SCIENCE

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BEFORE AND AFTER LISTER[1]

LECTURE I, "BEFORE LISTER"

ON July 1, 1861, I entered the service of the State of Massachusetts as assistant surgeon of the Fifth Massachusetts, and on July 4 was sworn into the service of the United States in the shadow of yonder capitol. On August 1 I was honorably discharged and resumed my medical studies at the Jefferson Medical College. Strange as it now seems, when assistant surgeon I was not yet a graduate in medicine. As an evidence of the loose way in which medical and military matters were then conducted, I was actually appointed without any examination whatever.

After graduating in March, 1862, I again entered the service in May, after an examination, and was ordered to the Eckington Hospital in the then outskirts of Washington. Shortly afterwards I was ordered to fit up two churches as hospitals and to have them ready in five days. It was 5 P.M. on a Saturday afternoon.

People sometimes imagine that a practising physician can be transformed into an army surgeon merely by putting a uniform on him. I was not lacking in ordinary intelligence and was willing to work, but I was utterly without training. To get those two churches ready as hospitals I had to have beds, mattresses, sheets, pillow-cases, chairs, tables, kitchen utensils, knives, forks, spoons, peppers and salts, all sorts of crockery and other necessities for a dining-room, all the drugs, appliances and instruments needed for two hundred sick and wounded men; I needed orderlies, cooks and the endless odds and ends of things which go to make up a well-organized hospital. I did not know how to get a single one of these requisites. As to drugs, I did not know whether

[1] Two lectures before the U. S. Army Medical School, Washington, D. C., April 27 and 28, 1915.

to order six ounces or a gallon of laudanum, an ounce or two or a pound or two of opium, and I was in utter darkness as to the mode of getting any of the other things from a teaspoon to a cook. However, I inquired and as soon as I learned how, I set myself to work. For two nights I slept only about three hours each, and I had the satisfaction of reporting to Dr. Letterman at the end of three days, instead of five, that I was ready. On the fourth day I had one hundred wounded men in each hospital.[2]

I congratulate you in this more enlightened age and as students in this fine school where you are trained and drilled in matters which we had to cope with in our stumbling way, by dint of desperately hard work, without guidance, often learning only by our bitter mistakes.

We, the few surgeons still surviving those momentous four years, may well say to you *Morituri salutamus.*

I have been so very fortunate as to live during the whole period of the greatest revolution surgery has ever passed through. How strange seem these words of Erichsen, the then foremost London surgeon and Lister's early chief at University College Hospital uttered in 1874, just as surgery was on the eve of its very greatest triumph.

Surgery in its mechanical and manipulative processes, in its art in fact, is approaching, if it has not already attained to, something like finality of perfection.[3]

Anesthesia in 1846 and 1847 had robbed operations of the terror of agonizing pain. Quick, "slap-dash surgery"—a necessity before the days of anesthesia—then gave way to delicate, painstaking, artistic surgery. Antiseptics thirty years later relieved the patients from the terrors of death and gave to the surgeon restful nights and joyous days.

Hence when I received the kind invitation to address you it seemed to me that I could possibly render you some service by describing the state of surgery "Before and After Lister," since my testimony would be that of an eye witness.

When the Apostle Paul was about to be bound and scourged you remember that he claimed immunity as a Roman. "With a great sum obtained I this freedom," explained the chief captain. "But I," said the Apostle, with justifiable pride, "was free born." "With a great sum" of the most strenuous labor the men of my generation acquired the knowledge and the skill and the immense satisfaction of the antiseptic and aseptic era—but you, you are "free born" and have entered into a rightful heritage from your fathers. "Before Lister" and "After Lister" in the surgical calendar are the equivalents of "B.C." and "A.D." of our common chronology.

Modern military surgery may be said to begin with Ambroise Paré in the middle of the sixteenth century. Gunpowder, though long known, had been used in warfare to any large extent for only a few decades. The belief, shared fully by Paré himself, that such wounds were "poisoned," was universal. Treatment was directed to the destruction of the supposed poison by pouring boiling oil and hot pitch into such wounds. In the heat of his anger at the inhumanity of the new weapons he says in his preface to Book XI., "Of wounds made by gunshot and other fiery Engines and all sorts of Weapons":[4]

I think the deviser of this deadly Engin hath this for his recompence that his name should be hidden by the darkness of perpetual ignorance as not meriting for this his most pernitious Invention Any Mention from Posterity.

Yet with a curious inconsistency he immediately gives the name of a German monk as the "deviser."

[2] Keen, "Addresses and Other Papers," 1905, p. 424.

[3] Wrench, "Lister's Life and Work," p. 281.

[4] "The Works of that Famous Chirurgeon Ambrose Parey," translated by Th. Johnson, London, 1678, p. 270.

Listen to his quaint story of how he discovered that gunshot wounds were *not* poisoned. In 1536

it chanced on a time that by reason of the multitude that were hurt I wanted this Oil ["oyl of Elders Scalding hot with a little Treacle mixed therewith"]. Now because there were some few left to be dressed I was forced . . . that I might not leave them undrest to apply a digestive made of the 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 precedent 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 wounds. . . . 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 vehemency of pain, to have had a good rest and that their wounds were not inflamed . . . but . . . the others that were burnt with the Scalding Oyl were feverish tormented with much pain . . . and swoln. 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.[5]

But he still advocated the actual cautery for arresting hemorrhage even down to early in 1552. But later in that same year he changed his practise and thus describes his introduction of the ligature—a famous advance.

I confess here freely and with great regret that heretofore my practise has been entirely different from that which I describe at present after amputations. . . . I advise the young surgeon to abandon such cruelty and inhumanity and follow this better method. . . . Having several times seen the suture of veins and arteries for recent wounds which were attended by hemorrhage I have thought that it might be well to do the same after the amputation of a limb. Having consulted in reference to this matter with Etienne de la Rivière, Ordinary Surgeon to the King, and other surgeons sworn of Paris, and having declared my opinion to them, they advised that we should make the experiment [espreuve] on the first patient that we had, but [note his cautious uncertainty] but we would have the cautery all ready in case of any failure of the ligature. I have done this on the person of a postilion named Pirou Garbier, whose right leg I cut off . . . following a fracture.[6]

At the Siege of Danvilliers[7] also in 1552 he records the amputation of the leg of a gentleman in the suite of M. de Rohan "without applying the actual cautery." In another place[8] Paré says that he was taught this new method "by the special favor of the Sacred Deity." He also refers to Galen's advocacy of the ligature. After many trials, Paré definitely adopted the ligature and "bid eternal adieu to all hot Irons and Cauteries."

He does not seem to have lost sleep over the ligature as he did sixteen years before when he abandoned the boiling oil and the hot pitch. Both were experiments on human beings. "Human vivisection" would have been the outcry of a sixteenth-century antivivisection society. But had he or some successor *not* made these experiments we should still be filling gunshot wounds with boiling oil and hot pitch and searing amputation flaps with the actual cautery. How much greater a boon to humanity it would have been if years earlier instead of experimenting in both cases on human beings first, Paré had experimented on a few animals to determine whether gunshot wounds *were* poisoned and whether the ligature or the cautery *was* the best means of arresting hemorrhage.

We can also incidentally learn how the doctrine of euthanasia was applied in Paré's time in the case of the desperately wounded by the following incident.

In his first campaign, entering a stable where he expected to put up his own and his man's horses, Paré

[5] Johnson's "Paré," p. 272.

[6] Malgaigne's "Paré," Chap. XXVI., pp. 227, 230.

[7] Malgaigne's "Paré," III., 698.

[8] Johnson's "Paré," London, 1678, Book XII., Chap. XXIV., p. 305.

found four dead soldiers and three propped against the wall, their features all changed, and they neither saw, heard nor spake, and their clothes were still smouldering where the gun-powder had burnt them. As I was looking at them with pity there came an old soldier who asked me if there was any way to cure them. I said no, and then he went up to them and cut their throats gently and without ill will toward them.[9]

Leaping over three and a half centuries of only moderate progress, let us next consider the state of surgery a hundred years ago. No better representative perhaps could be chosen than John Bell, the professor of surgery in Edinburgh, whose "Discourses on the Nature and Cure of Wounds" had reached a third edition in 1812, and his "Principles of Surgery" a new edition in 1826, to which his brother, Sir Charles Bell, also contributed.

In the former he states that tents or setons were much in use and the surgeons "were quite delighted with seeing prodigious quantities of matter spouting out when they drew their spigot away" (p. 299).

As to abdominal wounds he says:

> Having put it down as a prognostic, which is but too well confirmed, by much melancholy experience, that wounds of the belly are mortal, there is no reason why we should, in recording our cases, take any note of a man having died after such a wound. Death from such a wound is a daily and expected occurrence and, therefore, is not marked; but if we find that a man has escaped, are we not to record every such escape? (p. 313).

Per contra, to-day recovery has been achieved after 19 wounds of the abdominal viscera!

He considers wounds of the joints also as mortal, and amputations even in the most favorable circumstances did not heal under four, five or six months!

In his "Principles of Surgery"[10] he pictures the wards of a hospital as follows: You look

> upon limbs variously wounded, but all of them lying out, swollen, suppurating, fistulous, rotting in their own filth, having carious bones, bleeding arteries and a profusion of matter; the patients exhausted in the meanwhile, with diarrhea, fever and pain.

Again he refers to a wounded limb as "soaking in suppuration" and again, of its "lying in a slush of matter and foul poultices."

He relates the case of an officer under the care of Guérin, a French surgeon. He was wounded by a ball which had broken the fifth rib twice and traversed the entire chest. After dilating the wounds, Guérin introduced a seton ["a great strap of coarse linen"],

> which, of course, went across the breast as a bowstring crosses a bow, and this seton he continued to draw with a perseverance which is truly wonderful from the first day to the thirty-eighth day of the wound; during all of which time the patient's sufferings were dreadful (p. 458).

In fifteen days the patient was bled twenty-six times. After the removal on the thirty-third day of a splinter of bone, which had been imbedded in the lung, the patient, strange to say, recovered both from the wound and from the surgeon. It is not to be wondered at that Bell condemns such treatment. But it existed in the practise of reputable surgeons.

Erysipelas, tetanus, pyemia, septicemia were rife. Hospital gangrene was endemic in many if not most hospitals, due to inevitable infection in practically every wound. Veritable epidemics were frequent. Is it any wonder that it had always been present for nearly two hundred years in the Hôtel Dieu in Paris when there were often from two to six patients (and such patients!) in one bed? Passing along the streets of Paris even during the Crimean War[11] "one could

[9] Paget's "Ambroise Paré," p. 31.

[10] John Bell's "Principles of Surgery," new edition, with comments by Charles Bell, London, 1826, p. 86.

[11] Wrench's "Life of Lord Lister," p. 239.

recognize at a distance a surgical hospital owing to the stench of the human putridity it contained." In the surgical wards, "no matter how well ventilated, there was a fetid sickening odor" up to the days of Lister himself, wrote Sir Hector Cameron, Lister's house surgeon in Glasgow. Death always stalked grimly behind the surgeon.

> Secondary hemorrhage, tetanus, erysipelas, septicemia, pyemia and hospital gangrene were never all absent . . . and at times pyemia and hospital gangrene became alarmingly epidemic.[12]

After vividly describing the ravages of hospital gangrene Bell then vehemently asks:

> What, then, is the surgeon to do? Is he to try experiments with ointments and plasters while the men are dying around him? Is he to seek for washes and dressings to cure such a disease as this? Is he to expend butts of wine contending, as it were, against the elements? No! Let him bear this always in mind, that no dressings have ever been found to stop this ulcer, that no quantities of wine or bark which a man can bear have ever retarded this gangrene; let him bear in mind that this is a hospital disease, that without the circle of the infected walls the men are safe; let him, therefore, hurry them out of this house of death; let him change the wards, let him take possession of some empty house and so carry his patients into good air; let him lay them in a schoolroom, a church, on a dunghill, or in a stable; let him carry them anywhere but to their graves.[13]

To-day we do not even know the bacteriology of this foul disease. I saw many cases of it during the Civil War, but since 1865 I have never seen a single case. There has been no opportunity to discover its germ if, as is probable, it is a germ disease. Lister made its return impossible.

But let us come down next to the period immediately before Lister's work.

You can not do better than read that remarkable and revolutionary paper entitled "Hospitalism" by Sir James Y. Simpson, of Edinburgh, published in 1867.[14] It was a bombshell whose explosion aroused the profession as hardly any other paper in my lifetime. The controversy was bitter and widespread. Fortunately, antisepsis came close upon its heels and has forever done away with such a disgrace.

Simpson collected the statistics of the obstetrical mortality in hospitals and in homes with the following startling result.

> Of 888,302 women delivered in hospitals, 30,394 died or 1 in 29—3.4 per cent.
>
> Of 934,781 delivered at home, 4,045 died, or 1 in 212—0.47 per cent.

The reason for the greatly increased mortality in maternity hospitals—over seven times greater than in individual homes—was chiefly puerperal fever. After Oliver Wendell Holmes (1843) and Semmelweiss (1861) had attacked the evil, Pasteur finally in 1879 showed its bacteriological cause and gave it the *coup de grâce*.

The 0.47 per cent. of Simpson's home cases has been reduced to 0.15 per cent. and even 0.08 per cent. in the maternity hospitals of to-day.

But his chief assault was upon the surgeons. He analyzed the four main amputations—arm, forearm, thigh and leg—and excluded amputations at joints and all the minor amputations (fingers, toes, etc.).

> Of 2,089 such amputations in hospitals, 855 died, or 41 per cent.
>
> Of 2,098 in country practise, 222 died, or 10.8 per cent.

The latter were collected from 374 country practitioners, thus eliminating the personal equation. The difference was clearly due to the crowding and lack of sanitation in the hospitals of that day.

He gives two very interesting tables. The first is most instructive in showing the

[12] Cameron, *British Medical Jl.*, Dec. 13, 1902, p. 1844.

[13] Bell, "Principles of Surgery," 1826, I., p. 149.

[14] Simpson's Works, Vol. II., p. 345.

results in the then unsanitary state of all hospitals.

Mortality After the Four Selected Amputations in Proportion to the Number of Beds in the Hospitals

In the large Parisian hospitals	62 in 100 die
In British hospitals with 300 to 600 beds	41 in 100 die
In British hospitals with 300 to 201 beds	30 in 100 die
In British hospitals with 200 to 101 beds	23 in 100 die
In British hospitals with 100 to 26 beds	18 in 100 die
In British hospitals with 25 beds or less	14 in 100 die
In isolated rooms in country practise.	11 in 100 die

In the second he tabulates the mortality according to the experience of the operator.

Death Rate After the same Four Amputations in Accordance with the Experience of the 374 Operators

Those who had done less than 6 amputations	lost 1 in 7
Those who had done from 6 to 12 amputations	lost 1 in 9
Those who had done 12 or more amputations	lost 1 in 12

What an argument for the necessity for a year in a hospital for the recent graduate before allowing him full liberty of action!

In France matters were as bad if not even worse. T. Holmes and Bristowe in 1861 had found that in Paris, of 102 of the four amputations in question, 67 died, a mortality of 65.7 per cent., or two out of every three. Out of 1,656 amputations in the Paris hospitals collected by Malgaigne and Trélat 803 died, 48.5 per cent., almost one in every two (Simpson, p. 291).

To-day, how entirely changed is all this. Listerism has transformed what Bell well called "Houses of Death" into "Havens of Safety." No home, however wealthy its inmate, can be as sanitary, as surgically clean or give as good results as a modern hospital.

The best evidence of the truth of this statement I can give you is the statistics of Dr. W. L. Estes,[15] of South Bethlehem, Pennsylvania. They are of especial value in that they are the statistics of the same surgeon in the same hospital and on the same class of patients. He reports the result in 724 major amputations. In 616 single amputations there were 28 deaths, a mortality rate of 4.54 per cent. Of 469 of the four selected amputations, 25 died, a mortality of 5.3 per cent. Of synchronous double, triple and one quadruple amputation, many of them complicated with other wounds and operations, there were 108, with 19 deaths, a mortality of only 18 per cent. It is very noticeable that in an earlier paper in 1894 in which he had reported the first 46 cases of synchronous double, triple and quadruple and complicated amputations, there were 13 deaths, 28.3 per cent., whereas from 1894 to 1913 in the last 62 such cases there were only six deaths, a mortality of 9.6 per cent., showing again the value of still larger experience even to an already experienced surgeon. In the second series there was no quadruple amputation.

But as officers of the Medical Corps of the Army you will be especially interested in the facts as to military surgery before and after Lister. Capt. Louis C. Duncan of our corps published a very interesting and comprehensive article[16] just before the present European war broke out.

He states that in Motley's "Rise of the Dutch Republic" in three volumes covering "30 years of almost constant sanguinary warfare" in the sixteenth century he "never once alludes to an army surgeon or an army hospital"! The surgeons were undoubtedly not officially attached to the army, but were in the suites of kings,

[15] *Annals of Surgery*, July, 1913.

[16] *Journal of the Military Service Institutions of the United States*, March–April, 1914.

princes or great nobles, as was Paré, in the same century.

To Sir James McGrigor in the Peninsular Campaign (1808–11) only fifty years before our Civil War, is given the credit by Duncan of first collecting accurate military medical statistics.

One hundred and fifty years ago 25 per cent. or more of the wounded died. In the Civil War and in the Franco-Prussian War of 1870–1 the rate had fallen to about 15 per cent., while to-day up to the present war not over 5 or 6 per cent. die of wounds.

The Crimean War will always be an example of utter inefficiency in the English and even worse in the French army. Its one bright spot is the splendid epoch-making work of a woman, Florence Nightingale, whose labors were unceasing and effective. Every war since then has seen less sickness and fewer deaths because of what she then accomplished.

Chenu, the French medical historian of that war, has made one curious and interesting calculation, partly official, partly estimated. The number of projectiles of all kinds actually fired he gives as 89,595,-363. The total number of killed and wounded was 175,057. This would show that it took 512 projectiles to kill or wound one man. Such a disproportion would more than justify a cartoon during our Civil War. Two soldiers were surprised by a hundred of the enemy. One proposed to the other to run for it. "No," was the cool reply, "There's no danger, for they say only one ball in 200 ever hits and there are only one hundred of those fellows."

Duncan's figures give 82,901 British soldiers sent to the Crimea, but the average strength was only 34,559, or only about 40 per cent., of effectives. The killed (2,755) and the deaths from wounds (2,019) gave a battle death rate of 69 per 1,000 per annum, while the disease death rate rose to 230 per 1,000 per annum.

In all, 300 men out of each 1,000 perished each year!

But the French statistics are still worse. While 315,000 were sent out, the average strength was less than 104,000 effectives, or only 33 per cent. The killed numbered 7,607 and the deaths from wounds 8,813. The battle death rate was 70, the disease death rate 341, per 1,000 per annum. Over 6,000 died from typhus alone.

Could there be a nobler example of the altruism of our profession—an altruism often tested and never in vain—than that shown by Drs. Richard P. Strong, Thomas W. Jackson, and many other doctors and trained nurses, and now finally by the chief of our corps—the friend of humanity—Major General William C. Gorgas in hastening, regardless of danger, to the relief of Serbia, sorely smitten by the deadly typhus fever?

Chenu's report gives a summary of the English as well as the French losses. Comparing it with Simpson's civil statistics eleven years later the mortality of the four selected amputations (arm, forearm, thigh and leg) was as follows: Of 2,089 of these four amputations in civil hospitals the mortality in Simpson's table was 41 per cent. In the Crimean War among the British there were 460 such amputations and 183 deaths, or 40 per cent. In the French army there were 5,972 such amputations with 4,023 deaths, a mortality of 67.4 per cent. In both armies disarticulation at the hip-joint had a mortality of 100 per cent., *i. e.*, every case died. It is instructive also to compare the fate of those who had an amputation of the thigh (1,666 French cases) with a mortality of 92 per cent., and 487 cases treated conservatively, *i. e.*, without amputation, with a mortality of only 70 per cent.!

In our Civil War Duncan quotes the figures of Fox, which are "the latest revised

tatistics and are all larger than those of ne Medical and Surgical History of the War." The average strength of the Union rmies was 806,755, and the deaths 359,-28, of whom 67,058 were killed in battle nd 43,012 died of wounds. This gives a attle death rate of 33 per 1,000 per an-um. The disease death rate was 65 per ,000 per annum. The case death rate rom disease was only 3.4 per cent., a very ow figure.

I can testify to the excellent condition f the Civil War hospitals, of which I saw nany, but only in the East. When I say 'excellent condition" it must be with the eserve that we knew nothing as to bac-eriology, which did not exist, nor of infec-ion, which was utterly unknown as to its auses and prevention. The general sani-ary conditions, and by this I mean shelter, entilation, cleanliness, good food, as good ursing as intelligent orderlies could give, tc., were all excellent. But the surgical onditions as we *now* know were simply dreadful. Practically every wound sup-urated, and in summer I have seen many wounds swarming with squirming maggots as large as chestnut worms—disgusting, ut, fortunately, not especially dangerous.

In my "Surgical Reminiscences of the Civil War"[17] I have given many statistics taken from the official Medical and Surgical History of the War, a few of which I will reproduce that you may see what blessed conditions you "free born" men have inherited. Pyemia (blood-poisoning) was one of our worst scourges. There were 2,818 cases, and of these only 71 recovered, a death rate of 97.4 per cent. Few of you probably have seen even one such case. I have given a matter-of-fact description of it in my "Surgical Reminiscences," but if you wish to see it sketched by a master's hand read that most touching and beautiful of all medical stories I know—"Rab and his Friends," by dear old Dr. John Brown, of Edinburgh. He vividly paints the sudden change in the wound, the pulse, the eye, the mind, on and on, worse and worse, until "that *animula, blandula, vagula, hospes comesque* was about to flee."

Tetanus had a mortality of 89.3 per cent. Of amputations at the hip-joint 83.3 per cent. died. Trephining had a mortality of 61 per cent. Even of ligations of the femoral artery, 374 in number, 281 died, or over 75 per cent. Of 2,235 cases of secondary hemorrhage, 61.7 per cent. died. Hospital gangrene, of which there were several hundred cases, had only a mortality of about 25 per cent., because we early learned the correct though empirical treatment, viz., the application of the actual cautery, pure bromine, strong nitric acid or similar destructive agents which killed the germ, whatever it was, and arrested the disease.

The Franco-Prussian War of 1870–71 was marked by notable progress in military sanitation in the German army, yet in spite of this there were 74,205 cases of typhoid fever, almost 10 per cent. of the entire average strength (788,213) and 8,904 deaths, a mortality of 11.3 per cent.

Surgically the results were nothing to boast of. Listerism had as yet made but little progress in the profession. Carbolic acid was used to some extent, but there was no thorough antiseptic system, for the germ theory was as yet neither understood nor accepted.

Of tetanus there were 294 cases, and 268 died, a mortality of 91.1 per cent.

The total of the four selected amputations was 2,194 with 1,196 deaths, a mortality of 54.5 per cent.—over one half.

Disarticulation at joints showed an average mortality of 56 per cent. Fifteen

[17] Keen, "Addresses and Other Papers," 1905, p. 420.

amputations at the hip-joint gave a mortality of 100 per cent., and resections claimed 40.2 per cent. of deaths. Even at the knee-joint Stromeyer amputated 36 times with 36 deaths and Nussbaum 34 times with 34 deaths.[18]

The French results were naturally worse, for their armies were constantly being defeated and retreating, and, especially in the latter part of the war, they consisted largely of volunteers, while the Germans were mostly veterans of the Schleswig-Holstein and Austro-Prussian wars.

Of the Boer War (1899–1901) only two features need be noticed. First, that typhoid attacked 57,684 men and killed 8,022, while the Boers only killed 7,781. Bacteria were more deadly than bullets, as Osler has said.

Secondly, the modern missile was for the first time in general use, with the result that instead of about 15 per cent. of the wounded losing their lives, only about 8.8 per cent. died. The wounds from the new missile were much less severe and healed more quickly than ever before. The first aid packet also had come to the aid of the soldier.

The Spanish American War, surgically speaking, was of little moment, as the numbers killed and wounded were too small to make the statistics of any great value, but it is gratifying to find that only 4.6 per cent. of the wounded died.

Typhoid, however, held high carnival. It caused 86.24 per cent. of all the deaths! Happily we can say that hereafter—thanks chiefly to the anti-typhoid inoculations—there will never be another such holocaust. (*Vide* Lecture II.)

The statistics of the Russo-Japanese War also need detain us for only a moment. I shall only quote the Japanese official statistics, as given by Major Lynch, of our army.[19] There were 47,387 killed. Of 173,425 wounded 11,500 died, a mortality of 6.7 per cent. The killed and those who died of wounds numbered in all 58,887, while the deaths from disease numbered only 27,158, a remarkable showing.

The present war naturally has yielded so far very few statistics. These can only be collected and tabulated after some years of peace. So far as I can judge, I fear that, while the mortality from disease (except perhaps from typhus, especially in Serbia) will be less than in former wars, the military conditions are such that the larger number of artillery wounds, the unavoidable delay in gathering the wounded into hospitals, the apparent absence of any truce for collecting the wounded and burying the dead, and the virulent infection from the soil may result in a large mortality rate and possibly a larger percentage than in previous wars in spite of the benefits of Listerism. But were the first-aid packet and the Listerian treatment not available the mortality ratio in this present horrible war unquestionably would be far greater than that which will be recorded.

This short résumé gives us some idea of surgical conditions preceding the great revolution inaugurated by Lister to which we will next proceed.

W. W. KEEN

[18] Wrench's "Lister," p. 236.

[19] "Reports of Military Observers attached to the Armies in Manchuria during the Russo-Japanese War," Part IV., p. 399.

LADY HUGGINS

LADY MARGARET LINDSAY HUGGINS, who passed into the higher life March 24, was a personality worthy to be classed with the group of pioneer women of the last century who, under difficulties, achieved distinction in intellectual fields.

Mary Somerville was deprived of her candle when her mother found that she was secretly studying Euclid; Anna Swanwick was denied