THE INFLUENCE OF WARS ON THE CRAFT OF SURGERY.¹

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From time immemorial the instinct of man has led him to fight, either singly or collectively, for a multitude of reasons; and, unless human nature undergoes a very radical alteration, of which there is no evidence at present, the dream of a world at peace must remain but a dream.

A superficial glance reveals very little connection between the terrible and bloody strife of war and the beautiful, almost bloodless art practised by the surgeon of to-day. Indeed, is it possible to conceive a greater contrast between the deliberate destruction of life itself compared to the salvation or reconstruction of our maimed physical bodies in the modern operating theatre? Nevertheless, we will attempt to trace the evolution of our craft, commencing in the mythical ages, passing through medieval times to 1933. We shall then be in a position to appreciate how much of our modern surgical technique actually originated in the minds of those who laboured among the wounded in the wars of long ago. It will be proved beyond a shadow of doubt, that during the creation of our craft the most skilful surgeons were trained in naval and military circles. Not only that, but we shall see by many examples how it came to pass that the early leaders of surgical knowledge, the teachers and writers, were all recruited from those who had seen service in the field of battle. Finally, an endeavour will be made to show the tremendous influence which the last great war exerted upon the whole realm of surgery.

The idea of the title arose from a casual study of the armorial bearings of the Royal College of Surgeons of England. In these we see Machaon holding aloft in his right hand the broken arrow drawn from the side of Menelaus, brother of King Agamemnon.²

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² Pope in his translation of Homer's Iliad describes the incident thus:—

"... Machaon, to the king repair:
His wounded brother claims thy timely care;
Pierced by some Lycian or Dardanian bow,
A grief to us, a triumph to the foe.
The heavy tidings grieved the god-like man
Swift to his succour thro' the ranks he ran;
Where to the steely point the reed was joined
The shaft he drew, but left the head behind.
Straight the broad belt with gay embroidery graced
He loosed; the corselet from his breast unbraced;
Then sucked the blood, the sovereign balm infused
Which Chiron gave and Aesculapius used."
On another occasion Machaon cured the wound in the heel of Philoctetes. We may infer that the pathological lesion was a chronic sinus resulting from caries in one of the bones in the ankle due to an infective osteomyelitis. At any rate the stench arising from it was so appalling that Philoctetes was left isolated for a period of ten years in the island of Lemnos. He appears to have been a poor-spirited beast and dirty withal, or he would not have got his wound infected. However, Machaon's skill enabled him to return to duty. His duty, incidentally, consisted of tipping the arrows with his own particular variety of deadly poison. Perhaps this poison was responsible for the death of Achilles.

Thus, even in this age, we note that the leading surgeon in the land was on active service, in command of his own troops and in command of his own hospital. Hence we may conclude that Machaon, like many able surgeons, was an extremely versatile character.

Returning for a moment to the armorial bearings of our College, we see in the crest two anchors, two portcullises and the eagle—each symbolic of our three fighting services. Surely such a significant feature in the very seal of our Royal College reflects, without thought or design, the influence of wars on the craft of surgery.

We will now turn over some pages of surgical history and try to picture to ourselves the manner in which a surgeon was trained, in medieval times. John Arderne [1], who may be considered the first English surgeon of repute, commenced his career in the army. During the reign of Edward III he practised those principles which he had learned in the Hundred Years War, being on the staff of John of Gaunt. Returning home after the battle of Crécy, he finally settled down at Newark on Trent in 1349, perhaps, as Sir D'Arcy Power has observed, because the ravages of the Black Death caused a temporary cessation of hostilities in France and compelled the military surgeons to seek a more peaceful livelihood. Arderne lived in an age of chivalry when knights and gentlemen wore heavy armour, spending many hours in the saddle in all weathers. As a natural consequence, ischiorectal abscess was a very common complaint, the usual sequel being fistula-in-ano. Now it was Arderne who boldly invented the operation for cutting down and freely opening up the fistula. His description of the operation, with the woodcut illustrating the patient in the lithotomy position, differs very little from those given in modern textbooks.

Books [2] were rare in those days and yet he managed to write his "System of Surgery," which was founded on his experiences in the Hundred Years War. This book may be seen in the British Museum—a beautiful example of early English literature. It is interesting to note that he refers to his patients by their armorial bearings, never by their name.

In chronological order we come to one of the most remarkable and outstanding characters in the whole of surgical history, Ambroise Paré [3], the father of French surgery. Born of poor parents, he raised himself to a position that gave him a reputation famous throughout the world. Like every able surgeon he was an extremely shrewd observer; he pondered over his experiences and then took action. His life was spent with the armies and his entire surgical training was gained in camps.

In 1537 he was made surgeon to Colonel-General of Infantry René de Montijean, with whom he fought his first campaign in Italy. This lasted three years. Paré,
on joining up at the age of 26 years, had never seen a recent gunshot wound. He
was horrified, and not without reason, at the treatment of wounds then in vogue,
by pouring boiling oil into the wound to staunch the haemorrhage; and, if the supply
of oil failed, the red-hot iron was used as a cautery. He first observed that the
patients who were treated by the surgeons were much worse the next morning than
those who had been left alone. He then acted, and, fearful of the result, commenced
the treatment of wounds by the application of a dressing, viz., “digestive made of
the yolk of an egg, oil of roses and turpentine.” Thus it came about that a revolution
in the treatment of gunshot wounds had begun.

At the siege of Danvilliers in 1552, he performed an amputation, omitting for
the first time the use of the cautery, and so brought into practice for the first time
the ligature of blood-vessels after amputation, as he says, “binding them round with
a strong thread after they had been picked up by a crow’s beak forceps.” Thus the
most important procedure in the technique of any operation of to-day was brought
into being through the genius of Ambroise Paré, a military surgeon.

In addition to the above two remarkable achievements he invented the method
of reducing a dislocated shoulder by the heel in the axilla; he noted metastatic
abscesses in pyaemia; and he recognized fractures of the skull by contrecoup. Thus
it is not difficult for us to conclude that, like Machaon, he was an extremely versatile
character. His book on “The manner of treating wounds made by Arquebus and
other Firearms, and those made by Arrows, Darts and the like; and also Burns
made especially by Gunpowder” is a perfect mine of information on all subjects.
As Mr. Stephen Paget says of him, “Save Art and Politics, the works of Paré
contain every possible subject: anatomy and physiology, medicine, surgery,
obstetrics, state medicine, pathology, pharmacy, natural history, demonology, and
much else. The divine origin of diseases, the influence of the stars, the power of
devils, the nature of the soul, the history of medicine—he ranges from these to the
tricks of beggars and of quacks, the homely remedies of old women, the folly of
tight-lacing, the best sort of tooth powder and the right way to make pap for a
baby.”

Johnson’s translation of “The works of that famous Chirurgion Ambrose Paré out
of Latin, compared diligently with the French,” became the standard textbook for
English surgeons from its first edition in 1634 until at least the end of the century.

In England John Woodall [4] may be considered the contemporary of Paré. It
is largely due to him that the great traditions of Elizabethan surgery were transmitted
to the surgeons of the Commonwealth and Restoration. Like all Elizabethan
surgeons, he had gained his experience in the field. In 1591 he served as surgeon
to Lord Willoughby’s regiment. In 1627 he was specially ordered to Portsmouth
to attend the wounded returning from the Rochelle expedition. His chief works
were “The Surgeon’s Mate, or Military and Domestique Surgery,” and “The Viaticum: being the Pathway to the Surgeon’s Chest.” Both these books are
profusely illustrated with either a naval or military background. At this period
they were classed as the standard textbooks of the day. What he wrote of gunshot
wounds then is still perfectly true to-day. “No wound of gunshot can be said to
be a simple wound, neither was there any artist that could truly say he healed any
gunshot wound by first intention.”

Woodall also invented the modern trephine, worked by hand and fitted with the
removable centre pin. Of this instrument he wrote as "being of my own composing; is more compendious and of more facility than is the trepan" which had no centre pin and was worked by a brace, one end of which rested against the surgeon's breast. Although other methods of opening the skull are now gradually superseding the trephine, the modern pattern of this instrument is practically identical with that invented by Woodall.

Following Woodall came Richard Wiseman [5], and few men have exercised so wide an influence over English surgery as he. How did he learn his craft? At the age of 21 he entered the Dutch naval service in which he served in several naval actions. Then, returning to England he joined the army of King Charles I and was present at the battles of Worcester, Truro and Dunbar; he served throughout the campaign in the West of England. When, however, the Commonwealth made the country uncomfortable for the Royalists, he served as a surgeon for many years in the Spanish navy.

Wiseman formed an important link between the Elizabethan surgeons and Cheselden and Percivall Pott, who may be considered to represent the dawn of modern surgery. He may be looked upon as being the first consulting surgeon, since he never saw a patient unless recommended by another doctor. He was a prolific writer, chiefly on such subjects as tumours, ulcers, the King's evil, and so forth.

Up to this period we see very clearly that wars produced the most skilful surgeons of the time, and it is on this foundation, rough and coarse though it may appear to us in these enlightened days, that the fabric of surgery was built. In 1674, Morel invented the tourniquet, at the siege of Besançon—another valuable addition to our craft. Some years later, Petit modified this by adding the screw.

Now we come to the Napoleonic wars in which Larrey, surgeon-in-chief to the Grand Army, became the foremost surgeon of his time. He may be looked upon as a worthy successor to the great Ambroise Paré. His experience was gained in sixty great battles, including Waterloo, and four hundred engagements. He himself was wounded three times. Larrey was the first to introduce plaster-of-Paris as a splinting material. He also invented what is known as "Larrey's bandage," which is after the fashion of a many-tail with its edges glued together. His method of disarticulating the humerus at the shoulder-joint by the external racquet is still practised. It is said that he performed two hundred amputations in a single day, and Napoleon I referred to him as being the most virtuous of men.

His contemporary was George James Guthrie [6] who has been termed the English Larrey. He, too, saw an extraordinary amount of active service as an assistant-surgeon in North America and also in the Peninsular war, during which he earned the special commendation of the Duke of Wellington. He was attached to the 29th regiment when he was only 16, and his colonel was only 24. Yet it was said that no regiment was better commanded or better doctored. He was the principal medical officer at the battle of Albuera at the age of 26. On one evening he had three thousand wounded on his hands, with four wagons, and only such equipment as the regimental surgeons carried in their panniers, the nearest village being seven miles away. After being placed on a period of half-pay he became a distinguished ophthalmic surgeon. He introduced the straight splint for fracture of the femur, and was the first to tie both ends of the artery at the site of injury, contrary to
the teaching of the great John Hunter. He described in detail the compressor urethrae muscle—still known as Guthrie's muscle. He wrote "A Treatise on Gunshot Wounds," which became the standard work of the day, and later, "Operations for the Formation of an Artificial Pupil," and "Lectures on the Operative Surgery of the Eye." An interesting link with the past lies in the fact that the father of Sir D'Arcy Power was an assistant-surgeon to Guthrie.

The Crimean War left us two important legacies. In 1855 Mr. Sampson Gamgee [7] became surgeon to the British Italian Legion, being in charge of the hospital at Malta where many of the wounded were treated; but it was not until 1880 that he gave his epoch-making lecture to students at Birmingham on "Absorbent and Antiseptic Surgical Dressings." Thus the poultice was supplanted by the absorbent dry dressing, which in its turn was followed by the cyanide or iodoform gauze and finally by the sterile gauze of to-day. Again another revolution in the treatment of wounds had begun.

Just before this, in 1841, Thomas Spencer Wells [8] joined the Royal Navy as a surgeon. He acquired such a reputation as a surgeon in Malta that the Fellowship of the Royal College of Surgeons of England was conferred upon him in 1844. In 1848 he resigned his commission and visited Paris to see the gunshot wounds coming from the barricades. Then he went out to the Crimea and became surgeon to the civil hospital in Smyrna where he used his forei-pressure forceps which, almost a hundred years afterwards, still bear his honoured name.

Thus two of the most valuable assets in our craft, viz., the dry dressing and the Spencer Wells forceps, were a direct outcome of experiences in the Crimean War.

Finally we come to the effect of the last Great War upon the practice of surgery. In estimating this we should remember that by this time the realm of surgery had extended its boundaries and become one vast expanse, and yet there cannot be found a single subdivision which did not receive benefit to a greater or lesser degree.

It is manifestly impossible to refer to the work of every individual surgeon, but we may discuss with advantage certain general aspects attributable to the Great War.

(1) The rise of orthopaedic surgery.—Most of us present are old enough to remember the appalling scenes which occurred more especially during the first two years of the war. The wounded were numbered by thousands; the wounds were of a severity hitherto unknown; the heaviness of their infection passed the bounds of the most vivid imagination, while the complicated nature of the fractures exacted a heavy toll in crippling disabilities and death.

Under such conditions it became evident that the very magnitude of this stupendous task lay beyond the power of the Army and Navy medical resources. Consequently, with great foresight, the Medical Director-General of the Army invoked the aid of Lord Moynihan, Sir Harold Stiles and Sir Robert Jones, and the Medical Director-General of the Navy, that of Sir Watson Cheyne, Sir George Lenthal Cheattle and Sir George Turner.

Sir Robert Jones quickly gathered together a band of enthusiastic surgeons, defined the scope of orthopaedic surgery and carried his ideas into effect—not without some opposition. However, his skill and tact smoothed away all prejudice. Consequently special hospitals for the treatment of fractured femur were set up in France, and orthopaedic hospitals sprang up at home. This tremendous feat of
organization constituted a personal triumph for Sir Robert Jones, and there is not
an orthopaedic surgeon living to-day who does not owe a heavy debt to his guidance
and inspiration.

The practical results of this new régime immediately became evident. The
treatment of fractured femur, largely owing to the work of Pearson and Maurice
Sinclair, underwent a revolution. The Thomas's knee splint, invented by Sir
Robert Jones's uncle some seventy years previously, may be said to have been born
anew. To-day there is not a single modern police-ambulance which does not carry
one as part of its standard equipment.

Our ideas of amputations were completely changed. For instance, in the region
of the foot, such methods as those devised by Chopart and Pirogoff were relegated
to memories of the past, while the value of the Syme was greatly enhanced. The
old sites of election disappeared and, by co-operation with the manufacturers of
artificial limbs, new ones took their place.

Thus out of all this experience have arisen the true orthopaedic surgeons of
to-day, one or two of whom are attached to every large hospital in every civilized
community.

(2) The value of co-operation among surgeons themselves, i.e., team work.—A
year before the great war Sir Rickman J. Godlee wrote: "We are all brothers
working hand in hand for the advancement of our science." No sooner had the
war begun than this great truth became evident to everyone. "The business of
surgery is individualistic, competitive, and secretive, but the science of surgery is
altruistic, public and above all co-operative." Those words may be applied very
aptly to the medical branches of our three fighting services to-day.

The war in this respect exerted a most profound influence over British surgery
whose insulation or insularity broke down completely when brought into close
contact with contemporary French and American practice. As a natural sequel
surgical units have grown up in our hospitals where team work among the surgical
specialists forms the most important feature of the system.

Nothing but this great upheaval could have brought about such an inestimable
benefit. Our conservative and somewhat narrow views were in a moment trans­
formed to a more liberal and broader plane on which we are now building our hospital
organization. Not only has this resulted in specialism in the different branches of
surgery being brought to a greater state of perfection, but as we are sometimes apt
to forget, the patient receives the reward of such a benefit.

(3) The introduction of new types of antiseptics.—The heavy infection of the
wounds served to stimulate a thorough search for more effective antiseptics. Early
in 1915 an opportunity arose for me to visit Edinburgh, as my ship was based on
Rosyth. Just previously to that, the work of Lorrain Smith and Ritchie resulted in
the production of the Edinburgh University solution, or what is generally known as
eusol. About the same time Dakin discovered a similar solution and thus the
Carrel-Dakin method of treating infected wounds came into use. Later, through the
agencies of chemists in the laboratories, a valuable class of antiseptics derived from
synthetic dyes sprang up—such as brilliant green, flavine and acriflavine. Thus it
has come about that carbolic acid and perchloride of mercury do not now enjoy their
pre-war popularity.

(4) The great stride forward made in the plastic surgery of the face, particularly
The Influence of Wars on the Craft of Surgery

The nose and lips.—Examples of the dreadful disfigurement caused by modern projectiles may still be seen in that part of the museum of the Royal College of Surgeons of England which has been called the chamber of horrors. Here are a series of plaster casts moulded from faces which had lost one or more of their features—faces so ghastly and yet so life-like! The mental anguish which patients so mutilated must have suffered can be better imagined than described. It can only be measured by the immensity of their gratitude when it was found possible to reconstruct a nose, lip or jaw from their own flesh and blood, by means of the pedicle tubed graft. The work of Sir Harold Gillies at Aldershot was that of a pioneer. Such patient, delicate and beautiful artistry has justly earned its place in the forefront of specialized surgery.

The enormous amount of surgical work performed during the war lies outside the scope of this address, and only very brief references have been made to four aspects of it. However, I would remind you of the work of Bayliss and Dale in rescuing from chaos the problem of surgical shock, the work of Sir George Makins in the surgery of the blood-vessels, and the great advances made in the surgery of the chest. All this will suffice to indicate that at least some good emerged from that terrible disaster which almost overwhelmed us in those eventful years from 1914 to 1918.

In conclusion I must pay my grateful tribute to Sir D'Arcy Power, from whose writings and eponyms in the British Journal of Surgery I have quoted freely.

Finally, let us not forget that most of those characters, whom I have briefly mentioned, denote our own predecessors in the fighting services. We have inherited their legacies, handed down through each succeeding period of our history, and so, whatever the future may hold in store for the science of surgery, her craft must ever reflect the glories of the past.

REFERENCES.