

On hindrances to the success of surgical art : being an address delivered before the Fellows of the Medical Society of London, (by request) on the 17th of October, 1870 / by John Gay.

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(8.)
ON

HINDRANCES TO THE SUCCESS
OF
SURGICAL ART.

BEING

An Address

*DELIVERED BEFORE THE FELLOWS OF THE
MEDICAL SOCIETY OF LONDON,*

(By Request)

ON THE 17TH OF OCTOBER, 1870.

BY

JOHN GAY, F.R.C.S.,
PRESIDENT.

*Member of the Council of the Royal College of Surgeons of England ;
Vice-President of the Pathological Society ;
Senior Surgeon to the Great Northern Hospital ; &c., &c., &c.*

(PRESENTED.)

LONDON :

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HINDRANCES TO THE SUCCESS

OF AGRICULTURAL ART.

By JOHN G. F. REEVE.

PRESENTED BEFORE THE SELECT COMMITTEE OF THE
HOUSE OF COMMONS ON THE AGRICULTURAL ARTS.

IN 1831.

LONDON: PRINTED BY W. CLAY, ST. MARTIN'S LANE.

IN

JOHN G. F. REEVE,

Author of

"The Art of the Farmer," &c. &c. &c.
"The Art of the Gardener," &c. &c. &c.
"The Art of the Housewife," &c. &c. &c.

(Continued)

LONDON:

Printed at the Office of the Select Committee.

GENTLEMEN,

Since we last met and parted, the evolutions of the seasons have given us a summer which has gathered into itself all that could delight the senses, and conduce to the invigoration of the frame; all that could develope man's energies and kindle his most joyful aspirations; still more, all that could give assurance of peace in our borders, and plenty in our homesteads. And in our little sea-girt isle these goodly issues have been in a great measure realized.

But whilst Nature has been thus almost prodigally beneficent, whilst the grape was empurpling in the vineyard, and the cornfields were consummating their hues of gold, war broke out amongst neighbours, not far remote from our shores, and the hopes of earth which had well nigh culminated with the welcome return of *Astroëa* amongst the stars of heaven, were doomed to disappointment, akin to despair. And in its wake that science, whose aim is to multiply and perfect the acts of mutual destruction, has subsidized to its purposes the mental and material resources of the world, in a manner and with a success which throws into the shade any human efforts that have ever been made in the like period of time in the interests of peace.

But there are ways that are not as our ways; and a little thought tempered with humble trust may lead us to dwell more hopefully, than seems fitting at the outset, on the eventualities of so saddening an occurrence.

Side by side in those battle fields have been displayed fiendish strife and godlike heroism; brutal carnage and saintly love and devotion; the hell-born arts of mutilation and slaughter, and the heaven-sent gifts of healing and redemption; so

that a scourge which has inflicted on our age a degradation such as the clouds had never before wept over, has also presented spectacles of sublimity on the like of which, perhaps, the sun had never shone.

May we not, as a profession, gather some lessons from these gloomy regions? It is ours to be constantly waging an internecine war, in which the enemy is multiform, subtle, unseen; around us and within us; vigilant in our rest, busy and dogging us in all our ways; not given to truce even to bury the dead; an enemy not of a nation but of the race; and of whom it may be said his battle-field is neither a kingdom nor a continent, but the inhabited world. May we not learn something of the heights to which human enterprise may be carried, and feel assured that by indomitable perseverance in rendering available those resources of science and art that are at our command, we may yet overcome in the far nobler strife in which we are engaged?

In reference to our assembling this evening, the thought which has struck me as being forcibly suggested by war readings is this:—that one of the hindrances to advancement is the indisposition of generations as of individuals to make the most of inherited stores of knowledge. We appear to work out again and again, by hard, and often costly experience, and with the same conclusions, the problems that our forefathers had solved for us, and it may be without even a suspicion that their labours will disentitle us to be placed in the enviable rank of original discoverers. What time, what labour would be spared if we took up the thread of our work where our predecessors dropped it! Much that has been “learnt” at Wörth and Saärbrücken, was dogma two thousand years ago, and had been re-learnt in many a battle-field during the last three centuries; and may it not reasonably be surmised that there exists even still, in our literary store-houses, many a “wise saw and modern instance,” which dust and other rubbish have encrusted, and will, unless rescued, be consigned to oblivion.

Let me give an instance which bears upon the more recent suggestions for increasing the salubrity of our hospitals.

In a recent number of the ‘*Times*’ we are told that on the

battle-fields of France, "*the miraculous effects of fresh air have for the first time been fully exemplified in preserving the wounded soldier from pyæmia, erysipelas, gangrene, and those diseases of a like nature which beset the wards of our Metropolitan hospitals, and that the device of what are called 'tent or hut hospitals' has led to this discovery;*" and the statement has been allowed to pass uncontradicted.

Had the annals of military surgery been sufficiently scanned it would have been seen that in 1755 Dr. Hume observed that a malignant fever which broke out in an American man-of-war was suddenly and effectually stopped by placing the men in sheds and tents, or in old shattered houses that admitted the air freely. In 1764 Dr. Blocklesby, an army physician, who observed that sheds covered over-head, but open at the sides, the prototype of our hut hospitals, formed the most salubrious hospitals, inasmuch as they allowed the patients to be constantly, and even to take their food in the open air; and during the Peninsular War the observation was repeated by Sir John Pringle. Even the need of constantly refreshing the surface of the soil by turning it up, as an antidote to the spread of pyæmia was acknowledged long before its quasi discovery at Sedan and elsewhere. The experience of the Austrian army since 1854 has tended to the same conclusion, showing that in cases of zymotic disease, pyæmia, hospital gangrene, and erysipelas, these diseases ceased to spread, and the infected persons recovered more rapidly when they were placed in well ventilated tents, than when housed in the more comfortable but closed up hospitals. And if this can be done in the military, why can it not be done in the civil practice of our art? Is there any reasonable excuse that we should still labour under the reproach of a large rate of mortality in the surgical cases of our hospitals from these very same causes?

The fact just related proved the position that Surgical Art (and I am about to make the success of art in contradistinction to science the thread of my remarks)—that Surgical Art is behind its privileges; that, in other words, it has not attained those limits of remediable success to which it might justly

aspire. What then are the hindrances which have stood in its way? I will allude to what I apprehend to be some of the foremost.

First, I am inclined to think that we somewhat over-estimate the strictly mechanical part of our science. I do not mean to assert that too much attention can be bestowed in order to secure dexterous manipulation in the performance of operations, and in the use of accessory means and appliances for those injuries to which humanity is prone. Dexterity in these respects is of the highest importance; but it is not all. In the exercise of his Art the surgeon adjusts disordered or deformed parts, and removes diseased textures; but he succeeds only as his performances are in a subsidiary relation to those powers of the organism by which the after processes of repair and restoration can alone be successfully accomplished: with, in fact, its latent store of *available* "vis medicatrix."

And here I trust you will forgive a momentary digression for the sake of remarking that by recognizing its dependence on that power, Surgical Art gives the lie to that empirical notion of its prerogative which makes it "curative;" and that it asserts its claim to scientific alliance only as it disdains to appeal to the silliness of mankind by arrogating to itself any such pretension. Indeed for all sorts of mountebanks, from the earliest ages to the present day, the disorders which belong more especially to the surgeon have presented a test to which they have not dared to expose their impudent pretensions; and it has been pertinently remarked by a recent writer, Dr. Davies,* that it was to such tests that the Divine Head of the Art of Healing appealed when He called earth to bear witness to the fact of His essentially *miraculous* powers. A cure is a miracle; and if the advancement of our sciences has taught us one thing, it has been the encouraging rather than humbling truth of inspiration that "healing *cometh* from above."

Given then that as Surgical Art consists in the skilful adjustment of injuries, and the removal of any forms of objective disease which stand in the way of, or interrupt the

* "On the Unity of Medicine: its Corruptions and Divisions."

healing activities of the organism; so its perfect success must in great measure depend upon the immunity of the means or measures employed, from interference by those agencies or influences that are ever in attendance upon them and tend to mar or counteract their salutary operation.

Of such hostile forces, the surgeon has from time to time to encounter a somewhat formidable array. Some appertain to the injury inflicted whether accidental or designed; others to the individual—as age, sex, temperament; a third set includes vitiated states of the system, either of a temporary or a permanent nature, such, for instance, as are indicated by the presence of sugar or albumen in the urine; whilst a fourth embraces those disorders of epidemic or zymotic origin, which succeed to the infliction of an injury, such as pyæmia, erysipelas, hospital gangrene, fever. Of these again some are clearly fixed and inevitable—inherited; others also are fixed and determinate in their consequences, but preventible, such as organic changes from depraved habits; whilst those of a third set are altogether foreign to the individual, and to a very great degree absolutely under control.

It is to a class of diseases, made up from the several classes I have referred to, and which may be regarded as to a great degree preventible, that the observations I am about to make are intended to apply; and these will be considered as relating:

- 1st. To the injury.
- 2nd. To the individual.
- 3rd. To external agencies.

First as to wounds, accidental or designed, *i.e.*, made in the course of an operation. Can a wound be said to be dangerous in direct ratio to its dimensions? I think common experience, without the necessity of any special reference to clinical evidence, must decide this question in the negative. A small penetrating wound of the chest or of a joint is regarded with more anxiety than a large and simply fleshy wound. The operation of tying the innominate artery is perhaps about as hazardous as that of amputation at the hip-joint, yet the extent of wound in the two operations is widely different. It may be objected that wounds thus considered

in the abstract can hardly be said to constitute fitting premises for a reliable induction as to the varying amount of danger—taking this word to mean those relative degrees of local and constitutional disturbance that are regarded as possibly fatal to life—which attend them respectively. But the objection is at all events questionable; for it may be argued on the other hand that the danger arising from a given wound is by no means in correspondence with the mere disturbance with function that it involves. The abstract functional disturbance accruing from a wound of the lung, or of a large joint, or from the delegation of the innominate cannot be reckoned at much, since limitations of function far graver than would succeed to these lesions are constantly borne without any very manifest derangement of the general organism. So that we must, I think, admit the existence of another, and a still more active and important ingredient in the sum of those forces which are called into activity by a local injury; and one also to which we must look almost exclusively for those, its immediate consequences, local and constitutional, which are always regarded with anxiety by the surgeon, as indicating some latent but serious source of peril. If we take a large range of data from which to generalize in this direction—I cannot specify them here—we shall, I apprehend, see that the relative danger of wounds lies in their proximity to, or more especially as they involve parts or organs that are supplied by nerves from the sympathetic system and its ganglia, the nerves of organic life. Wounds of organs and especially injuries of the large vessels of the trunk are hazardous in the highest degree. That laborious statistician, Dr. Crisp, shows, as conclusively as can be shown, that wounds of the large arteries are pre-eminently fatal, not from the consequent disarrangement of the circulation, but from those secondary diseases which are associated with general constitutional depression, such as pyæmia, erysipelas, secondary hæmorrhage, and in cases of aneurism, from sloughing of the sac.

In wounds that affect the general contents of the cranium, it is not, as far as we know, the injury of the brain tissue that gives rise to the most serious symptoms, but of the dura

mater, and the parts in the immediate vicinity of the large vessels at its base. An injury inflicted along these tracks is usually followed by the gravest results ; and, as bearing upon the same argument, it may be noticed that some of the most irremediable forms of disease, as diabetes, are now clearly referred to morbid changes in these textures. It may, I think, be averred that injuries to parts contiguous to and supplied by the large ganglia related to the sympathetic system, are attended with the greatest peril to life, in contradistinction to wounds distinguished merely by their dimensions.*

Wounds which lay open serous sacs, in the tissues of which none of these fibres are to be met with have been regarded as more than ordinarily hazardous ; but the peril attending them seems to be of another kind, and referable, not so much to the wound as to its *prolonged patency*. If such wounds be sealed up as soon as they are made, no harm comes of them, as may be inferred from the experience of those that are made with this provision into the knee-joint for the extraction of a loose cartilage. Prolonged exposure to the air renders the serous membrane prone to pyogenetic action, to subsequent degradation of its tissue, and to contingent disorders more or less grave in their results upon the joint and the system at large.

Such consequences appear to be peculiar to serous membranes, since they do not follow the case of mucous cavities, such as the stomach and bladder, when submitted to like injury and prolonged exposure.

The *mode of making a wound* has, I apprehend, something to do with its course in relation to repair. In the first place, I question much whether the essential differences between a clean cut and a laceration is sufficiently appreciated in regard to operations. We usually avoid lacerations, because they are not favourable to healing. Why ? Why do they invariably suppurate when a clean wound heals at once if the surfaces

* It may be objected that injuries of the ovarian pedicles, in the operation for ovariectomy form marked exceptions to this rule ; but neither are these pedicles abundantly supplied from the organic system of nerves, nor is their increase in disease attended with commensurate increase in size or number of the nervous twigs supplying them.

are properly adjusted? Obviously on account of the varying power of extensibility and retractability possessed by the several component tissues;—the blood vessel, the nervous, muscular, ligamentous, areolar, and other tissues. Each of these resists tension with relatively varying forces; so that a laceration is a wound with uneven or ragged surfaces, such as do not admit of exact coaptation, a condition essential to immediate union. And not only so, but a wound made by laceration leaves particular tissues exposed beyond its common level or plane; and these, according to the especial nature and function of the particular tissue exposed, give rise to peculiar results of a more or less unfavourable nature, either in the wound itself or in remote parts or organs. Take the case of a bone, and it will be found that if it be evenly divided and the ends are brought again into exact apposition, they will unite speedily as though they had been stuck or fused together; whereas if it be splintered the re-union will be effected by a complex and protracted process, and by a great apparent waste of new bony material. Take a lacerated wound in a *fleshy part* as another illustration, the muscular and other contractile fibres retract, whilst the less contractile and amongst these the nervous fibres lie more or less exposed upon the surface, giving rise to the pain that ensues upon this form of injury. Suppose laceration is caused by the forcible impaction of a splinter of wood, and it is made in a part more than usually endowed with sensitive nerve fibres; and, moreover, that one of these fibres becomes impaled on the splinter; the foreign body acts like a toxic agent, and tetanus or trismus follows.

We all know, too, that the laceration of the prostate and the neck of the bladder, in lithotomy, is one of the most constant causes of the high rate of mortality consequent upon that operation.

Let me make a practical application of these few cursory and simple remarks. They instruct us that the mode of making a wound in operations has an important influence on its subsequent course; and therefore not without effect on the issues of Surgical Art. They instruct us that every wound made with the view of primary or adhesive union

should be made so as to ensure the utmost evenness of surface, and the avoidance of all tearing. The edge of the surgeon's knife cannot be too sharp, nor can the saw be too fine. Moreover, the incisions in an operation cannot be too few in number, or too deliberately made. And these rules are of all the more consequence in operations adjacent to important organic structures. A wound made by a number of *higgling* instead of a few *clean* and decided cuts, and by a dull rather than a sharp edge, is a thing of danger, especially if made in proximity to a nervous centre. Every distinct act of pain is a direct offence to the sensitive ganglia, and should be made with a strict regard to economy. Again it instructs us that, in dealing with wounds, our treatment should be guarded by very different considerations according to their nature respectively. In the case of a clean wound, the surfaces should be cleansed of their blood, brought into perfect coaptation, and the edges sealed against the intrusion of the atmosphere by some adhesive, and at the same time, antiseptic material. For this purpose I have used Dr. Richardson's "Styptic Colloid," a compound of tannin, zylidine (made by acting on starch with nitric acid) and ether, made into a thick covering with cotton wool, with marked advantage. Whereas, in the case of a lacerated wound, the surfaces should be brought together and the wound closed up before the blood has quite ceased to ooze from them. By this method the intervening unevennesses are filled by organizable material, and the wound reduced approximatively to the physical state of one that is evenly cut; exposed nerve fibrils are protected as by the finest wool; and minute structures kept alive that would not otherwise have survived the injury.

And here let me make a remark or two about an instrument that has come somewhat into vogue latterly with some other "Armamenta Chirurgiæ," not, to my mind, in keeping with nature's instructions for dealing with her difficulties—I mean the *écraseur*. It is *possible* that there may be cases for operation in which danger from hæmorrhage may be apprehended, and in which that danger can be best avoided by *tearing*, in the place of *cutting*, the vessels; but, after looking

at the subject in every light in which I have been able to present it to my mind, and after many observations of the use of that instrument, I can hardly conceive such a case; certainly not a case in which vessels that would be troublesome by being *cut*, would become absolutely safe by being *torn*. I do not remember, in the course of my experience, to have seen *dangerous* hæmorrhage from a surface, otherwise than of malignant or other morbid tissue, that did not come from a vessel which, according to every canon of surgery, it would be wise to wound unless the trunk had been previously secured; a vessel for which the process by the *écraseur* would of itself have been a reliable safeguard. If so, and what I have said of lacerated wounds be true, then the *écraseur* and all other instruments and process for making wounds by laceration should, if possible, be avoided as inimical to the success of Surgical Art.

The question as to the best method of securing wounded arteries against the risk of hæmorrhage cannot escape attention here. I have already referred to the subject of hæmorrhage, when speaking of the best modes of obtaining primary union in a wound; but not to the several modes by which, according to their several advocates, its arrest from a large artery can be most safely effected. I believe for this purpose the ligature is, after all, to be preferred to either *acu-pressure* or *torsion*, its formidable rivals. It has the advantage of being simple in its mode of application; it admits of precise adjustment; and, once firmly placed on a healthy vessel, the surgeon may go to his rest without any fear that it will fail its purpose.

But in this estimate of the comparative efficiency of the ligature, we must not omit the important proviso, that the risk of secondary hæmorrhage is not greater after this than after the other modes of securing an artery that have been alluded to. In order, by such a comparison, to depreciate the value of the ligature, it must be shewn that secondary hæmorrhage, when it does follow its adoption, is due to some specific effect of the material of which it is composed, and not quite to other causes, such as arterial deterioration in

proximity to a large branch, or to local mischief, the result of a depraved state of constitution. In the records of such cases, I do not find any reason, in any one instance, for ascribing the casualty to the irritation of the ligature. Nor do I see any occasion for discarding silk for ligatures of animal tissue, suggested by Mr. Lister. It must be remembered that silk is an animal product, and Mr. Spencer Wells has shewn, by experiment, that it is absorbed, or otherwise got rid of from the body. I have long been in the habit of using such ligatures; cutting them off close to the knot, and leaving them to the care of Dame Nature. The plan of rendering them antiseptic may be advisable. By the use of a ligature so prepared, I think an artery requiring it will be best secured against the probability of hæmorrhage, and the wound be placed, at the same time, in the condition most favourable to early and direct union.

The mode of dressing wounds must be admitted to have a signal influence on their healing, and on certain other alleged contingencies which will hereafter briefly occupy our attention. I have spoken of two kinds of wound; there is still another to which, for a moment, I must call your attention; viz., that form of wound in which parts have been removed so as to leave an open surface—an excavated wound. In the first place, I am disposed to think, that such wounds should be allowed to remain without that tension on their sides which futile attempts to approximate them must necessarily occasion. This plan, indeed, seems to realize that very objectionable wound, surgical or accidental, which may be characterized as *cavernous*,—a large and deep wound with a narrow outlet. It is objectionable in operations in which primary union cannot be looked for; as, for instance, in lithotomy, herniotomy, incisions into joints, deep abscesses, and for the removal of tumours. My experience in this respect has been in conflict with theory; and, excepting in certain cases for subcutaneous operation, I have been led to believe in the advantages of a wound with a *free* outlet. And this brings me to the consideration of pyogenetic and putrefactive processes in relation to wounds. The former, the formation of pus, has been variously

explained. Perhaps a recent account of it, viz: that by Mr. Lister, is the one nearest the truth—that *pus cells are "the extreme of excess of quantity and impairment of quality in the product of abnormal nutrition."* Had Mr. Lister limited the use of the term "abnormal" to certain forms of pyogenesis, I cannot but think the truth would have been still more nearly approached. A simple cut into the tissues of a healthy organism does not, for the purpose of its repair, excite in, or impart to those tissues a disposition to depraved action. The action involved in that process is, in the main, analogous to that by which the lobster is supplied with a supplemental claw, or a stag with a like antler, in the event of either having been shed or torn off. It is strictly a normal act, and consists in the culmination of ordinary nutrition in growth,

Now the pyogenetic process in connection with the tissues of a depraved organism, whether in superficial wounds, chronic abscesses, or pyæmic deposits, differs from that form which I have been considering, in its being, on the other hand, the expression of general as well as local abnormal nutrition. In both cases the pus cells represent the proteinaceous element of the blood; for it is only upon such a view that collections of these cells, in closed cavities, can be explained. Where no pus is formed, as in cases where the union of the sides of a wound is effected by direct adhesion, there is no waste of blastema, or protoplasm; in the case of a healthy open wound, blastema is carried to it in excess of its requirements;—it is wasted, and the waste is represented by the pus poured out on the surface; whilst in the depraved organism, there is not only a waste of blastema, but the blastema has itself none of those qualities which fits it either for the purposes of ordinary nutrition or repair. In the case, then, of a healthy suppurating surface—the "laudable" pus surface—the condition of the sore needs no corrective interference in the way of treatment, not even by the use of antiseptics; whilst in the other, that in which the pyogenetic process is obviously bad *ab initio*, the sore, or other surface from which the vitiated pus issues, is really not its *factor*, but simply its *eliminator*. And time and appliances are misused which are devoted to them, solely with a view of

rectifying the depraved processes. The blood and its factors are, in such cases, primarily in fault. There again we are met by unhealthy processes in connection with wounds and other raw surfaces, distinguished by a peculiarity in their suppurative action, which indicate an enemy to our art, deep laid in the tangles of a depraved organism.

But we are told that beside pyogenesis, there is a constant tendency in raw surfaces to take on *putrefactive action*, from the contact and through the agency of certain organic germ cells by which the atmosphere is constantly flooded; and that this action militates largely against the success of Surgical Art.

I have not time to discuss this interesting and complex subject. It is still to a degree *sub judice*; but no one can have given to it any amount of close attention without being satisfied that there are many elements of truth in the observations which have been made respecting it; and that its further pursuit may lead to results of high import, especially to the practical surgeon. It is long since that Pouchet, Eiselt, Sanderson and Frank instituted experiments which have since been repeated in various forms and with great ingenuity by Pasteur, Tyndall, Lister and others, that go to prove the existence in the atmosphere of a cloud of dust in great measure consisting of organic germs. Devergie found an enormous proportion of organic matter amongst the dust of the air in the vicinity of a patient with hospital gangrene; and in 1862, Chalvert alleged to have found that the dust collected in the wards of St. Louis consisted in great measure of organic matter, especially epithelium cells, which gave out the odour of horn when burnt, and whilst decomposing, a foetid smell. In one analysis there was 36 per cent, and in another 46 per cent of this organic matter in the accumulated dust. Many such observations have been since made.

Now if we take another fact, and that is that the immediate and perfect separation of patients, attacked with hospital gangrene, from others in a ward in which it has broken out, invariably checks its progress, we may fairly incline towards

the inference that this disease spreads by contagion; and claiming the right to some help from the imagination, until demonstration is made to supply or refuse the missing links—that of non-infection without actual contact and the possession by these cells of the assumed communicable forces,—we may fairly assume for the theory some substantial claims to our respectful consideration. Take a third observation—and for this we are especially indebted to Mr. Lister—viz.: that, in the Royal Infirmary at Glasgow, by his mode of dressing wounds *antisep-tically*, the mortality after operations has been reduced from at the ratio of one in every two-fifths to that of one in every five-sixths; and we can hardly avoid an inference from the syllogism strongly in favour (*a*) of the existence of these germ cells, (*b*) of their power to eventuate disease by communication, and (*c*) of their destructibility by antiseptic agencies.

May we not then fairly hope that by still further investigation in the direction indicated by the foregoing experiments and reasoning, we shall hereafter have it within our power absolutely to check specific forms of unhealthy action in raw surfaces, and, by thus averting its contingent evils, materially modify the death rate of some of our most important injuries and operations? With regard to Mr. Lister, his labours towards that end cannot but elicit our commendation; and I cannot avoid the suspicion that they would have commanded a larger share of general support if a fair consideration and trial had been given to his principles and practice in the hospitals of our metropolis.

According to my own observations, this has not been the case. Mr. Lister says “that of all actions in raw surfaces after wounds and operations the putrefactive is the most prejudicial; and this we must endeavour to prevent. But an agent if sufficiently potent to destroy the life of the organisms to which this action is said to be due cannot fail to be abnormally stimulating to the exposed tissues. It is therefore incumbent at the same time to protect them from its action, if the wound is to progress exactly like a subcutaneous injury. Thus it is not sufficient to wash a wound simply as is usually the custom with an antiseptic solution, but in order to be efficacious the process

must be conducted according to the following principle. An antiseptic to exclude putrefaction, with a protection to exclude the antiseptic, will by their joint action keep a wound free from abnormal stimulus."*

I need not here detail the steps of the process by which these principles here enunciated are to be practically observed; but must add that with the reports of their success before us, and this in cases under public observation, Mr. Lister's plan is still entitled to a full and hopeful trial.

I now approach the consideration of certain other hindrances to surgical success which are met with in the human organism, but which are, for the most part, induced and altogether preventible.

Neither individual facts, nor facts statistically arranged, are needed to prove or illustrate the malign influence of certain depraved states of both our moral and physical natures—departures from the standard type of perfect humanity—on the results of operative art; or their origin in vitiated air, too much or too little work, unwholesome and deficient food, vicious and debasing habits, and the depressing passions and emotions of the mind. That state of society in which these evils form a constant and wide spread element, is to a great degree chargeable with many, very many of the surgeon's failures. Happily, however, they are not independent of control; and social science and its kindred agencies are doing much, and it is to be hoped will yet do more, to lessen their number and influence.

It is not necessary for me here to urge on our profession the duty of furthering all efforts made towards the attainment of an object so closely associated with the highest objects of our labours, since many of its members are already ranking amongst the foremost of the pioneers in this holy cause, and all who realise the true import and dignity of their calling, are indirectly yet powerfully co-operating as well in its advancement.

In this country, unfortunately, it is the drunkard and debauchee more especially who are the enemies of our Art. Perfect knowledge and consummate skill, with their most

* "Case of compound dislocation of ankle," page 17.

efficient auxiliaries, are positively powerless before a gin-depraved brain, liver or kidney. But in such cases it is not only frightful to contemplate the victims as their own slayers, but still more the fact that on the rickety, the strumous, the imbecile and the idiotic offspring of such criminals they impress their own degeneracy, not in a single organ, but in every crevice, blood molecule, and fibre of the organism, defiant at every point and at every step from the threshold of life through its brief and miserable tenure.

A few words on the somewhat vexed question of alcoholic stimulants as food, or even as medicine, may not be inopportune here. Every step taken in physiological inquiry, as well as every fact deduced from observation under conditions almost exempt from the possibility of error—I refer to military experience—prove that alcoholic liquors, in which the alcohol exists in proportion above 8 or 10 per cent, impair the powers of the stomach, and hinder the complete oxidation of food. In this manner they interrupt the processes essential to nutrition, weaken the strength, and induce mortal disease in the brain, liver and lungs. The most trying circumstances in war, such as prolonged fatigue and exposure to extreme heat and cold, have, as a rule, been best borne by men who have taken no alcoholic stimulus. I need hardly remind you that this is no *new* axiom. In the campaign of Egypt under Abercrombie in 1804, its truth was severely tested; and it has since received additional attestation from the Caffre War of 1852, the Crimean and Austrian Wars, and from Arctic exploration.

If still more evidence on this important subject is required, it is to be met with in an account of some experiments on the effects of alcohol on healthy persons by Dr. Parkes and Count Wallowicz, recorded in *The Transactions of the Royal Society* for May last, as well as in an able monograph on "Intermittent pulse and palpitation," by Dr. Richardson.

From an extensive series of facts these observers show conclusively that "in a healthy man the daily increase of the beats of the heart under alcohol, as compared with the number of beats when water is the only beverage, is rather more than 13 per cent. As to its permanent effects, they show

“that the amount of alcohol the heart will bear without losing its healthy sphygmographic tracing is small;” and as they add, “it must be supposed that some disease of heart or vessels must eventually follow the over-action produced by large doses of alcohol.”

And yet the habit of taking strong stimulating drinks, with the persuasion that in health they are well nigh omnipotent to *save*, and in sickness to *cure*, is becoming, under the sanction of the profession, or as it is commonly termed “under advice,” a fashion in the higher and middle sections of society; so that the champagne, port wine, and brandy bottles are beginning to be as much an habitual resort under temporary ennui or langour, whether from indolence, dissipation or indisposition, as is the gin flask to depraved poverty under the maddening burdens of remorse or despair. In this way Surgical Art has been, and is being robbed of its just successes; and if the profession does not intervene to check an evil which has had its origin to a great extent within its borders, it will, it is to be feared, be chargeable hereafter with a larger share of its failures than it would like to acknowledge.

The same views of the salutary effects of stimulants have, I cannot but think, been transferred to nitrogenous beverages, and led to another mischievous practice alike unfavourable to the results of Surgical Art; I mean that of urging patients, labouring under long standing chronic diseases, and especially in the prospect of, as well as after severe surgical operations, often without reference to special circumstances, to swallow as much beef-tea, generally with brandy or port wine, or as many eggs in their unwholesome and unnatural affiliation with the same liquids, as they can be got to take.

The condition of the system usually resulting from this practice as indicated by a dry, black tongue, a brick-dust and sallow countenance, a feeble and oft-faltering or intermittent heart, and a drain from the bowels which quarts of chalk mixture are ineffectual to relieve, is of all conditions most unfavourable to the successful issue of such like cases.

It is the reverse of such a condition, viz., that in which there is an entire freedom from the influence of this artificial

and perilous excitement—a state induced by the most guarded exhibition of both nourishment and stimuli—that leaves the resources of nature most free to act beneficently in times of severest trial, and which should be secured most especially on all occasions in which the issues of Surgical Art appear to hang tremblingly in the balance.

I hasten now to a general consideration of those sequelæ of injuries and operations, principally of zymotic origin, which most frequently stand in the way of their favourable termination; such as adynamic fevers, pyæmia, erysipelas, phagedæna, and hospital gangrene.

Perhaps it is not so much their frequency, as their relative fatality, that constitutes these diseases, in an especial degree, the enemies and opprobria of our Art. Thus, for instance, I find from the “Transactions of St. Bartholomew’s Hospital,” that during the four years, from 1860 to 1864 inclusively, there were in that splendid and well-ordered Institution, seven hundred and forty-nine cases of erysipelas (the Report does not distinguish between those of idiopathic, and those of traumatic origin), forty-three cases of pyæmia, and sixteen of hospital gangrene. The mortality in the cases of erysipelas was at the rate of 18 per cent; in those of pyæmia, 70 and hospital gangrene, 8 per cent respectively.

We cannot, I fear, hope for any sudden emancipation of the Surgeon’s Art from the disasters by which it is so often marred through the agency of these terrible and insidious diseases. They are met with, for the most part, in hospital practice, supplied from densely populated and unhealthy neighbourhoods; and are clearly traceable to the violation of certain fixed and immutable laws, upon obedience to which the sanitary state of a community depends. We must, therefore, look to social *progress*, in its somewhat more earnest form than as the apotheosis of a sentiment, as the means by which these enemies to our Art and our race are to be mitigated, and finally exterminated;—to enlarged knowledge of Nature’s laws and to its diffusion; to the elevation of the lower, or indeed of every class, through the improvement of their habits, their tastes, and the necessaries of their existence; to social energy

and to moral influence ; to the legislation ; and lastly and largely to our own profession. But we must not *wait* for the millennium. Happily much that was obscure, with regard to these several subjects, has been made clear ; and the application of acquired knowledge to their general treatment has led to a very considerable diminution in the number of their victims.

I have spoken of wounds and other injuries ; and have justified a hope that an advanced and more rational mode of managing them may prevent their lapsing into those conditions of peril to the patient, that have hitherto proved hindrances to the just expectations of our Art. I have taken a cheerful glance at the approach, though tardy, of that state of society in which Nature and her laws will be both better understood, and less violated, and at the mixed and somewhat diverse instrumentality by which it is to be brought about. Let me conclude by a few remarks on some important questions that bear upon our hospital system—a subject that has recently been attracting much and deserved attention.

Mr. Holmes has shown that, for by far the greater number of these eventualities of wounds and injuries, especially for erysipelas and diffused cellulitis, the hospitals are not responsible ; but that they are imported into them from the dwellings, or rather the “*fever dens*” from which the patients are transferred ; and in a conclusive paper in the “*London Hospital Transactions*,” entitled “*Why did not Hospital Phagedæna occur in Gloucester Ward?*” Mr. Hutchinson shows that that disease,—and the inference naturally follows, that other diseases of this class come under the same law,—spread by the communication of the specific poison from one patient to another. We then glean that foul air and the ordinary accessories of poverty are not only the originators of these diseases, but that they are multiplied by contact and overcrowding.

The late Sir James Simpson, as we all know, from a large and elaborate array of statistical information, asserted that, by the avoidance of these complications in *rural practice*, the mortality after all operations is only 10 per cent, whereas in London hospitals it amounts to 41 per cent. This state-

ment naturally excited inquiry. At length the proof of the position, that this excess was due to these hospitals, was disputed, especially by Mr. Holmes and Mr. Callender.

The former of these gentlemen took the amputations in St. George's Hospital, from the years 1865 to 1868, and, admitting that the causes which unfavourably affected the mortality after these operations were erysipelas, diffuse cellulitis, phagedæna and pyæmia, referred the origination of the cases of erysipelas, and diffused cellulitis, to the conditions of the dwellings from which the patients were brought; but admitted that the pyæmic cases developed themselves most frequently within the hospital. As a matter of course, the pyæmic complication can from what I have said with good reason, be alleged to have been due primarily to long existing degradation of the animal tissues, so that the hospital must be acquitted of complicity in the origination of these serous maladies.

The conclusions of these two gentlemen, however seemingly diverse, appears, upon closer inspection, very much to correspond. Professor Simpson affirmed, that a hospital or a dwelling of any kind, *the air of which is vitiated*, is an improper receptacle for traumatic cases, from the proclivity which it imparts to serious complications. Mr. Holmes admits this; but says that the proclivity is rather due to the unhealthy habits and atmosphere of the poor man and his dwelling, and existed antecedent to the injury. The apparent discrepancy admits, I think, of this satisfactory solution, *that a hospital, as a dwelling, is prejudicial to surgical success, just in the ratio of its unwholesomeness or want of cleanliness and fresh air*. Mr. Callender, after an interesting survey of the results of "County Hospital" practice, with the practice of "Country Cases in London," and "Country Private Practice," says that the mortality after all amputations is remarkably uniform, viz., 17·5, 17·0, and 17·1 per cent; but there still remains the important item which is not, so far as I see, got rid of, viz., that the like mortality in St. Bartholomew's is at the rate of 27·1 per cent. It is very clear that the air of hospitals in densely populous districts cannot be so well

adapted for cases of injury and operation, especially when occurring to or performed upon enervated persons as that without their confines. I cannot go further in details, but must refer to the experiences of the war, especially to a report from Professor Fischer of Breslau, director of the hospital staff at Forbach.

“A hospital of this class is neither more or less than a ropewalk. Overhead there is a roof, and that is all. There are neither walls, nor windows, nor anything between the patients and the outer air except a piece of canvas let down on the side of the wind. But even this lodging is not airy enough for the presiding physician. Every morning, when the weather is fine—and it has been very fine lately—the patients are carried out into an open meadow, and there left upon their beds till nearly sunset. As to treatment, it is of the simplest kind possible. The wounds are washed as often as necessary with diluted carbolic acid, and then allowed to heal of themselves, with the aid only of strengthening food and comfortable clothing. The results are marvellous. There is no foul atmosphere, and therefore no hospital disease; the wounds heal quickly, and the men pick up health and spirits with a rapidity scarcely credible. On the other hand, the least successful hospitals are the regular establishments—magnificent and spacious buildings to look at, with all the appliances which science could devise. But in these edifices it is found impossible to insure the ventilation required. Probably no arrangement or multiplication of windows could, under the circumstances of the case, be made sufficient; but the fact is the experiment has no fair trial.”

And the principle upon which a hospital and its wards should be designed, so as to render it in the highest degree salubrious, is thus illustrated. It accords remarkably with those teachings that, as we have seen, come to us from almost all war experiences during the last century; and is one with the lessons of modern scientific research and discovery. Nay, it receives confirmation from the early history of our Art; for as we are informed by Plutarch, “the temples of health in ancient Greece, under the directions of the Asclepeiadæ, were

erected in high situations, where the air was wholesome, and beside medicinal springs and cleansing waters." Can we entertain a doubt that if, with the means possessed by our large and noble hospitals, provision could be made for the transmission of such cases of injury as from their very nature entail a liability to the most fatal complications, to "a high situation where the air is wholesome," and some general reform of our hospital system be carried out, our mortality from such causes would not be materially lessened, and the surgeon be gladdened with an enlarged meed of recompense for his labours.

Much has been done to augment the sanitary influence of our hospitals in a psychological point of view; and nothing I conceive has been of more practical importance than giving to the wards an air of cheerfulness, and to the nursing a ministry of sympathy and love. Referring, again, to ancient Greece, it must be remembered that the almost entire negation of medical science in her temples of health was to a certain extent compensated for by the employment of those means that were calculated to work upon the imagination and the moral sense, such as imposing religious ceremonies, music, and whatever else could revive hope, command confidence, and recall the sufferer from a consciousness of pain and danger. And it was in happy keeping with the principle involved in these usages, that not long since a Royal Princess presented to the wards of a Royal Hospital, copies of those works of Raphaele, the designs of which are in unity with the highest emotions of the human soul in its hours of sadness; an example which may well deserve to have its imitators.

And modern experience illustrates the wisdom of an appeal to such encouraging resources. It is well known that in civil practice the mortality after *primary*, largely exceeds that after *secondary* amputations; whereas in *military* practice the results are reversed. Trephining and some other operations follow precisely the same rule. Quickened by the ardour of his calling, and by hope that, "*not surfeited to death, stands in bold cure,*" the soldier scarcely heeds his wounds; so that it is not uncommon, we are told, for men after amputations,

such as of the arm, to walk off and rejoin their comrades in the strife. And thus in civil practice, if we desire to give full scope to the beneficial effects of our art, we must call to our aid all those resources, moral as well as material, that can cheer and reassure in the hour of nature's trial.

Time does not admit of my entering more fully into an inquiry so replete with interest, so wide in its scope, and so important in its bearings as that to which I have deemed it not inopportune to draw your attention this evening.

But there is one other topic to which I must casually refer, especially as it has been enforced upon the attention of the Society by a distinguished Fellow, Dr. Richardson, and appears to be deserving of much more practical consideration in reference to surgical operations, than has yet been given to it.* It is asserted by Dr. Richardson, upon what appears to be the indisputable testimony of facts, that the sequelæ of surgical operations are to a very great extent governed and directed by season, temperature, barometrical pressure, moisture and electrical condition of air, as well as by the direction and force of the wind,—in short by all conceivable atmospheric phenomena. The results of an elaborate inquiry, which have been since verified by the observations of Dr. Addenell Newton of Pennsylvania, are stated thus: "The time is favourable for operation—

"(a) When the barometer is steadily rising.

"(b) When the barometer is steadily high.

"(c) When the wet-bulb thermometer shows a reading of five degrees lower than the dry-bulb.

"(d) When, with a high barometer and a difference of five degrees in the two thermometers, there is a mean temperature at or above 55° Fahr.

"The time is unfavourable for operation—

"(a) When the barometer is steadily falling.

"(b) When the barometer is steadily low.

"(c) When the wet-bulb thermometer approaches the dry-bulb within two or three degrees.

* "On Meteorological Readings," by B. W. Richardson, M.D., F.M.S., 1870. See also "Change of Air," by J. C. Atkinson, M.D., 1867.

“(d) When, with a low barometrical pressure and approach to unity of reading of the two thermometers, there is a mean temperature above 45° and under 55° Fahr.”

It may be difficult to arrange surgical operations generally according to the ever varying conditions of the atmosphere in the manner thus indicated; but if it were possible to do so even in exceptional cases, some gain may thereby accrue to Surgical Art.

I have, in this avowedly simple and discursive address, said nothing new. I have merely brought under your notice some old facts, and experiences; the more valuable, perhaps, because, like old wine they have stood the test of time, and been refined by it too. I have repeated them, because I am not only desirous that we should utilize the principles which they represent on every occasion presented to us with all our powers, but that we should start on the pathway of new and further research from the platform which they have raised. I have repeated them because I feel assured that they help us to the solution of difficulties which beset the surgeon in his endeavours to attain for his labours that full measure of reward to which they are reasonably entitled; and, finally, because I would awaken that earnest jealousy for the repute of our art which will brook no rest, no content, until it ceases to suffer from the stigma of unattained, but attainable, success.

Gentlemen, I thank you for your courteous patience.









