Excerpts

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THE EARLY HISTORY OF THE ARMY MEDICAL
SERVICE.

THE early history of the Army Medical Service is somewhat obscure and difficult to follow. But the germ of the system is to be found—at any rate, so far as regards its control—in the practice which obtained from early times of appointing a physician and a surgeon to accompany the monarch or the commander-in-chief when he went to the war. Naturally the men were appealed to by the commander in any medical difficulty that arose, and soon, in addition to being responsible for the health of its head, they were saddled with the additional care of the health of the army. One of the first appointments in this capacity was that of Thomas Muffett, who accompanied the Earl of Essex to Normandy in 1591. During the Civil War a serious attempt was made to place the medical department of the army under proper supervision, and to this end the Parliament ordered three physicians, one of whom was Paul de Laune, to be attached to the army under the command of the Earl of Essex. The commission lists of the Cavaliers and the Roundheads also show that to each regiment a regular surgeon was attached. In 1649 a further step was taken, and Jonathan Goddard was appointed by Cromwell to the post of "first physician" to the army. In this capacity Goddard accompanied Cromwell to Scotland and Ireland, where he was succeeded by Sir William Petty in 1652. The position of a single medical head in supreme authority over medical matters in the army was thus established, and a surgeon came to exercise supervision over surgeons. At first these chief physicians and surgeons held their appointments only during a war; but in 1660, when a standing army was authorized, a physician-general and a surgeon-general were appointed who exercised authority continuously during peace and war. The first physician-general was Thomas Laurence in 1685, and the first surgeon-general was John Knight in 1664. Physicians and surgeons-general were also appointed for Scotland and Ireland, and from 1660 until 1756 no material change was made in the method of government of the medical department in the army.

According to Richard Brocklesby, the first attempt to form an Army Medical Board of Control was made in 1736 by the Duke of Cumberland, who desired Viscount Barrington, Secretary of State for War, to establish a hospital board for the army. The board was composed of the Physician-General, the Surgeon-General, the Physicians to Hospitals, the Principal Surgeon of Hospitals, and the Purveyor-General. The board recommended that the physicians should examine, superintend, and control the hospital mates, but that the surgeons should be allowed to nominate mates for their own department. Much was expected from the deliberations of the board, but its career was suddenly cut short by the outbreak of war, when the physicians to hospitals and most of the surgeons were sent abroad, and the Principal Hospital Surgeon, after having been appointed Inspector of Regimental Infirmaries, gradually assumed all the functions of the board. He appointed all the hospital mates and accepted the examination at the Surgeons' Hall as a test of fitness. The board, therefore, virtually ceased to exist, and was not revived until 1793.

During the early part of the reign of George III the post of Physician-General was held by Sir Edward Wilmot from 1740 to 1787 and Sir Clifton Wintringham from 1787 to 1794. The combined posts of Surgeon-General and

Inspector of Regimental Infirmaries was held first by Mr. Adair and afterwards by the great John Hunter.* On Hunter's death in 1793 the two appointments held by him were separated, and two of his surgical colleagues at St. George's, Mr. Gunning and Thomas Keate, were appointed respectively Surgeon-General and Inspector of Regimental Infirmaries. They were instructed to consult together regarding all army medical affairs, including the appointment of physicians, surgeons, and hospital mates. In this manner the Army Medical Board was reconstituted. On January 15th, 1794, after the death of Wintringham, Sir Lucas Pepys was appointed Physician-General as a reward for services rendered to the King during his illness in 1789. Pepys had never served in the army and had no special knowledge of the conditions and requirements of the Army Medical Service. From 1794 to 1798 the three members of the board performed their functions in a collective capacity, and, although they had their special departments, the board as a whole was responsible to the Commander-in-Chief for the acts of each member.

On March 12th, 1798, a new order regarding the Army Medical Board was issued by the Commander-in-Chief, by which many of its collective functions were abrogated, and each member was made more or less supreme in his own department.

Even after a patient study of the report of the Commissioners of Military Enquiry for 1808, and of the evidence given by the members of the board before the Committee of the House of Commons in 1810, regarding the Walcheren expedition, it is most difficult to determine the functions of the board in either its individual or collective capacity. The position, so far as it can be ascertained, was as follows: Collectively the board was supposed to meet if questions were submitted to it. It was to obey orders, but it was no part of its business to make representations. In their individual capacities the members were assigned special duties, but the conduct of these duties could not be brought under the criticism of the board as a whole. The Physician-General, with a salary of 40s. a day, was responsible for the choice of physicians, for the supervision of medical drugs, and for the examination of candidates for the posts of physician in the army. The Surgeon-General, who had a salary of 40s. a day, and also an extra £800 a year as the holder of the sinecure post of surgeon to Chelsea Hospital, appointed the surgeons for the army, and provided surgical drugs and appliances. He also occupied a seat on the Court of Examiners at the College of Surgeons for granting certificates to hospital mates. He consulted with the authorities on medical matters while the troops were on foreign service, and he received the returns of sick and wounded. The Inspector-General was entrusted with the duties of providing inspectors of hospitals and hospital mates. He had charge of regimental hospitals, and was surgeon to the staff of the Commander-in-Chief. In addition to his salary of 40s. a day, he received an equivalent amount on account of his position of Controller of Army Hospital Accounts. Finally, he was responsible for the provision of drugs for the Guards regiments, and superintended the education of cadets for hospital mates. To complete the description of this edifice of inconsistencies it remains to be said that the Guards chose their own surgeons, that the medical department of the ordnance was a separate concern under the control of an Inspector-General, and that the medical comforts were under the control of the Commissary-General. Finally, all the members of the board were engaged in active private practice.

In spite of all the manifest imperfections of the board, one great principle was instituted: the medical examination of all candidates was obligatory, although in the case of surgeons it was only an easy pass examination specially framed by the College of Surgeons for hospital mates.

The hospital system in the army was a cause of much trouble. Originally each regiment had a regimental hospital, under the care of the surgeons, but the board instituted general hospitals which were largely staffed by physicians, and the regimental hospitals were depleted in order to fill the general hospitals. Owing, it was alleged, to the want of military medical experience of physicians, the patients were not so well treated as in the regimental hospitals.

NOTE.—A report of Dr. Chaplin's first course of FitzPatrick Lectures, given in November, 1917, was published in the BRITISH MEDICAL JOURNAL on November 17th and 24th and December 1st in that year. The second course, from which excerpts are here made, will, together with the first course, shortly be published in a volume now in preparation.

* Hunter held his posts for scarcely a year, although he had been Deputy Surgeon-General for several years.

The method adopted by Sir Lucas Pepys, the Physician-General, in appointing physicians caused much discontent. When he assumed control, he at once established the rule that he would appoint as physicians only those who were Licentiates or Fellows of the Royal College of Physicians. He followed this plan in defiance of the express order of the Commander-in-Chief in 1798, that, "for physicians, a medical degree in an English university or a licence from the College of Physicians, although desirable, must not be considered indispensable." Scarcely any medical men already in the army held the licence, and consequently the superior posts of physician were given to men who had no previous connexion with the army. Staff surgeons and regimental surgeons, however able, were entirely shut out. In all, during his occupancy of the post of Physician-General, he appointed fourteen physicians, not one of whom had ever served in the army before.

As the result of these causes of complaint, the Commissioners of Military Enquiry investigated in 1808 the manner in which the Army Medical Board was performing its functions; their exhaustive report led to the thorough reorganization of the Army Medical Service and the inauguration of an era of increased efficiency. They advised a reconstruction of the board, so that it should be a consultative body with one supreme head assisted by a certain number of other individuals. They pointed out the injustice of the manner of selection for various medical posts, and indicated the way in which this selection should be conducted. Finally, they took exception to the loose manner in which the members of the board had supervised the contracts for drugs and appliances, and recommended the employment of some person skilled in accounts to check them.

In 1809 a military committee, appointed to give effect to these recommendations, advised the following changes:

1. That the medical department of the army should be presided over by a single head, to be called the Director-General, with a salary of £2,000 a year.
2. That two others, to be called Principal Inspectors, should be associated with the Director-General in the control of the department, with a salary of £1,200 a year.
3. That in future all promotions must take place among those already in the army, with due regard to seniority.
4. That the whole time of the Director-General and the Principal Inspectors should be devoted to their duties.

District surgeons were abolished, and the various grades in the service were settled as follows: Inspectors, Deputy Inspectors, Physicians, Staff Surgeons, Regimental Surgeons, Assistant Surgeons, and Hospital Mates, with respective salaries of, 40s., 20s., 15s., 12s., 7s. 6d., and 6s. 6d. per diem. It was the duty of the Director-General to examine hospital mates as to their professional knowledge, but they were to possess the certificates of the Court of Examiners at the College of Surgeons for regimental surgeons. Physicians were to be chosen from staff surgeons, or were to hold a degree in medicine from a university, or were to be licentiates of the College of Physicians. The Director-General, however, was empowered to hold in addition such examination as he thought proper.

These changes were made on February 24th, 1810, and Dr. John Weir was appointed the first Director-General, with Theodore Gordon and Charles Ker as the first Principal Inspectors. Weir did not hold his position long; he was succeeded in 1815 by Sir James McGrigor, the glory of army medicine, and from his assumption of office may be dated the real efficiency of the service.

While reform was slowly making headway in the control of the Army Medical Service, a considerable advance was taking place in the knowledge of medical conditions as they existed in the army. Sir John Pringle gave the first impetus to the study of diseases in the army by the publication, in 1752, of his *Diseases in the Army*, a book which marks the first attempt to systematize the subject, and to place it on a sure basis. The work is founded on the experience of Pringle while engaged as Physician-General to the Forces during the campaigns of 1742-48, in Flanders, Germany, and Scotland. This shrewd observer collected facts concerning the incidence of disease in the army, the effects of climate and locality, and the influence of variations of temperature and moisture on the health of troops while engaged on active service.

It is an appalling tale of serious disease constantly following the footsteps of the army, destroying its efficiency, and producing havoc in its ranks, compared with which losses in battle were trivial. The chief diseases responsible for these losses in effectives were dysenteries, remitting or bilious autumn fevers, and hos-

pital fever or typhus, besides pneumonias, pleurisies, and rheumatisms, which were of frequent occurrence. Apparently hospital fever or typhus was present in every hospital where soldiers were crowded together, lying on straw which soon became rotten, and constantly breathing the pestilential air; in the open camp this disease scarcely ever attacked them.

For the prevention of these diseases Pringle advocated that the sick should be removed to small regimental hospitals rather than crowded together in the large general hospitals. He also laid much stress on the importance of fresh air, dryness, and warmth, and on the necessity for frequently changing the ground on which the camp was pitched. He studied with great care the climatic conditions and the endemic diseases of the countries passed through by the troops. In particular he described at length the insalubrity of the island of Walcheren, and had the Government paid attention to his advice the disaster of 1809 would have been averted.

In 1764, twelve years after the appearance of Pringle's work, Richard Brocklesby published his *Economical and Medical Observations tending to the Improvement of Military Hospitals*, a book scarcely less important, but far less widely known than its great forerunner. Brocklesby was a fearless writer, and as the lifelong friend and admirer of the great Burke it was only to be expected that his energies would be directed towards the reform of abuses. It required no little courage for a physician to the army to assail the imperfections of the system and its exponents, but Brocklesby threw caution to the winds and risked his position rather than allow what he conceived to be abuses to pass without comment. He had high ideals as to the duties of doctors and commanders towards those over whom they were placed, and he gave his opinions in no uncertain manner. Apart from the excellent style of the book, the observations contained were often far in advance of the times. Brocklesby was the first to point out and carry into practice the principle that hospital fever, or typhus, could only be checked by admitting abundant fresh air into the hospitals. At Sandy Heath, near Ripley, and at Winchester, he caused to be constructed temporary hospitals cut out of the chalk and sand in such a way that they admitted a constant current of fresh air, with the result that the fearful epidemic which had raged in those places quickly subsided. He also attacked the methods in vogue of commandeering, while on active service, small cottages to serve as hospitals, which were expected to accommodate forty sick men, although constructed to house a family of five or six people.

Concerning the organization of the Army Medical Service he was no less outspoken. He was of opinion that the surgeon of a regiment should occupy a position immediately after the field officers, and that both should work together for the preservation of the health of the troops.

Other physicians wrote concerning military medicine, notably Donald Monro and Claghorn, but none of them exercised such a profound influence upon the subject as Pringle and Brocklesby. The work of these men was no doubt responsible for much of the progress made in this field of medicine, but it would have had little effect had it not been for the unremitting endeavours to secure departmental reform that came from within. The names of McGrigor, Borland, Jackson, and Young are closely associated with this movement, and it was largely owing to their ceaseless activities that the Commissioners of Military Enquiry were induced to examine the condition of the Army Medical Service in 1808.

After the system had been remodelled as the result of the report of the Commissioners for Military Enquiry in 1808 came Sir James McGrigor, and from the time he assumed control may be dated the modern army medical system. Although the Army Medical Service has passed through many vicissitudes since then, the main principles which have guided its destinies have not, I venture to think, materially changed.

It has always been stated that the Army Medical Board was deposed on account of its shortcomings with regard to the Walcheren expedition. This is a mistake, for the Commissioners for Military Enquiry had printed their report before that expedition was even thought of, and it was on the report alone that a change was decided upon. The

Walcheren expedition was a coincidence merely, which confirmed the War Office in its determination to effect a radical change.

The medical history of the expedition may be said to have begun with the capture of Flushing on August 15th, 1809, for at about that time sickness in an unusual degree began to be recorded among the troops quartered in South Beveland. The disease rapidly assumed alarming proportions, and by September 10th, when Lord Chatham returned with part of the army, leaving 16,000 men to hold the island of Walcheren, 8,000 of these were on the sick list. The diagnosis of the complaint presented no difficulty; it was clearly miasmatic in origin, and such as might be expected from a residence in the swampy islands of Beveland and Walcheren during the summer and autumn. Indeed, these islands had for a long time borne an evil reputation as being the most fever-ridden places in Europe. There was ample evidence of this, for fifty years before Pringle had given a full description of the complaint as it occurred in these same islands.

Much has been written concerning the conditions existing in Walcheren, but the most complete picture of the state of the army and the climate will be found in a letter written on September 11th, 1809, by Mr. John Webbe, the Inspector of Hospitals. He says:

Independent of the existing records of the unhealthiness of Zealand, every object around us depicts it in the most forcible manner. The bottom of every canal that has direct communication with the sea is thickly covered with an ooze, which, when the tide is out, emits a most offensive effluvia. Every ditch is filled with water which is loaded with animal and vegetable substances in a state of putrefaction, and the whole island is so flat and near the sea that a large proportion of it is little better than a swamp, and there is scarcely a place where water of a tolerably good quality can be procured. The effect of all these causes of disease is strongly marked in the inhabitants, the greater part of whom are pale and listless. The endemic diseases of this country, remittent and intermittent fevers, begin to appear about the middle of August, and continue to prevail until the frosty weather checks the exhalation from the earth, gives tone to the debilitated frames of the people, and stops thereby the further progress of the complaints. It is computed that nearly a third of the inhabitants are attacked with fever every sickly season. . . . The fever which now unhappily prevails in the army first appeared among the battalions cantoned in South Beveland, and only began to demonstrate its influence here about the time that Flushing surrendered. The rapidity with which the disease has extended itself during the short period that has elapsed is almost unexampled in the history of any military operations. . . . As the progress of the mischief is much greater than could rationally have been calculated upon . . . it must be an inevitable consequence of the British troops remaining in Walcheren that a very considerable loss must be sustained.

Three days after writing his letter, Webbe was stricken down with the fever, and the duty of supreme direction fell upon Francis Burrows, the next in seniority, after death had removed Mr. Aveling. The necessity for more doctors became urgent, and on September 14th one staff surgeon and three hospital mates arrived, with the excuse from the Army Medical Board that the war in the Peninsula had made such excessive demands upon the supply of surgeons as to render it impossible to send more. The condition of the army was now deplorable, and the dispatches of the Commander, Sir Eyre Coote, dealt with little else than the ever-increasing sickness. The accommodation for the sick was of the worst description: there were no convalescent hospitals, the supply of blankets, wines, and medicines began to fail, and typhus fever made its appearance.

The Government at last became alarmed, and, in response to the urgent solicitations of Sir Eyre Coote, they requested Sir Lucas Pepys, the Physician-General, to proceed to Walcheren to deal with the terrible sickness which existed in that island. But to the astonishment of all, Sir Lucas begged to be excused, on the ground that he, the Physician-General to the army, "knew nothing about the investigation of camp and contagious disease"! In this dilemma the Government appointed a medical commission composed of Sir Gilbert Blane, with the title of Acting Physician-General, Dr. James Borland, and Dr. William Lempriere, and, in addition, Dr. James McGrigor, Inspector-General of Hospitals. Blane and McGrigor arrived on September 30th, and at once made a close examination of the conditions as they existed. They found the roofless churches, houses, and other buildings crowded with sick men, and every day bringing fresh cases in hundreds. They found the medical staff quite

insufficient to cope with the work, and the stock of medicines and medical comforts almost exhausted, while pervading all they found an atmosphere of paralysis, panic, and despair.

The minds of Blane and McGrigor were soon made up as to the course to be pursued, and on October 1st they addressed a joint letter to Sir Eyre Coote. As a first precaution they recommended that about six thousand sick men should be shipped to England in ships of the line, since transports were inadequate. Sir Eyre Coote accepted this suggestion, and during the month of October the evacuation of the hospitals proceeded, with the result that for the first time the depleted medical staff was in a position to cope with the daily influx of sick soldiers.

Blane and his two colleagues returned home on October 10th, but McGrigor remained in supreme charge of all the medical arrangements. Here he laid the foundation of his immense reputation, and by his energy and sagacity quickly changed the state of medical chaos into one of tolerable efficiency. Sir Eyre Coote gave up the command of the army on October 29th, and was succeeded by General Don, the third commander in four months to occupy this unenviable position. It was a sorry army he was called upon to command, for he reported that he had only 4,534 men fit for duty, of whom about one-third was unfit for considerable exertion. But the agony of Walcheren was soon to be terminated; the Government decided to evacuate the island, and on December 9th the poor remains of the army embarked; all the heavy ordnance followed on December 23rd, and thus ended the famous expedition.

An exhaustive inquiry took place in 1810 by a Committee of the House of Commons, and the examination of the medical men connected with the expedition revealed an extraordinary state of divided control. The evidence showed that the authorities had never consulted the Army Medical Board with reference to the condition in Walcheren until the sickness began to be excessive. Indeed, until the expedition arrived in the Scheldt the board was ignorant of its destination, and therefore no special provision was made to counteract the dangers of the climate. Although it was proved that the medicines ran dangerously short, there was no evidence to show that the troops were ever in actual want. Blankets and other medical comforts were certainly in insufficient supply, and there was a totally inadequate medical staff to deal with the enormous amount of sickness, although some half-hearted attempts appear to have been made to remedy this defect. In fact, the chief blame that could be attached to the board was that, when the amount of sickness became known, it exhibited a supineness in grappling with the difficulty which nothing could excuse. No measures taken before the expedition started would have had any great effect upon the sickness, for the disease was malaria, which was endemic in Walcheren at the time the army landed. With the exception of some cases of typhus it was the sole cause responsible for the sickness, and removal from the evil climatic influences was the only remedy.

THE NAVAL MEDICAL SERVICE.

Materials for the study of the early history of medicine in the navy are extremely scanty, and it is not possible to describe with any degree of exactness the phases through which it passed until it became an established branch of the British Navy. Records from comparatively early times show, however, that physicians and surgeons were appointed from time to time to attend the commanders of various naval expeditions, and presumably to advise them concerning medical questions. One of the first of these appointments, if not actually the first, was that of Roger Marbeck, a Fellow, and the first Registrar of the Royal College of Physicians of London, who was appointed to attend on the Lord High Admiral Howard in his expedition to Cadiz in 1596. In the British Museum will be found a manuscript of Marbeck in which he gives an account of his adventures, and this may be regarded as the first report in existence dealing with the medical service of the navy. In the following year (1597), Henry Atkins, a president of the College, was appointed to the expedition of the Earl of Essex to Spain. The agonies of sea-sickness, however, only permitted him to go as far as Plymouth, where he was landed in an exhausted condition, and his place was taken by Thomas Moundford, another President of the College of Physicians.

In Cromwellian times it became the practice to appoint physicians to naval expeditions proceeding to foreign waters, and the duties attached to these appointments referred more to the care of the sick on board than to the care of the health of the commander of the expedition. Thus, Paul de Laune was appointed by Cromwell as physician to the fleet proceeding to Jamaica under Penn and Vennables. Soon after this the practice became established, and physicians and surgeons were regularly appointed to most of the warships in commission.

Early in the eighteenth century medical affairs in the navy were under the control of the Sick and Hurt Board, which was composed of medical and lay members. From an inspection of the minutes of this board in the Public Record Office, it does not appear that the authority conferred upon it was very ample, and for the most part its functions were advisory, and only when applied to by other naval departments. Indeed, at this time little care was taken of the health of seamen on whom depended the safety of these islands, and such solicitude as existed for their medical welfare was dependent almost entirely upon the energy and conscientiousness of individual naval surgeons. The standard of medical education required was of the lowest kind; they were obliged to provide their own drugs and instruments, and the authorities made no attempt to raise the medical service.

The work of the two great pioneers, James Lind and Gilbert Blane, produced a complete reformation in the Naval Medical Service. To Lind, perhaps, belongs the greater honour, for his was the first definite attempt to improve the position of medicine and hygiene in the navy. In 1754 he published his work on scurvy, a disease with which he was fully acquainted from the practical point of view. Previous to him many writers had, it is true, dealt with the subject, but in most of the accounts given no clear and precise description of the clinical features of the complaint is to be found. Lind sketched with really masterly hand the special features of this disease, and so ably did he delineate the picture that his description has been followed ever since. But he did more—he indicated the principles of the treatment of scurvy, and showed that, provided the proper antiscorbutics were carried on board ship, its terrible ravages would very soon become unknown. His wise advice, however, fell upon unheeding ears, and many years were to elapse before scurvy on board ship ceased to limit the naval and mercantile activities of this country.

In 1757 Lind published *An Essay on the Most Effectual Means of Preserving the Health of Seamen*. The book is not remarkable for its literary style, but is, nevertheless, full of shrewd observations and practical suggestions founded on an extensive acquaintance with disease on board ship. It is one of the most practical books ever written, and it is astonishing how true, even to-day, are many of the observations it contains. His recommendations concerning the care of the health of seamen, his insistence on the necessity for taking bark as a precautionary measure against miasmatic fevers, his remarks regarding hospitals on board ship, and the prevention of infection, had they been attended to, would have saved the lives of thousands of sailors. Probably, however, he was aware of the amount of prejudice his innovations would encounter, and that is the reason why his wise counsels are couched in a somewhat deferential tone.

Lind was essentially a pioneer in naval medicine and hygiene. In an age when no thought was given to the care of seamen on board fighting ships, when harsh and repressive discipline was common, he had the courage to point out to the authorities the importance of conserving the health of those on whom the country depended for its defence. His work was epoch-making, and from the time that he wrote, the attention of the Navy Board was drawn, though tardily, to this important subject.

If it be true that Lind sowed the seed of medical and hygienic reform in the navy, it is equally true that Blane tended and garnered the grain, and it is doubtful if the principles introduced by Lind could have obtained such wide acceptance without his powerful support. Blane was possessed of a most logical mind, a determined yet cautious spirit, and the ardour of a true reformer. He brought these qualities to bear on his work, and when he resigned the chief medical direction of the navy in 1802 a brighter

era of medical progress and efficiency had already dawned. In 1785 Blane published his book, *Observations on the Diseases of Seamen*, and it quickly ran through many editions. The plan of the work bears a somewhat close similarity to that of Lind. Its literary style is easy, almost graceful, and the method, true to the nationality of the author, is mainly deductive. But the chief excellence of the work is to be found in its foundation on a wide clinical experience.

The book is divided up into three sections. The first gives a detailed account of the sickness in the fleet under the command of Lord Rodney while cruising in the West Indies, from 1781 to 1783, to which fleet Blane was appointed physician in charge. He ordered the surgeons of ships to take complete notes of the cases and to furnish exact returns. These results he compiled, and almost for the first time made use of the statistical method in a manner simple yet correct. Although Blane's statistics would by no means satisfy an actuary, still his logical mind kept him clear of those pitfalls in figures and their manipulation into which our profession is so prone to stumble. The net result of his tables was that the annual mortality in the fleet from disease amounted to 125 per 1,000, not an excessive mortality when judged by the standards of those times. The second section of the book deals with the causes and prevention of disease, and here Blane frankly admits that much of the subject matter is derived from Lind. Indeed, in this section, it is Blane the disciple who is advocating the principles of the master. In the third division of the work observations on fevers are given, and, from the point of view of clinical acumen, this part is the most able and original of all.

The work of Blane and Lind had a profound effect upon the Naval Medical Service, but they were not the only pioneers in this field. The labours of Thomas Trotter in the direction of a more efficient medical service in the navy, and towards improvement in the naval hospitals, although scarcely less important than those of Blane, were handicapped by a disposition to attack the ruling powers for their failure to promote reforms. Robert Robertson was another reformer who did much to quicken the sense of the Navy Board towards the imperfection of the Naval Medical Service.

Not only were surgeons urged to fresh activity by the work of these reformers, but the naval authorities began to show interest in the subject of the preservation of the health of seamen, and in 1795 Lord Spencer, the First Lord of the Admiralty, reconstructed the old Sick and Hurt Board, and, under the name of the Commissioners for Sick and Wounded, set up an authority composed of two physicians and one civil member. To these he delegated the direction of all medical matters in the navy, and for the first time medical men were responsible for the Naval Medical Service. Dr. Robert Blair and Dr. Gilbert Blane were the two medical commissioners, and Sir William Gibbons was the civil representative. Blair, however, soon retired, and Blane at once began to put into practice the principles he had advocated years before. In all he remained seven years in supreme control of the medical service in the navy, and when, in 1802, he retired, the Naval Medical Service had been thoroughly regenerated; abuses had been modified or removed, and the way was left clear for progress on prudent lines.

Blane was succeeded by John Harness, who had been appointed a Commissioner in 1800, and who, with organizing ability superior even to that of his predecessor, carried forward still further the work of reform. At this time it was felt that the work of the medical department of the navy was onerous enough to demand the undivided attention of the Commissioners, and it was therefore decreed that they should not engage in private practice. It was, however, found that the Commissioners for Sick and Wounded were not sufficiently in touch with the other departments in the Admiralty, and in 1806 the board was abolished. The functions of the board were now performed by the Senior Medical Commissioner, who sat at the Transport Board, and thus the control of medical matters was vested in one head. Inspectors of naval hospitals were appointed in 1804, who acted under the direction of the Medical Commissioner, and in 1817 the Medical Commissioner was again transferred, this time to the Victualling Board, but his functions were the same. Besides Harness, John Weir and Andrew Baird shared in

the work, and at the end of the reign of George III the principles of medical control in the navy under one authority were well established, and have served as the model for all subsequent changes.

BONE GRAFTING IN GUNSHOT FRACTURES OF THE JAW.

BY

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FOR rather more than two years we have had charge of the "Jaw Department" at the 1st Southern General Hospital, Birmingham, to which all cases of injuries to the jaws requiring special treatment are sent from the whole Southern Command. A very large percentage of these cases suffer from compound fracture of the mandible. Successful treatment involves (1) osseous union, (2) functional occlusion, and (3) avoidance of disfigurement.

In the majority of cases these results have been obtained by means of mechanical technique associated with due regard to the establishment of aseptic conditions. In some, however, satisfactory results cannot be obtained by this technique alone. Where there is a gap between the bony fragments greater than half an inch osseous union is rarely obtained unless (1) the fragments are allowed to approximate at the expense of normal alignment, or (2) a bone graft can be successfully introduced.

The gap between the fragments may be due to extensive loss of bone at the time of the injury or to subsequent necrosis from resulting sepsis. Sepsis in these cases is always severe and unless adequately combated in the early stages may be extremely persistent.

It is essential that firm osseous union should be obtained even at the expense of deformity, otherwise the power of mastication is gravely impaired. When, however, the gap is wide, the deformity resulting from allowing the fragments to approximate is so great and renders the fitting of suitable dentures so difficult that it can only be the extreme resort. A satisfactory functional and cosmetic result can then alone be obtained by successfully bridging the gap by means of a bone graft.

Other classes of cases in which surgical assistance is necessary to secure osseous union are those in which (1) there is overriding or malposition of osseous fragments; (2) mobility of the fragments from muscular action cannot be prevented by mechanical means—for example, short posterior edentulous fragments.

Operation in these cases consists in carefully dissecting away the scar tissue from between and around the ends of the fragments, rectifying the deformity by the division of contracted muscular attachments and fibrous bands, and immobilizing the fragments by means of a plate and screws. If, as is often the case, a gap remains between the fragments when pared and brought into correct alignment, a small graft is introduced, and the technique is similar to that described for bone-grafting.

Bone grafting in fractures of the jaw resulting from war injuries has presented many difficulties, and at first success was so rarely obtained that the attempt was given up and discouraged by very competent surgeons as not being worth while. The alternative of obtaining union by allowing the fragments to approximate led to so much disfigurement and such awkward mouths to fit with satisfactory dentures when the gap was a wide one that we felt compelled to persevere, especially because osseous union could not be obtained in a definite percentage of cases in spite of all sacrifice of normal alignment, etc. To discharge such cases with non-union was a confession of failure that could only be made with extreme reluctance.

The technique we now employ has been reached only after much experiment, many devices having had to be abandoned. Without enumerating the various stages through which we have passed, we think that a short account of the preparation for and the performance of the operation now in use will be helpful. Whereas success was the exception two years ago, it is now the rule, and it rarely happens that the graft fails to heal firmly.

Preliminary Preparation.

This is prolonged, and it may be many months after the original wound was received before the operation of bone grafting can be undertaken. The fracture is always complicated by sepsis, usually severe, and often by extensive injury to surrounding soft tissues. As soon as possible an x-ray examination should be made, after which the patient should be anaesthetized and the wound explored. Foreign bodies, teeth in and adjacent to the fracture, and loose fragments of bone should be removed. Larger fragments of bone with reasonably good attachments to soft tissues may be left in the hope that they will live. At the same time it is often possible to carry out some rough plastic work, the fragments of bone being replaced in as normal a position as possible and soft tissues being drawn together. Care must be taken to provide for efficient drainage and access to raw surfaces inside the mouth.

A more or less prolonged interval must now elapse while wounds are healing. Sepsis is apt to be persistent, and one or more subsequent operations may have to be performed for the removal of sequestra and drainage of pockets. During this interval careful attention must be paid to the maintenance of the patient's physical fitness by careful feeding and suitable environment. Much can also be done, by means of dental splints, etc., to correct or prevent displacement of the fragments of the jaw by muscular action and contracting scar tissue, even though firm bony union cannot be secured.

Finally, before attempting to bone-graft, it is very important that dribbling of saliva from the mouth should be prevented by plastic operations. This dribbling is very common when there is a defect in the lower lip, and saliva soaking into the dressings greatly increases the risk of sepsis in the operation wound.

After all wounds inside and outside the mouth have healed an interval of from four to six weeks should elapse before the bone-grafting operation is performed. During this time the patient is usually sent to a convalescent hospital.

Immediately before the operation all dental fixation splints are removed from the mouth. It was found that the retention of these militated against the success of the operation. They caused risk from post-anaesthetic vomiting, greatly added to the discomfort of the patient, and, where pressure was exerted by them in or near the operation area, increased the risk of sepsis. For these reasons, no attempt is made to fix the fragments of the jaw during the operation or for about two weeks subsequently. Everything which interferes with prompt "healing in" of the graft must be discarded.

Operation.

A skilled anaesthetist is essential, and we owe much to the skill with which Captain McCardie has maintained successful anaesthesia under very difficult conditions.

A curved incision is made in the neck beginning one inch behind the extremity of the posterior fragment and ending one inch in front of the end of the anterior fragment. The incision commences and finishes about half an inch above the line of the lower border of the jaw and in the neck runs about one inch below that line. It is only by carrying the incision well below the jaw and raising a flap that sufficient soft tissue to satisfactorily envelop the graft can be obtained. Often at the site of the fracture there is nothing but dense scar tissue which extends through to the mouth, and great care has to be taken in splitting this to avoid opening into the mouth, an accident which necessitates postponement of the operation. The unsatisfactory bed provided by this scar tissue constitutes one of the difficulties of bone grafting in these cases.

The incision is deepened by cutting upwards and inwards until the lower border of each fragment is reached. The soft tissues covering the outer surface of each fragment are then raised for an inch away from the gap and turned up in the flap. The ends of the fragments and the

FIG. 1.