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2

Notes

UPON

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Hospital Gangrene

Upon a subject such as this, which seldom falls under the notice of the civil practitioner, it is impossible that a junior can throw any new light; and for the best of all reasons, that fortunately now a days our hospital police is so much stricter, and our hospital wards so much better ventilated, that but few instances of this disease are now brought before us (if indeed this is the reason why Hospital Gangrene is now so very rare in our public hospitals).

The question will naturally arise as a sequence of the foregoing statement; — Why Choose as a subject for a dissertation, a disease which you own yourself to know little of, and one which has never come under your observation? Firstly; because, though happily nearly banished from hospitals at home, it is and will always be to a certain extent, rife in Military hospitals, when an army is employed on active service

Secondly; because, the aspect of the times points it out as a fitting subject for consideration
 Thirdly; because, I hope ere long to have an opportunity of making myself practically acquainted with this Malady; and a knowledge of what has been the experience of Surgeons in days past will secure the possessor at least some indications, by which he may be guided in his researches.

Writers upon Hospital Gangrene, having each seen (or supposed themselves to have seen) the same affection in different phases, have so complicated the disease and all connected with it, that not even the Nomenclature has escaped the general Confusion.

We have the name by which it is best known to British Surgeons, Hospital Gangrene; and that by which it is recognized in France *Pourriture d'Hopital*; and surely with two names so exactly alike, we might be able to communicate our observations with the utmost facility; but this appears to be an erroneous idea, for every Author has his own term, and describes the same disease under such names as *Phagedæna Gangrenosa*

Gangrene humide des Hopitaux, Gangrenous ulcer,
 Storbatic Ulcer, Malignant Ulcer, Putrid & Stoughing
 Ulcer, and lastly I find the terms Hospital Gangrene
 and Traumatic Gangrene used indifferently. Of
 these the first two are strictly correct, expressing as
 they do the nature and appearance of the disease,
 while the ^{appellations} class of ulcers as applied to this affection
 are some of them meaningless, and others are
 hardly definite enough. As to Traumatic Gangrene
 being considered the same as Hospital Gangrene
 the idea is not to be entertained for this reason
 that Traumatic Gangrene may happen in any
 individual case, it may be in private practice,
 after a compound fracture, while true Hospital
 Gangrene never can and never will take place in
 an isolated instance, unless by special inoculation
 I believe the fault to lie in the term alone, and
 I think that the error has crept in through some
 French works especially that of M. Olivier, "De
 la Gangrene Traumatique", who, under this name,
 has brought forward much valuable information
 upon the subject of Hospital Gangrene
 I shall therefore in this paper keep to the term
 which is best known viz Hospital Gangrene,
 though, as a scientific term I consider that of

Mr. Blackadder to be the more correct "Phagedæna
Gangrenosa"; Still it matters little which we use while
to either we agree to attach the same meaning
I intend dividing this subject into two Chapters
First — a short Historical notice of the disease
Second — the History of the disease including
a - The Nature - & - The Cause - & - The Treatment of
the disease

First then as regards the Historical notice of the
disease, Hospital Gangrene appears to have been
known to many of the older Medical Authors,
at least a determination on the part of Sores to
take on an unhealthy (I had almost said Malignant)
Character has been noticed by them, which so nearly
corresponds with the disease which we are at
present considering, that hardly any doubt of
their being one and the same can remain in
our minds, after a very superficial glance at
the description of these Ancient Writers

Celsus particularly, mentions a Species of Ulceration
which we can hardly mistake for any other
than Hospital Gangrene "Color est lividus vel
" niger, odor foetidus: Multus, et mucos similis,
" humor. Ipsum ulcus neque tactum neque
" Medicamentum sentit: pruriginè tantum movetur

"at circa dolor est et inflammatio. Intertum etiam
 "febris oritur. Numquam ex ulcere sanguis erumpit,
 "atque id quoque Inalium serpit". From this quotation
 it would appear, that Celsus was fully aware of the
 appearance, and nature of the disease, for he expressly
 says, "Intertum etiam febris oritur", showing that he
 regarded the Constitutional symptoms only as the effect,
 while he looked upon the local lesion as the true
 Cause)

Many other Authors have taken notice of the same
 affection, but under so many different names, that it
 is only by Comparing them one with another, that we
 arrive at certain points of similarity, which lead us
 to conclude that they all entertained the idea of
 an ulceration so destructive that Celsus, speaking
 of it says, "Quia celeriter perpendo, penetrandoque
 usque ad ossa, Corpus vorat", a sentence, at once
 so short and so pithy, that it expresses to the full
 all the horrible accounts given by more Modern Authors
 on the subject

Aetius a writer in the fifth Century, has also mentioned
 the disease, and appears to have been fully impressed
 with its obstinacy of Character, as may be seen from
 the following "Depascentia ac putrida ulcera appell=
 =antur, quae vicinas partes erodunt, et putrefaciunt;

Why quote
 him in
 Latin?

"et sane vehementissimis Medicamentis, et sapissime
"inunctiones requirunt".

Paulus, who wrote in the seventh Century, Avenenna,
an author of the eleventh, and others who wrote in
the thirteenth Century, take notice of this disease;
especially Guido, who has compiled all that is
of value, and interest, in the works of his predecessors.
I shall therefore translate a few extracts from his work,
which was published in an abridged form by Tagaultius
in the sixteenth Century and as they are quoted in the
original Latin by Mr. Blackadder who was led to
adopt the local treatment of the disease by the perusal
of the following passages

"We have defined above what is a corrupt ulcer, which
"the Grecians call "porrapos", also what may be called
"a fetid or putrid ulcer - Moreover that ulcer is
"called Corrupt and putrid by Guido which (to use
"his own language) by its Malignancy putrefies the
"limb, by sending forth a viscosity or fetid flesh
" (he says) either soft or crusted over, from which
"arises a putrid and deadly odour. And indeed
"they even call such an ulcer deceptive. But if
"its Malignancy proceeds and insinuates itself further,
"it degenerates into gangrene (called Esthiomenum
"generally) and takes away the patients life".

In talking of the treatment the same Author observes
 "Afterwards the ulcer is cleansed by the ointment
 "Commonly called Apostolic, or by that which is
 "named Egyptian. But if the filth should degene-
 "=erate into putrefaction or mortification, the spot
 "should be washed with oxycratum, or (as Guido
 "wished) with Aqua Cineris or Saponis
 "But if such wasting and putrid ulcers should
 "come to that stage of fierceness and malignancy
 "so that they eat away the adjacent parts more and
 "more, and excite an unlimited depravity in them
 "they need the most powerful remedies (such as we
 "have enumerated above for the cure of malignant
 "ulcers): nay Canteris and even excisions are necessary
 "for them, so that everything vitiated and corrupt
 "may be thus entirely extirpated. But among
 "other strenuous remedies, which separate the living
 "part from the mortified and are accustomed to
 "be considered famous in this disease, that which
 "they call Sublimed Arsenic is discovered by daily
 "experience to be the most excellent & powerful of
 "them all as we have several times noticed elsewhere
 "For this arrests the disease at once and that
 "indeed without pain"
 "But the encircling place, the parts round the ulcer

"Should in the mean time be continually protected by
 "refrigerants lest the discharge should be irritated by too
 "violent remedies applied"

"But that last and afflicting remedy should never
 "be applied unless when the others profit nothing and
 "are quite overcome by the disease"

Guido may be taken as the type of all those who
 preceded him; and he seems to have come to
 the conclusion, that by local means only, could
 this disease be successfully combated, and he
 certainly did not waste his time in the weaker
 remedies, but often hurried at once to the actual
 Caustery, an application, which while we have no
 wish to deny its power for good, yet is a power-
 ful for evil; and the statements of these older
 writers as to the benefit to be derived from its
 use must be received with some little reserve:
 for when we find one of them speaking of "the
 sacred virtues of fire" and recommending it in
 nearly all cases, we may form some idea of to
 what an extent they carried a favourite hobby.
 Wiseman and Lamotte in the seventeenth, and
 Du Rost in the eighteenth century, have mentioned
 this disease at some length; the two last speak
 of it under the name of "Ponriture a l'Hotel Dieu,"

from the fact that it raged in that hospital at the end of the seventeenth, and beginning of the eighteenth Century.

Mr. Samotte in his book * speaks of it thus "laquelle, dit-il, survient et accompagne toutes les plaies qui sont traitées dans cet hôpital, et la plus grande partie des abcès qu'on y ouvre, à cause de l'air corrompu qui y règne, et que ces blessés y respirent par la grande quantité de malades qui y sont."

Mr. Pouteau, who held the office of a dresser in the Hotel Dieu, appears to have studied this disease during an epidemic which prevailed in Paris at the time; and his attention appears to have been drawn particularly to the subject, by the fact of his having wounded his hand with a scalpel, upon which Gangrene supervened. Still he appears to have had no doubt that the Epidemic was caused in the first instance by the foul air in the hospital, and carried this idea so far, as gravely to put the question to his professional brethren, whether, an hospital was a benefit, or a curse, to suffering humanity? he certainly considered it as the latter; but one cannot wonder at this, when they read that not

* Traité de Chirurgie. Chap. 19, p 263

a single amputation escaped this complication, and that the majority of healthy ulcers, at the time in the hospital, put on this malignant character. Mr. Pouteau is quite as fond of his Caustery as the more antiquated authors of whom he have been speaking, and he considers all Constitutional treatment as worse than useless, with the single exception in favour of five grain doses of Camphor every four hours.

We have many instances of this disease occurring on shipboard, some of which have doubtless been the scorbutic ulcer, and not the true Phagedæna, while others, from the history of the cases, appear really to have been a species of so called Hospital Gangrene; for in many of these it was remarked that the disease was generally traceable to some connection with the shore, and that it broke out more frequently while the vessels were in port than when out at sea. Another circumstance which appears worthy of mention is, that in these cases the due allowance of fresh meat was served out to the crew, along with abundance of vegetables; a fact which renders it less likely to have been scurvy.

But it was in the great Continental wars of Napoleon that an opportunity on a grand scale, of investigating this disease presented itself, and it is to the

11
 exertions of the Surgeons during the campaigns in the Peninsula, that modern Science is chiefly indebted for the information that has been collected bearing upon this important subject; truly important at present, when again we are plunged in a war, from which ere we can extricate ourselves too much scope it is to be feared will have been given to the young Surgeon to make his observations; for it is a disease which, though now seldom seen at home, is (as I said before) very liable to attack the inmates of an ill arranged hospital, such as the hospital of an army in the field must always be to a certain extent. During the Peninsular Campaigns some of the hospitals suffered extremely from this disease, especially those at Vittoria, St. Sebastian and Bilbao, accounts of which have been given us by the respective Medical Officers who had the charge of them, and horrible indeed must have been the sufferings of the unhappy inmates, who were attacked by this noisome, and often fatal disease.

Messrs. Guthrie, Blackadder, Boggie, and Hernen have all written upon this disease at considerable length. Mr. Blackadder, especially, appears to have satisfied himself of the local nature of the disease, and of the utility of corresponding treatment; while

Dr. Boggie whose observations appear to have been equally minute, and whose descriptions of the disease (as he saw it) are graphic in the extreme, contends as strenuously for the Constitutional theory; who is right is a matter for future investigation.

M. Olivier has written a work on this subject and indeed most of the French Surgeons have held their own views with regard to it with the exception of Baron Larrey, who has taken little farther notice of it than mentioning its occurrence in Egypt.

The French School principally adhere to the local treatment with the exception of M. Delpech so that the Constitutional rests chiefly upon the testimony of Dr. Boggie and Mr. Keeney, testimony so high that, however much we may be inclined to side with Mr. Blackadder and others, we are bound to do so with some little reserve considering the height that the opinions of the above named gentlemen must carry with them.

Passing from this short, and very imperfect historical notice, we enter upon the History of the disease, and the more minute facts connected with its appearance and successful treatment, and the following Chapter I purpose dividing into three heads, its nature, Cause, and treatment concluding

with a few practical deductions.

Chapter II The nature of the disease (12)

Every disease to which the human frame is liable may, after careful observation, be noted in its accession by certain physical phenomena termed symptoms, which according to their nature are classed under one of two heads, Local or Constitutional, and perhaps in no disorder have the claims of each to priority been more determinedly advocated by their supporters than in Hospital Gangrene. This I believe, is to be accounted for firstly, by the fact of the disease being Communicable in more ways than one; and secondly, from the circumstance that, when Communicated, its symptoms will very much depend upon collateral agencies, which will be enumerated more in detail hereafter.

No doubt the older authors, who have been referred to, appear to have considered this disease as a purely local lesion, depending upon external causes; and if they are to be taken as our sole guides upon this matter, we must throw off all our ideas as to the possibility of any Constitutional taint being at the bottom of this affection in any one case; but in an age so much more empirical than that in which we live, men were more likely to be attracted by those

Symptoms which appealed most powerfully to their physical senses, than by others, the true nature of which was not understood by them; nor indeed by their successors, until, by the exertions of minds more philosophically constituted, theories were worked out and supported both by practice and by statistical observations, and problems were solved, which never occurred to men who were denied much of the information which has since been thrown on diseases of a like nature, by Pathological and Physiological Science; and who had not arrived at a just appreciation of the more modern dogma, that it is not always by treating each individual symptom, but by striking at the root of a disease, that we are to expect an amelioration of these symptoms. It is the cause that we have to combat, not the effect.

Still undoubtedly these symptoms are of great value to us as diagnostic marks by which we may be guided in founding a method of treatment and hence the importance of determining which class is the first to make its appearance, in a disease like that which we are considering.

I believe that, under different circumstances, either the local or the Constitutional symptoms may occur first; for, admitting it to be a specific

poison, I think that it is not such an one as requires in all cases (like the Syphilitic Virus) actual Contact, but one which becomes a true *Materies Morbi*, which is capable of being disseminated in some manner through the Atmosphere under certain Conditions, and of constituting the predisposing cause, which only requires the application of the exciting Cause to burst forth in all its virulence, and exhibit its local phenomena in all their hideousness. Of course the converse of this is equally true; for, should direct inoculation have taken place, there is not any more need for a predisposing Cause than there is in the case of a child who has been vaccinated, and in whose arm a true vaccine vesicle has formed, in which case one would of course never deny the priority of appearance of the local symptoms. Considering all this, perhaps Dr. Boggie has taken the more scientific view of the matter in denying, as he does, that the term Hospital Gangrene as understood by supporters of the local nature of the disease, is applicable to all forms of it, or at least that a subdivision into Contagious Gangrene and Phagedenic Gangrene would better suit the exigencies of the case. However, to proceed to the detail of the symptoms

of Gangrene, when there can be no doubt as to its origin (I refer to a case of direct inoculation) The finger having received a puncture, or abrasion of the cuticle, and having afterwards been in contact with the virus of the true gangrenous ulcer, unless the wound is of itself painful, the hidden matter will give no warning of what is about to happen for the first forty-eight hours; then slight heat of the surface is felt, and, if narrowly watched, a vesicle may be seen, surrounded by a red areola, the integument around the wound swells, & becomes very sensitive; then the vesicle breaks presenting a hardened base with irritable edges, and the constitutional febrile symptoms are ushered in by chilliness, headache, nausea and languor, succeeded by an inflammatory reaction, often of a low and typhoid character.

Such are the symptoms of the disease when it takes place in its simplest form, as from a puncture from a bistoury which has been in contact with the virus; and indeed these symptoms have been watched under the most favourable circumstances Mr. Blackadder having accidentally, & Mr. Olivier willingly, punctured their fingers, watched the

effect on their own persons, and therefore have a right to know more than the generality of writers on the subject; and they agreed perfectly in their descriptions, though it is somewhat curious that Mr. Blackadder does not mention the occurrence of any glandular affection, as the result of the gangrene, though he appears to have had sufficient trouble before the wound cicatrized.

The foregoing may be taken as a fair specimen of Hospital Gangrene in its simplest form, and while we have it completely under our control; for it seems not improbable that in this, as in some other zymotic diseases, the local symptoms require to be developed in some degree at the point of inoculation, before the malignancy of these symptoms becomes apparent through the constitutional affection. As in that horrible disease, Hydrophobia, excision of the bitten part will, though delayed for a week or longer save the patient, if the period of recrudescence has not yet supervened; so in Hospital Gangrene the free application of the Nitrate of Silver to the vesicle, so as to insure its entire destruction, will generally cut short the dire train of symptoms which would otherwise inevitably have followed. But this is not always in our power, and most

unfortunately there are other and more malignant stages of this disease. Some have even thought that they could trace different varieties, and have classified them according to the characteristic appearances presented by each; thus we find three given by M^r. Olivier, in his description of the disease*

I Croison sans escare apparente

II Croison avec escare

III Dernier degré de la seconde

while M^r. Delpech† has enumerated two varieties, to each of which he adds a second stage; his principal divisions being into:

I Gangrene Ulcerense

II Gangrene Palpeuse

and, lastly L^r. Boggie has divided the disease into

I Contagious Gangrene

II Phagedenic Gangrene

But as all these authors, especially M^r. Olivier, allow that these varieties may run into one another, and so form stages merely in the progress of the disease, I prefer describing it as a train of symptoms leading on from bad to worse and in a few of the sites which appear most liable to be attacked by its ravages, modified as it is, by various circumstances

* "Traite du Typhus Traumatique"

† "de la Gangrene Humide"

from its accession to its decay.

Having glanced at the disease as it appears when the result of direct inoculation on the sound skin of a previously healthy person, let us look at it under other and less favourable circumstances; and perhaps there cannot be a better opportunity for observing this Malady in its worst form, than when a number of old Ulcers exist among the patients in a small hospital ward, for, should the disease have once broken out, whatever else may escape, they are sure to suffer, and that severely.

The disease generally shows itself in these Ulcers by a burning and throbbing pain, accompanied by a feeling of oppression about the forehead, loss of appetite, and inability to sleep: the patient is aware that there is some Change going on in the sore, but cannot describe his sensations, soon there is more or less fever, and now an imperfectly formed vesicle may be seen at the edge of the ulcer which becomes tumid and angry looking, while before it was granulating and healthy; the surrounding integuments also become first highly florid, gradually deepening in tint, till they appear of a purplish black colour. And now on the sore itself, a grey, viscid, tenacious slough may be seen; this eventually comes away

20

(only to be succeeded by another), displaying a Cup shaped cavity with reverted edges, hard & unyielding. This goes on, the Ploughs being discharged; the limb becoming more and more Edematous, and the ulcer increasing each time, both in Circumference and in Depth, till the areolar tissue has been totally destroyed, and a dissection of the parts is presented to our view, more minute than the most helpful preparation of the Anatomist, in which the living Arteries may be seen pulsating among the dying tissues, a spectacle truly horrible.

This is accounted for by the fact of the different tissues possessing in a greater or less degree the power of resisting the destructive effects of the disease, and the areolar tissue being endowed with least inherent vitality, gives way first, leaving the others as yet almost untouched. But soon the muscles become implicated, and a greenish matter, like that seen on a dead subject, which has been long kept in a dissecting room overspreads the entire extent, and soon changes into a stinking Plough, which is cast off to make way for another and another, till this disease in its insidious progress conquers the Muscular tissue also, involving often great loss of Substance. The small Arteries now

27
Spring, displaying spots of Arterial blood from time to time among the putrid mass. The fever, which has hitherto been of the inflammatory form, now inclines to the typhoid type, and the nervous system becomes visibly affected; there are tremors and spasms, especially during the act of swallowing. The lymphatics are also affected, and Abscesses form, which, whether opened or allowed to open of their own accord, only present new foci for the disease. Amidst all this the larger Arteries will remain intact for an incredible length of time, even after the periosteum of the bones has become affected. But at last the peculiar appearance of the Countenance, which distinguishes the patient labouring under gangrenous affections, becomes visible; Anxiety and despair are there pictured; a ghastly colour gives to the shrunken features a still more horrible appearance, till, amidst ferce delirium or helpless typhomania, the Artery Springs — the limb swells — involuntary stools are passed — and the unhappy man dies in a state of perfect Coma; neither the ligature nor the tourniquet will avail him anything, for by this time the surrounding parts are so much disorganized as not to admit of the application of either with success.

Such then are some of the horrors of a disease, which, both in the Peninsular and Indian Campaigns,

destroyed the greater proportion of those who died in hospital; and the events of the last years operations in the East show, that we are still far from ^{having} arrived at a true knowledge of the cause of this disease, or of suitable measures for controlling it, though certainly much has been done to lessen the ravages, which marked its progress in former days.

Of course many circumstances will influence the detail of these symptoms enumerated above; thus, if a gun shot wound, or bayonet thrust, be the seat of the disease, the first sign that we have of the state of affairs in the wound is the alteration of the discharge, becoming, as it does less in quantity, and more sanious than it was before; but soon a glary pellicle appears to stretch from the lips of the wound, which ultimately forms a slough, and the gangrene appears to burrow its way among the tissues, leaving the integuments almost entire; but this seldom lasts long, the wound shortly assuming the open form described above.

There is another circumstance which is said to modify this disease, indeed some claim immunity for such sores as are in the first instance the result of the Syphilitic Virus, and that the presence of some other specific poison has the power of rendering

this disease less formidable; whether this is true or not as regards Syphilis it certainly does not hold good with regard to the Mercurial poison; for it was observed, that in the Peninsular War, when Mercury was given in much larger quantity than it is now, those who suffered most from Hospital Gangrene, had been under the influence of that Metal at some time previous.

The Symptom which has generally been thought to be most characteristic of this disease, is its tendency (whatever may have been its primary stage) to assume that of the Circular, enlarging by Concentric rings; but I think that there is a much more prominent feature in this kind of gangrene, namely, the processes of suppuration, ulceration, mortification and cicatrization, may be seen going on in the same sore, at the very same moment, of which, as far as I know, we have no other instance in any other form of Ulceration. It has been remarked by some Authors, that, on Post-Mortem examinations, if a sore had existed during life on the Thorax or Abdomen, the viscus over which it was situated became studded with Gangrenous points; the same however was not observed in the case of the Brain, probably from its more obstinate defence; the hard & solid bones composing the Cranium.

That this formidable disease is in the highest degree contagious is, I think, an opinion which cannot be disputed; and yet, at one time, doubt were entertained upon the subject by many eminent men who had studied the matter, and more especially among the French surgeons objections were raised, till the question was set at rest by one of themselves, M. Olivier, then in the Peninsula. This gentleman has given a very detailed account of the disease, so far as it went in his own person, which he has laid before the medical world at page 199 of his work; the following are the results of his experiment. He caused himself to be inoculated with the very worst virus he could find (indeed the patient from whom it was taken died soon after), upon the 17th of October 1810, and, during the whole progress of the disease, he was removed out of danger from anything like infection; for two days afterwards he suffered no inconvenience; on the third day (the nineteenth) a pustule formed, presenting the characters mentioned in a former part of this paper, which went through its regular course, till on the twenty second (the fifth day after inoculation) all the phenomena of the disease were apparent, and on the twenty third, the lymphatic system was so much affected, that M. Olivier thought it was high time to put a stop to its farther progress. This experiment,

along with the experience of others, settles the matter as to the communicability of the disease by direct contagion, without the assistance of any other cause which was likely to favour its accession.

But, though this proves that the disease may be received by contagion, it does not disprove the fact that it may also be communicated by infection; and Mr. Hennew has recorded a case, which goes far to establish the infectious nature of the malady. He had in the hospital under his care a number of wounded soldiers, occupying the second floor of the building, the ground floor being considered too close for the reception of patients; but, after an action, the number of wounded was so much increased, as to render it necessary to fit up the lower floor for their accommodation. Some of the newly arrived wounded brought with them the disease under consideration, and, in order to afford free ventilation, Mr. Hennew caused a square hole to be cut in the roof, so that the two wards communicated; and the result was that in four hours time a change was observed in some of the patients and before next day many of them were seized with Hospital Gangrene, the constitutional fever and other symptoms making their appearance first; and yet in this

case no contact could have taken place except through
 the medium of the atmosphere ascending to the
 sound ward through the aperture which had
 been made in the roof by
insects?

Again a friend of my own, in going round one
 of the Metropolitan hospitals, in the summer of 1855,
 was shown one bed in the corner of the ward, which was
 then occupied by a patient suffering from Hospital
 Gangrene; and it had been remarked that,
 for some time previous, every patient, whose misfortune
 it was to have that bed allotted to him, was seized
 with the disease, though every care had been taken
 to ventilate and disinfect that portion of the ward,
 and yet the other patients on either side escaped.
 Amidst such conflicting instances as these, I think
 the safest plan is to hold a middle opinion (at least
 till one has an opportunity of observing for themselves);
 for there are facts to prove both the contagious and
 infectious nature of the disease, while there is
 nothing to disprove either.

And now, having attempted briefly to describe the
 nature of this disease, let us turn for a little to
 the second division of the subject viz the Cause
 the cause of the disease (6)

On this head little or nothing, upon which dependence

can be placed, is known; truly we may say "*Causa latet, vis notissima est*", for to found a scientific treatment upon a knowledge of the cause of the disease has as yet baffled all effort. That it is a specific virus, capable of being communicated by inoculation, we have seen; also that the *Materies Morbi* may find its way into the system, independent of actual contact with a wounded surface, is I think probable; but, from whence does this virus spring? - how does the first case, which is to be the means of inoculating the others, originate? - This is putting the question in its simplest form to those who consider it a local affection only; it cannot have arisen from nothing; such a way of getting over the difficulty would be in the last degree unscientific; and it is not a mere degenerate form of ordinary ulcer - how then are we to account for it? - and on this head I believe all we can do is to speculate.

The duties of a military surgeon, who has much more opportunity of investigating the disease than the civil practitioner, are much too arduous in time of war, to allow of his making such arrangements, with regard to his patients, as would lead to their greatest safety, and his own advantage in the study of this disease; and so,

origin of
all cases
our disease
abscon-

when the time for reflection comes, it is only by an aggregate of isolated facts, that he can be lead to form any opinion; for it seldom happens that a man has the power in a field hospital of heading out the gangrenous cases, and devoting a ward to them alone, and, it appears to me, that only in that way, and by a series of such experiments, will we ever arrive at a proper & correct judgment on this matter

Specific virus then is the most palpable reason for the spread of this disease, and perhaps in many instances, in which it was apparent, have been attributed to other causes, from the fact that in no way could contact with the virus be accounted for; but, when we reflect that the most minute quantity is quite sufficient to cause the disease, we must allow that this is the manner in which it is most frequently spread; it lurks among the bed-clothes and pallases, which, in time of active service, cannot be washed as they ought to be: it clings to the fingers of the surgeon, or nurse, who, doubtless, are often the unwitting means of disseminating the disease; and, above all the sponges, and surgical instruments, cannot fail to carry the contagious matter from patient

Xpact of spec

to patient; for which reason, as sponges are rather valuable, tow, or cotton waste, should be employed in hospital practice, and destroyed as soon as it has been used; as, should the same piece be taken to clean the surface of a healthy stump, gangrene will be certain to ensue; add to these dressings, which have been washed after being applied to a patient with a gangrenous limb, and then employed to bind up a fresh wound, and we have no want of means, by which the virus may be carried over a ward.

Among the causes which we may assign, as producing this virus, are Situation, Atmospheric influences, bad Ventilation, Miasmata from other diseases, improper Diet, inattention to Cleanliness, also Mechanical irritation, and habit of body.

I Situation: this, doubtless, has much to do with the origin and spread of this disease, as was exemplified in some of the hospitals in the Peninsula, where it broke out, at Passages, near St^h Sebastian, where the general hospital of the British Army was established in 1813, there occurred a good example of this; situated upon an inlet of the Bay of Biscay; overhung with mountains whose summits were never

entirely visible, on account of the dense mist which enveloped them, and protected from the wind upon all sides, except when it blew off the sea; the thermometer seldom standing above 55° Fah; and sometimes as low as 32° , (this was from October to April), and with almost constant rain; added to which, noxious vapours arose at night from a natural basin, in which this Canal terminates; here Hospital Gangrene reigned triumphant for a very long time, and, though ultimately banished as the season wore on, we can hardly overlook the influence, which the low and unhealthy situation had upon the disease; for all analogy tells us, that in the progress of an epidemic, it will choose those places least open to the four winds of heaven.

II Atmospheric influence, especially the sudden variability of temperature, appears to exert a strong influence on the progress of the disease, while Dr Boggie considers that one of the prime causes of Hospital Gangrene is a continuance of very warm weather, as when it made its appearance at Bilbao where he was stationed, he remarked that the thermometer never was

below 75° Fah: in the shade, and often very much higher; and here we find a striking difference from the temperature at Passages; the disease raging at the one place with a temperature of 120° in the sun, and 95° in the hospital, while at the other the maximum was 55° ; Dr. Boggie accounts for the disease being most prevalent in hot weather, by the fact that the secretions, and excretions, are under those circumstances more acid than they are in general, and that in accordance with this principle, the secretion from the surface of the wound becomes itself very irritating and so prevents the sore from healing.

III Bad Ventilation has been thought by many, who consider this disease to be a Constitutional affection, as quite a sufficient reason to assign for its appearance, and they hold that were our wards larger and better ventilated, this Malady would soon be numbered among the things that were; There can be little doubt, that in cases where the sewerage is deficient, or temporarily obstructed, or, where there is not sufficient draught to carry away the close and poisoned ^{air} of an hospital ward, (especially where Hospital

Gangrene has established itself) these circumstances will act as powerful allies, if not as exciting causes proper: Mr. Hennen holds that they are the means of setting up the disease; and he depends almost ~~almost~~ wholly on a rigid system of hospital police for getting rid of the malady, by punishing the exciting cause: and, whether this be the proper view to take of the matter or not, there can be no question, that at any time impure atmosphere, on account of its depressing influence, is a predisposing cause of disease: and when we consider, that the amount of Carbonic Acid exhaled, is about one fifth of the whole air inhaled, (and of course cannot be re-inspired without danger; since, 10 per cent. of Carbonic Acid in the atmosphere acts as a poison) we must be led to think, that this condition cannot exist long, with immunity to the patients.

IV Miasmata from other diseases: this properly speaking, is only a subdivision of the former cause, for were the ventilation properly attended to, this would, in a great measure, fall to the ground; however, as some very high authorities on the subject have considered this as a fertile

source of the disease, it will be as well to refer to it shortly under a separate head. M. Delpech considers the exhalations from patients suffering from typhus fever, as also the dejections of such patients, as well as those labouring under dysentery, as fruitful sources of Hospital Gangrene; also, that the presence of cases of ordinary gangrene in the same ward, may contribute to the production of the virus; and indeed, in his Memoir, he appears to hold the opinion, that either of these causes is in itself quite sufficient to account for the origin, and spread of the poison, and that the majority of the cases, which came under his observation, were to be attributed to this cause, rather than to direct inoculation; these subtle miasms being conveyed by the watery vapour, with which the air of the crowded wards became speedily surcharged. Other French authors mention this cause, as well as that of Erysipelas, and some of them consider that, under certain circumstances, that disease may terminate in Hospital Gangrene, instead of the usual erysipelas in which it so often ends; and certainly this supposition is not without many facts to support it, and which go far to prove that there

two, Hospital Gangrene and Erysipelas, are, under certain conditions, only different forms of the same disease.

V Improper diet, in its bearing upon this affection, may be either too stimulating, or too low; the first of these has again and again been brought forward as an exciting cause of this disease, for it has been observed that raw levies, brought from the country, where they were not accustomed to flesh diets, or from our crowded towns, where they had often been, before enlistment, "living from hand to mouth", and suddenly put upon full allowance of animal food, were the first to take on the unhealthy action; we have a good instance of this in a series of reports, collected by Mr. A. Copland Hutchinson, among which one gentleman mentions, that on board H.M.S. Phatham, when the scorbutic ulcer broke out, the young sailors, and landsmen who had for the first time gone to sea, were in a very short time seized with Hospital Gangrene; while the old sailors, though equally affected with scurvy, did not suffer in the slightest degree from this complication. These reports would be of great value upon the subject as statistical information, were it not

that they are liable to many fallacies; most of the gentlemen, from whom they are collected, appearing to consider Scorbatic ulcer and Hospital Gangrene as the same disease, under the name of Malignant ulcer. Too low a diet also acts by reducing the system of the patient, and so bringing him much more under the influence of the poisonous miasmata, without the power of shaking off the infection.

VI Inattention to Cleanliness need only be mentioned; as, it is self-evident, that, should these gangrenous sores not be regularly dressed, and cleansed, the very discharge from their surface, by remaining in contact with them, would only serve as fresh virus by which the disease might be spread to the surrounding parts.

VII Mechanical Irritation has been noticed by Dr. Buggy, who thinks that this source has been very much overlooked by writers, and, that many more cases, date their commencement from the time of transportation of the wounded from the field to hospital, than is generally thought. He states, that he has often observed, that those of the wounded who, though unable to keep up with the army, still made their escape from the

enemy, suffered severely in consequence; and, that many parties of wounded, who set out on a short march with their wounds in a healthy state, were unable to proceed from the spread of Hospital Gangrene among them.

VIII Habit of body has doubtless a good deal to do with this disease; those of the Plethoric, and highly, diathesis, being especially liable to it: also, there are many instances of patients, who had been under Mercurial action, being seized with it immediately on their admittance into hospital. These causes then, Collectively, or any one of them, are said to be the sources of this disease, though this part of the subject is hidden in much obscurity. Doubtless whatever is the primary cause, the disease will, and does, progress, after that cause has been removed, through the agency of specific Contagion, which, after all, is the great obstacle to the successful treatment of Hospital Gangrene.

c. The treatment — This may be divided into the Prophylactic and Curative

The first of these we may adopt, in many instances, with complete success, while, in those cases, in which it has actually supervened, though we have to fall back upon the second division, it must

be remembered, that it never can be attended with its best results should the indications of the first be neglected.

In the first place, there is, as we have seen, a most marked influence exerted upon this disease by the situation, and therefore in cases of temporary Camp hospitals, a proper site should be chosen, open on all sides, and, as far away as possible, from stagnant water. Elevation also is a great point to be attended to, for, should circumstances necessitate its establishment in a miasmatic district, the height will often make all the difference in the health of the inmates.

The Ventilation in the wards should be insisted upon, and, besides the ordinary means for attaining this, there is one within every mans reach, and under any circumstances; the contrivance of Mr. Arnott (if I remember correctly) viz cutting a hole in the wall of a room, so as to communicate with the Chimney about two feet from the roof, which will be found a very efficient means of carrying off the noxious atmosphere of a crowded ward, more especially should a fire be burning at the same time. The ordinary sanitary measures are to be taken, as white washing the roof, and walls, placing vessels containing bleaching powder and Sulphuric Acid, at

short intervals, and, giving as much space between the beds as circumstances will allow; If the disease is expected, though not actually present, a stream of Chlorine may be made to pass over the suspected ulcers while they are being dressed.

All dressings, sponges, and instruments, are to be kept out of the way of the virus, unless, when absolutely required, and, when used, should be afterwards cleaned with the utmost care; indeed, it is much better never to use the same dressing twice, should such a course be possible, and also, it would tend greatly to restrain the disease, were sponges not used, but in their stead, some cheaper article, which, might be destroyed after having served its purpose: Blankets &c. which have been on a bed occupied by a gangrenous patient, should be thoroughly washed ^{and} before hanging out to the air, where they ought to remain for some time, before being used again: And all these precautionary measures cannot be too rigidly enforced, as doubtless many of the dreadful epidemics of Hospital Gangrene, which have happened from time to time, have in the first instance been fostered, and spread from neglect of them.

Should Hospital Gangrene have broken out in

a ward, those seized should be transferred to another portion of the building, or, if possible, out of the house altogether; for it is better to have one ward fall of it, than to have cases scattered over ^{number} of which we all probably will soon spread, and so fill the house, more or less, with this formidable disease. This being done, the patients in the yet healthy wards, are to be watched narrowly, regimen being carefully regulated, strengthening food in small quantity being given, unless in special cases, where it is contraindicated.

Decayed vegetable, or other substances, are to be removed, or still ^{better}, destroyed by burning, as if they are permitted to accumulate they form fertile sources of the disease.

These, and other ordinary hygienic means, which from time to time may occur to the mind of the surgeon, are to be attended to, for here, as elsewhere, "prevention is better than cure".

The Curative treatment, as I before said, must be conducted with a due regard to the indications of the prophylactic, but, from all that I have been able to gather, I am inclined to think that, in the treatment of Hospital Gangrene, neither the local, nor the Constitutional methods are alone

to be trusted to, and I cannot think that any of the much vaunted lines of treatment, will, under all circumstances, be attended with success; but rather, that an attention to the Symptomatology of the disease, and especially, to the type of the Constitutional affection, will, in the majority of Cases, be crowned with greater benefit to the patient, than a routine of Escharotics on the one hand, or, Anaphlogistics ^{on the other}, according as we adopt either the Local or the Constitutional theory.

Not, but that before this, they have ~~separately~~ ^{and} ~~unaided~~, accomplished all that could be expected from them, but, that very often, sores after having resisted all local applications, have been successfully treated by Constitutional Measures, and vice versa; and that cases of Hospital Gangrene, which in their commencement, seemed, to be rapidly recovering under the first mode of treatment, required the second to complete the cure.

On the first appearance of the Gangrene, it becomes the duty of the practitioner to endeavour to obtain an ecrotic result, by means of escharotics, and of these only the most powerful will do any good.

The Actual Caustery stands at the head of the list — spoken of in the highest terms by French Surgeons, both of Ancient and Modern times, and advocated by authors, who, though they sometimes abused it, still must have found great benefit from its use, before they could speak of it in the laudatory terms, which some of them do — it has never come into the same general use in British practice, even in cases where a strong escharotic is considered necessary, the potential, being generally preferred to the Actual Caustery, and for no good reason, that I can see, unless it is the idea of a hot iron, for really the pain resulting from the use of either, is much the same in intensity at the time, while as regards the after pain, there is no comparison; the stifled groans of those suffering from the application of Caustic Potash, being heard long after every feeling is gone, attendant upon the use of the more formidable looking remedy; and in these days of comparative immunity from pain, I think, I should be inclined to put a patient, who laboured under Hospital Gangrene, into a state of Anæsthesia, and apply the Actual Caustery. Nitric Acid has been used with considerable success

in many cases - a pledget of lint having been soaked in the Acid, it is pressed firmly upon the whole surface of the sore, till it is transformed into an eschar, when, it is removed, and some medicated dressings employed to allay the pain which is excessive.

Caustic Potash and a variety of other reagents, have been used with more or less success, indeed, in some French works upon the subject, it is impossible to fancy the number of destructive instances, which we find enumerated, as having been used to combat this disease; but perhaps none has obtained so much celebrity, or appears to have been so successful, as the Oxide of Arsenic, or Fowlers Solution of Arsenic, removing as it did, in Mr. Blackadders hands, the local affection safely and effectually, it deserves a high place among local remedies, though it has failed in the hands of others, as signally, as it was successful in his.

These, and many others of a like nature, and in order to obtain a like result, have been tried, each having his own favourite remedy, I confess I should try the actual Caustery, as the surest, and best means of fulfilling one great indication

in the application of these escharotics, viz that by the instantaneous severity of its action, it destroys the old slough, before affecting the floor of the ulcer, which the others do not do so well, and if it be not attended to, we never can reach these tissues, which will be benefited by the escharotic treatment.

When the sore becomes very irritable it is to be dressed with Opium, or some other Medicated dressing, in order to sooth the part, for perfect rest, and quietude, are as necessary to a cure, as any other remedy which we may think proper to employ.

The Constitutional treatment will depend very much upon the type of fever which is present, and upon changes which it may undergo in its progress, as well as complications, which not unfrequently are present, of the Lungs & Heart for example, also of the Brain & Cerebro Spinal System, should the disease be consequent upon the effect of a Phos, or some other lesion attended with severe Shock; certain rules for the treatment have been laid down by some authors, but they are as positively vetoed by others:—Antiphlogistics have been tried in every possible degree—Tonics likewise—Antiperiodics—

and Lebrifuges, and all have succeeded on some occasion, while, on another they have been found quite useless. Should the fever be inflammatory in its character, and should the patient be a proper subject, we may employ active Antiphlogistic measures, - blood letting - Mercury, and the whole array of this group of remedies, and often with success, but apply this system of treatment to another, without. Considering co-existing circumstances, and we may fail to benefit him, and not only fail, but, actually foster the disease we seek to subdue. Again, suppose a patient to be recovering under these measures, day by day improvement is observed in all the symptoms; but some morning finds him low, depressed, anxious, and restless - the fever has changed its type, it is no longer inflammatory, but typhoid, and unless the man's strength be supported he must sink. To take another case in which we have employed Antiphlogistics, but without success, and begin to despair of doing any good by these means, suddenly a copious bleeding is attended with great relief; what has happened? probably the patient is seized with the first stage of Pneumonia, and this accounts for the benefit he has experienced from the loss of blood.

These conflicting cases prove, that, until we can
 arrive at the cause of the disease, all attempts
 to bind down the treatment, within certain limits,
 is worse than useless, at least so it appears to
 me, and if I had to treat a number of cases
 of Hospital Gangrene, I am not sure that I
 would treat any two of them alike, except in
 one point, and that is in destroying the ulcer
 by the Pauley, or some other powerful means,
 as soon as it made its appearance. As to the
 Constitutional treatment, I would be regulated
 by the state of my patients, at the time; some
 I should treat actively, ⁱⁿ others I should be content
 to destroy the local ulcer, leaving the Constitution
 alone, & doing little ^{more} than removing the patient
 from the ward, if possible out of the house, and
 if the disease prove intractable, breaking up the
 establishment, or a part of it, for a time; for this
 is I believe the shortest way of getting rid of the
 disease, when such a procedure is practicable,
 and not only the shortest, but, perhaps the only
 way, of getting rid of all the forms of it; for I
 think, that could this disease be more closely
 observed, we should find different types of it,
 depending upon different causes, and to be

subdued by different measures; some of them, in which the Constitution is severely affected, others, in which it appears to suffer little.

This therefore concludes what I have to say upon the subject of Hospital Gangrene, it is short and very imperfect, but I believe that in writing this paper, if, I have not arrived at any very distinct opinion of my own, it is because it would be folly in one, who never has seen the affection, to pronounce an opinion in the face of so many, & so conflicting judgements given by those who have studied it. This much I have done, I have attained to a pretty correct knowledge of the opinions and treatment adopted by others, and would not be wandering altogether in the dark, should I hereafter have an opportunity of observing for myself.

A. R. Handyside 1856

