty and devotion to their country, Mr. and Mrs. Charles D. Freeman have tendered to the United States Government, through the writer, their magnificent estate in Colonia, N. J. This estate of 800 acres, of easy access to New York by the Pennsylvania Railroad, is situated on high ground, far from the noise of the city, possesses all the above mentioned facilities for orthopedic, vocational, and functional reconstruction and reeducation, and can accommodate from 500 to 2,000 men if necessary. This estate and the details of its transformation into a war hospital will be more fully described and illustrated in an article soon to appear in this JOURNAL.

40 EAST FORTY-FIRST STREET.