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SOME REFLECTIONS ON THE DEVELOPMENT OF WAR SURGERY.

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On the military side this war is so slow in development that we have much time in which to consider what we should do and how we should do it when the clash comes. I may therefore be excused if I go back in the surgical calendar and survey briefly the development of our craft in relation to war.

It will, I think, be admitted that a knowledge of traumatic surgery was first forced on man by fighting of the same sort. The surgery of wounds provided the school material in which our art developed. Experience of it coloured the whole of surgical practice until a relatively recent date, and in scientific era the military surgeon has continued to contribute materially to our knowledge and technique.

Without venturing into speculations on the sources of surgical knowledge exposed in the Hippocratic treatises, I may remind you that Galen, whose ingenious anatomical and physiological theories dominated and sterilized medicine from the third century till the era of Fabricius and Harvey, served his apprenticeship to medicine as Medical Officer in Charge of the Gladiatoral School at Pergamum. While there, he initiated the treatment of wounds with an absorbent dressing soaked in wine and reported excellent results. He stated that in his four years of office no gladiator died while under his care.

About the same period the Roman Army established a legionary medical service. The surgeons serving in this organization were of poor education and of low social status. No written records of their work have been found, but to judge by the instruments they employed they must have reached considerable technical efficiency. They may be credited at any rate with the introduction of the all-metal artificial limb if one may judge by the fine bronze specimen to be seen in the museum of the Royal College of Surgeons.

After the collapse in Europe of the western empire the resulting cloud of bigotry and ignorance involved all branches of medicine until the twelfth or thirteenth century. During this period there is no record of sound practice or any suggestion of any progress in surgery. It is true that the flame of medical knowledge was kept alight by the Arabic school, but the subject of surgery was neglected owing to religious prejudices. A re-awakening of intellectual life, and with it a thrust to free surgery from the jealousy and reactionary attitude of the physicians and clerics, came in the fourteenth century. This movement may be attributed in no small degree to the realistic experience of practical surgeons in the frequent wars of the period.

Henry de Mondeville (1260–1320) had a surprisingly modern outlook,
and his successor, Guy de Chaliac, published his "Grande Chirurgie" in 1363. This work remained the classical treatise on the subject up to the time of Paré. In it is described the treatment of fractures of the femur by traction over a pulley, the limb being supported by bolsters. The method appears to me to be the same in principle as that adopted at the present time in one of our specialized units. John Arderne, a contemporary of Guy de Chaliac, is the first English surgeon to find a place in the literature. He was a pupil of the Salerno School and had extensive active service in the Hundred Years' War. On his return to England after the Battle of Crécy he set up in practice at Newark and his services were much sought after. In his retirement he wrote a textbook and introduced to England an operation for fistula, much as it is practised today.

The extended use of fire-arms which took place in the fifteenth and sixteenth centuries introduced a new complication in wound treatment. It is easy to understand that the soft low-velocity missile of those days was often associated with the retention of the bullet. Taking into consideration the low standard of personal hygiene a gross mixed infection must have resulted from almost every gunshot wound. It is, therefore, not surprising that John of Vigo and others propounded the theory that gunshot wounds were poisoned and should be treated accordingly.

The method devised and adopted on this theory was to treat the wound with the actual cautery or boiling oil. It was not until 1536 that Ambrose Paré illustrated the unsatisfactory nature of this treatment and reverted to the use of simple and harmless dressing for all gunshot wounds. Ambrose Paré is the most striking figure in the middle period of surgical history and his direct and common-sense reasoning effected great advances in the art. He was a man of humble extraction and moderate education, and wrote all his medical treatises in the vernacular. This was of great advantage to the practising surgeons who were often not Latin scholars, but roused great enmity among the physicians of his period. He entered the army service at the age of 19 and subsequently became Army Surgeon in succession to Henri II, Francis II, and Charles IV. His account of his experience which led him to discard the cauterization of wounds is worth repeating.

"In the year of our Lord (1536) I was in the King's Army, the surgeon of Monsieur Montejan, General of the Foot. I will tell the truth: I was not very expert at that time in matters of Surgery [he was 26 or 27 years old], nor was I used to dress wounds made by Gunshot. Now I had read in John of Vigo that wounds made by Gunshot were venenate or poisoned, and that by reason of the gunpowder. Wherefore for their cure it was expedient to burn or cauterize them with oil of Elders scalding hot with a little treacle mixed therewith. It chanced on a time that by reason of the multitude that were hurt I wanted this oil. Now because there were some few left to be dressed I was forced, that I might seem to want nothing and that I might not leave them undressed, to apply a digestive made of yolk of an egg, oil of Roses and turpentine. I could not sleep all that night for I was..."
troubled in mind, and the dressing of the previous day (which I judged unfit) troubled my thoughts, and I feared that the next day I should find them dead or at the point of death by the poison of the wound, whom I had not dressed with the scalding oil. Therefore I rose early in the morning, I visited my patients and beyond expectation I found such as I had dressed with a digestive only, free from vehemence of pain, to have had a good rest and that the wounds were not inflamed nor tumified. But on the contrary, the others that were burnt with the scalding oil were feverish, tormented with much pain, and the parts about their wounds were swollen. When I had many times tried this in divers others I thought this much, that neither I nor any other should ever cauterize any wounded with gunshot."

Later in his career he reintroduced the ligature for the control of hæmorrhage. It is interesting to note that it was a century or more before the value of this method became generally recognized. In his published works on surgery and midwifery his description and the figures illustrating the reduction of dislocations is remarkably up to date. The use of massage was also introduced to Europe by him.

In the seventeenth and eighteenth centuries no outstanding surgical progress was made in the military field, but the work of two Service men calls for mention. James Lind (1716–94) was a naval surgeon who took an interest in nutritional questions. He published a book entitled "On the most effective method of procuring the health of Seamen." That hard-headed Yorkshireman Thomas Cooke read this book and adopted its principles on his voyages in the Pacific. He records that he had but one death in a crew of 118 men during the voyage and attributed this low mortality to the régime advised by Lind.

John Pringle (1707–82) was an Army doctor who may be regarded as the father of modern hygiene. He drew up rules for the placing of camps and for the control of enteric diseases in hospitals and gaols. His conclusions were based on sound common sense and were little altered till the latter part of the scientific era.

The Peninsular War brought into prominence several British surgeons, and Thomas Guthrie (1760–1842) may be mentioned as one of the more prominent ones. He wrote a book on gunshot wounds but, on his return to London he became, oddly enough, a prominent ophthalmic surgeon. In the Napoleonic period the most outstanding figure in surgery was Larrey. He accompanied Napoleon on nearly all his campaigns as his personal surgeon. He also took a big part, however, in the organization of the French Army Medical Service and was created a Baron. He was evidently a practical man as he introduced the use of plaster of Paris for splintage, and the scultet or many-tailed bandage.

The Crimean War cannot be said to have brought much credit to the English Army Medical Service. It will, however, remain a landmark in medical history on account of its having given Florence Nightingale the chance to develop her work and lay the foundations of our modern nursing
service. In the technical field Spencer Wells, working at Smyrna, introduced his classical artery forceps and Gamgee, at Malta, the absorbent dressing which is still associated with his name.

The Franco-Prussian War was of such short duration that little opportunity was offered for the proving of new ideas, but it is of interest to note that German surgeons employed the newly introduced Listerian method in the treatment of compound fractures.

The Boer War, despite its relatively long course, did not afford a great deal of surgical experience. The official figures give some measure of the preponderance of medical problems. In the first year the admission per 1,000 head of troops was 130 sick and 48 wounded. The relative mortality for medical and surgical cases was 18.1 and 2.9. The introduction of T.A.B. vaccine by Sir A. Wright was the outstanding medical contribution to this campaign and reduced the typhoid problem in the second year to manageable proportions. The conclusions of the surgeons working in South Africa were entirely conservative in their direction. This arose from the fact that the effective missiles were most frequently Mauser rifle bullets and because the campaign was carried out in uncultivated soil. So little suppuration was observed that no special means were taken to combat it.

The surgery of the Great War interests us most closely, and it is worthy of notice how the conservatism derived from South African experience controlled the handling of wounds in France in its early part. Its failure under the conditions then experienced was soon recognized, but it was a year or more before a sound remedy was found. It took longer still to free the profession from a faith in the value of chemicals applied to the surface of a wound and to realize their limited value in war surgery. The outstanding discovery in wound treatment was the introduction of debridement or wound excision. It is not worth disputing whether this procedure originated in the French, Belgian, or English armies. Its general extension in our service may be associated with the name of Sir Henry Grey.

The splinting of open fractures, especially those of the lower extremities, was greatly advanced by the introduction of the Thomas' and other skeleton splints. It may be noted that it took a war to draw the attention of the general surgeons to the value of the Thomas' splint in the treatment of fracture of the femur. Its use had long been recognized by the Liverpool School, but it was not until its value was urged by the forceful personality of Sir Robert Jones that it came into general use. Ingenious modifications and adaptations of this splint were introduced, many of them associated with the name of Sinclair.

The value of early operation as opposed to conservatism for perforating wounds of the abdomen was fully proved; in 1917 a recovery rate as high as 60 per cent was shown by some units working under favourable conditions on this class of injury.

The active treatment of chest wounds received considerable notice. Advances in the handling of open pneumothorax and empyema were made
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which have had no little influence on the development of modern technique in this field.

One may now consider how far advances since 1918 in traumatic surgery have affected our practice. The outstanding changes have been the increased use of plaster of Paris and skeletal traction. In wound treatment Winnett Orr, followed by Trueta, have carried to its logical conclusion the experience of the Great War. How far the use of the complete plaster case for all wounds will prove satisfactory remains to be seen; I have no doubt of its value in certain fractures, e.g. those of the tibia and fibula and of the forearm; provided always that the risks of a rigid casing are kept in mind.

Skeletal traction, which was introduced by Steinman in 1908, gives a degree of control to fragments which we had hitherto lacked. It should not be forgotten, however, that it introduces a potential source of bone infection and also enables such a powerful traction to be applied that the normal process of union may be interfered with. There is no doubt that the use of the method has increased the incidence of delayed union.

Our great hope of improvement in the handling of wound infections is based on the use of the sulphonamide group of drugs. We know their value in established streptococcal infections, but their use as prophylactic agents is as yet experimental. The same may be said of their use in anaerobic infections. The organization which puts at our disposal stored blood is a further factor which should assist in saving many cases of very severe injury.

I will conclude by suggesting that with such a rich experience behind us we stand well armed to carry out our part. What progress we make in wound treatment remains to be seen, but I think we may expect that with due enterprise our work will add something to the sum total of surgical knowledge.