cases as in Epileptic Astigma, we have the latter condition entirely wanting, and loss of consciousness—the cessation of the cerebral functions alone is present. On the other hand, looking to those diseases which are seated principally in the spinal cord, we find them forming a very numerous and important class— a class in which we exhibit at one time a very great diminution of the function of the spinal cord, and at another time a striking increase or perversion of that same function; and although in many cases with the alteration in the action of the cerebro-spinal system, a degree of cerebral complication is associated, yet in a great number of instances this latter function remains intact, and the great organ of the reflex action is exclusively the seat of the disease. No better instance of this latter condition could be found than in that frightful and appalling disease Enanitis, where, while the musculcular system is put to its utmost stretch, the unfortunate subject of the disease is painfully conscious of the cruciating agony his spinal instrument is enduring. On this subject therefore it is the object of this thesis to discuss more fully, giving first a general account of the disease, secondly its Pathology, and lastly its Treatment.
General account of Tetanus

Tetanus is a disease which has long been known, even since the time of Hippocrates, the great father of Physic, who in describing it calls it by the same name as is now used TETANOS from τετανός to shake.

The principal features of the disease are spasmodic contractions of the voluntary muscles—contractions characterized not by a rapid convulsive thrill, at one time in full force and the next moment totally relaxed, but by a continued powerful tension of the muscles affected, relaxation occurring slowly and never completely—a state of tense spasm "evidently dependent upon an undue excitability of the spinal cord." These contractions do not invariably affect the same muscles, but sometimes one group is more particularly implicated than another, and according to the set of muscles affected, the disease receives various designations. Thus rigidity of the muscles of the lower jaw is a frequent symptom producing a perfect inability to open the mouth. This is called Stenosis or Lock-jaw. A very common form of the disease is a violently contracted state of the extensor muscles of the trunk, causing the body to be arched forward like a bow, the recumbent and heels alone resting on the ground. In this variety the name of Opisthotonus is applied. Again less frequently we find the opposite group of muscles...
affected and the body then rolled upwards like a ball, the head brought in actual contact with the knees. This condition receives the name of Empyœsphotonos.

Still more rarely we find the muscles of one side of the body more directly at fault, so that a lateral curve is given, and this form is called Neurosphotonos or according to Sauvage, Istamus lateralis. But when all the muscles of the body are equally affected, no contraction of one group predominating over another, the body lies straight and rigid. And to this variety the term Istamus is more particularly applicable, though it is in general used to denote any of the other forms already mentioned, all of which are to be understood not as separate forms, but only as symptoms of the same disease.

All authors however agree in making certain distinctions of Istamus out from its symptoms, but from the duration of the disease or from its cause. Judging from the length of its continuance and its severity they divide it into Acute and Chronic; the former being fatal and little amenable to treatment; the latter of a much less serious nature and more readily admitting of a remedy or a recovery.

From the nature of the cause producing it, a division is made into Traumatic and Idiotropic; the former
originating from some external injury, from a blow it may be without even the abrasion of the cuticle re-appears a lesion of the greatest magnitude, this form is almost always acute and is frequently mortal. Under this class it may be right to mention a variety occurring in newly born children, especially of the West Indies termed Thymus or Telenus Nasecentium, a disease possessing like the class under which it is placed a peculiarly deadly agency over the unfortunate infants, the subjects of the malady.

The Acholopathic variety has something internal for its origin, or it may happen from the influence of cold and damp. It is more commonly of a slow chronic nature and is therefore accompanied with a much less mortality than the Traumatic.

In the subjects of tetanus we find the disease too well armed to prevent any difficulty in recognising it. Its accession is gradual in general, though cases have occurred where such a statement could not be made. The celebrated example of the Negro of Professor Robinson sufficiently shows this. He lacerated his thumb by a China dish, symptoms of tetanus immediately made their appearance and he was a couple of fifteen minutes after the infliction of the wound. This one could not lay through a gradual accession, but fortunately such a rapid form
of the disease is rare indeed. Generally there are cer-
tain premonitory symptoms long before deserving the
name of premonitory, as in many other diseases they are
not uncommon. Unconsciousness, restlessness, watchfulness,
languor, depression, headache, dryness of skin, loss of
appetite and constipation. Richerand has noticed
a more decided symptom than any of these—an unusual
and persevering extension of the limbs during sleep, quite
different from the semi-stifled condition in health. But
most frequently the first symptoms which usher in the
disease are detected by the patient himself to an unpleas-
ant feeling about the neck, amounting to stiffness, but
which he ascribes as having arisen merely from cold.
This how ever soon manifests itself with greater severity, the
stiffness of the muscles of the neck increases and extends to
those moving the lower jaw; thus becomes impeded in its
movements or is firmly closed and that sometimes suddenly;
inspiration consequently is performed with difficulty or not
at all. At the same time there is a constant desire for
air, but which the patient would fain gratify, but finds
he is unable from the closure of his jaws, or if he does suc-
ceed in swallowing a little, the effort is attended with
such sensations stammering that its repetition is looked
on with so much horror as to exhibit in the subject
of Hydrophobia; indeed the mere sight of fluid may im-
press him with dread. Deflation has become af-
fected and refuses to perform its due function. At this
time or at any be present to it, he feels great lassitude
and is troubled with constant pain not unlike that of
acute Rheumatism. These are added however in compar-
ison with what may yet follow. The disease state goes
onwards, implicates various muscles and causes greater
suffering. A pain may now have beeged the patient at the
bottom of the uniform cartilage, the situation of the Cha-
phragm, as well as parietalic contraction of which a fear-
conception of intense agony acts through the body to the spine.
The muscles of the thorax gradually become affected and
decoration is performed with the greatest difficulty and
anguish, and this occurrence has eventually an important
action in the termination of the disease. The abdominal
muscles will soon become affected, the muscles of the trunk
and extremities will not remain long intact and in
fits of violent and general convulsions the patient will
continue from time to time to be lacerated.
The violent paroxysms which make this disease bore
at its commencement only occasional, and a lengthen-
ed period of remission or rather abatement of the symp-
toms was allowed the patient, but as the disease proceeds,
these periods of repose are of much shorter duration and
the paroxysms form in more frequent and selfish sects,
ill at length under one of these of increased violence
the patient suddenly succumbs or it may be his strength
has become exhausted and he quietly though surely dies.

This may be said to be a common form of the disease,
egot but a constant one, since the muscles are variously
affected by the tonic spasm and the aecurcose of the
pain varies in some cases.

In noticing more particularly the various symptoms of
this disease I will examine first the Contractures of the
muscular system. This condition is constant in every
case, though as already mentioned at any very in
degree. However, it is remarkable that the muscles after
becoming once affected do not again become free from their
rigidity, but continue in a state of tonic contraction until
death or recovery terminates the case. Contractures,
too, of this condition occur and so the muscles are
more violently contracted for the time, after which a
remission follows, yet retaining a minor degree of spasm.

Thus the hand during a paroxysm may be firmly closed
ed or the jaws as tightly closed, but join neither
of these conditions well the patient be entirely free when
the spasm has subsisted. The powerful influence of
Chloroform which in an otherwise healthy individual
produces perfect paralyzation of muscular power, in this
disease has failed to produce anything like complete
relaxation of the state of rigidity. This was well
shown in a case of acute tetanus which came under
my own observation two years ago, where the inhalation
of chloroform was persevered with for about nine hours,
yet without causing total abatement of the muscular
spasm. Some cases however have occurred in which the
episodes were completely relieved for a short duration, and
this has generally been during sleep. Mr. Mayo mentions
a very interesting example of this in the case of a boy
in the Middlesex Hospital suffering from tetanus. He
was found asleep during the night and in that state the
muscles were seen to be totally relaxed, his abdominal
muscles quite soft and yielding. On awakening there
however they were immediately attacked with spasm and this
again disappeared as he fell asleep. Mr. Barclay in
his treatise on tetanus states that he has witnessed
similar phenomena. Dr. Albright Palme mentions two
instances in which the episodes occurred only on that side
on which the wound was inflicted.

At the early part of the disease the convulsions may
come in every ten minutes or quarter of an hour lasting
for two or three minutes and then giving way to a
desis, but as the disease proceeds, the paroxysms
become more frequent till they seem hardly to be inter-
cepted, and this is a sure sign that the malady is of
a grave character or that death is not far distant.

During the paroxysms the countenance of the sufferer becomes greatly changed, so much so that Ariscon, when treating of the disease terms it "inhuman, calamitous, vengeance-dreaded, hideous, villainous, spectaculum et malum insanibilis." Stating further that the distortions of the face are such that the patient cannot be known by their most intimate friends. D. W. Hart in the Medical Observations and Enquiries relates the case of a patient aged 26 years, who, while suffering from idiopathic tetanus had his countenance so peculiarly distorted as to impress every one with the idea that he was 60 years of age.

In many cases the countenance becomes livid or nearly black, denoting impending suffocation; but the muscles of the face are often seriously affected, causing the forehead to become wrinkled, the eyes distorted, immovable and glaring in their sockets, the face drawn up, the angles of the mouth retracted so as to expose the teeth—altogether producing a most extraordinary change over the features. To add to this the tongue in its affected state is sometimes protruded during a spasm and caught between the teeth, so that it becomes black and bitter, and blood then oozes from it giving a more ghastly condition to the countenance.

In general there appears to be no evident cause for
the recurrence of the paroxysms, but in many cases and
more especially in an advanced stage of the disease,
the slightest circumstance will induce them, for instance
a draught of cold air, the least motion of the body or
any attempt to swallow.

The violence of the contractions vary in different cases.
Instances are mentioned where the teeth have been bitten
during a paroxysm, the thigh bones fractured by the in-
creased action of their muscles, and less rare than either
of these, rupture of the Recti muscles of the abdomen.
An instance of this latter recurrence as mentioned by
Dr. Barret Larrey. The patient was suffering intense spasms
and during one of these a tumour as large as an egg
suddenly made its appearance near the Linea alba
below the navel, which after death was seen to be the
result of rupture of one of the Recti muscles with in-
travasation of blood.

Pain is a marked symptom of this disease, yet it
varies according to the violence of the muscular spasms
and at different periods of the disease. During an
exacerbation it is greatly increased more especially at
the situation of the diaphragm and as Mr. Burley
remarks, the pain is extremely acute when the spasms
affect the muscles implicated in the wound, as in a stump
after amputation particularly if inflamed. During a
remission of the muscular tension the intensity of the
pain is much diminished; in some cases there may be
perfect freedom from suffering. But some cases have
occurred where none was experienced at all. Dr. Helbert.
Plone mentions such an instance. The disease continued
for four days with its usual severity, yet the feelings
of the patient were said to be rather of a pleasurable ting-
ling sensation than otherwise and continued so up to
his death.

Throughout the whole course of the disease the functions
of the brain continue little if at all disturbed, even up
to the time of dissolution; still there have been some
instances in which a degree of delirium has preceded death.

During the first stages of the disease the other vital func-
tions are much less affected than we might expect from
the universal character of the spasms. There is little or
no fever in general. During a paroxysm the respiration
may become hurried and labored, and the pulse rise in
frequency, but after this has ceased there return to their
normal condition. It is only near the termination of
the disease that the pulse alters its character and becomes
weak and feeble from the exhausted state of the patient.
The eudage of the body is also at times beclouded with sweat,
but this is absent when a remission has occurred.
The bowels are in almost all cases confined, dependent
upon the disordered secretion from the intestinal canal, but
also in part upon the medicines taken, and on the peculiar-
ravely contracted state of the sphincter ani, by which the
anus is most obstinately closed. In some instances however
the contents of the rectum have been expelled involuntarily.
The anus is generally diminished in quantity, clear and of
a tawny colour. This may be owing to the frequent evacuations
which the patient experiences during the exacerbations.
Occasionally there is retention of urine, and from the evi-
dence of the sooner or the sphincter bladder, the use of
the catheter is altogether prohibited. At other times it is
discharged with sudden force during the permanent con-
traction of the abdominal parietes.
The mode of termination of tetanus is various. First it
may end in recovery and that at widely different periods,
and secondly it may end in death and this also at various
dates and in various ways. As to recovery, this occurs very
slowly and even when well advanced, a degree of stiffness
and want of tone of the muscles may continue for a con-
siderable time. Mr. Larrey gives some interesting data as
to the duration of the disease. Of 5 or cases of recovery
collected from various sources, 8 were cured in the course
of a week, 3 in ten days, 2 in a fortnight, 4 recovered
at the end of 3 weeks, 8 after 6 weeks, 5 at the end of 8 weeks, 3
after 2 months and in 3 the symptoms were not removed till after three months. A more protracted case than either of those I find recorded in the Medical Museum Vol. II. 

The patient, a girl of 4, was first observed on Thursday 8th July 1762 to have some difficulty in opening her jaws. Precautions to this she had received on injury, suffered slightly from worms, but was otherwise healthy. Four days after wards the jaws were completely closed, but deflection could be performed without much difficulty. The muscles of the face and neck were then become emaciated and by the end of September the whole body had become rigid and in a state of complete opisthotonos. About the middle of November these symptoms continued unabated, but after this time under the use of electricity they began to subside, yet did not altogether disappear till January, eleven months from the commencement of the disease. This was evidently a case of idiopathic tetanus, gradual in its progress, but unusually long in its continuance.

As to the fatal termination of tetanus in certain period is observed. One has already been mentioned as terminating in a quarter of an hour after its commencement. More generally however the acute cases do not continue longer than the second, third, or fourth day, rarely as they last beyond the eighth. Hoppener says that if the patient survive the fourth day, he is pretty sure to
recover; but afterwards he adds that the 5th or 6th or 12th may be the fatal day. Sir James Mr. Cooper has observed a few cases continue to the 19th and 18th day, and Mr. Samuel Cooper had a case of chronic traumatic tetanus which survived even for 3 weeks. Thus we observe a considerable latitude in the duration of the fatal cases as well as of those of recovery.

In noticing the modes by which the fatal result is brought about in tetanus, they seem to be of two kinds, asphyxia and asthenia. Then the disease terminates by asphyxia death may be either sudden or gradual. When sudden, the cause appears to be, the spasmodic closure of the glottis; when gradual it may depend upon a spasmodic contraction of the diaphragm and other respiratory muscles, by which the respiration become embarrassed and hurried, the lungs get congested and are no longer able to perform their function.

Then death occurs by asthenia, the patient has become much exhausted from the continuance of the disease, and the want of food, the pulse gets feeble, the vital powers ebb and the heat at length ceases altogether.

These two modes of death though occurring in some cases separate, yet in many act in conjunction in destroying the unhappy sufferer.

Words: — The cause of any disease is undoubtedly An
important fact to be aware of, since the knowledge of it is frequently sufficient for the prevention, the cure, or at least the alleviation of the malady, but in tetanus the causes are little under our control and the mere knowledge of them affords us little means of thwarting the progress of the disease when commenced; and in fact those which produce tetanus in some individuals frequently occur without inducing the same malady in others. Another fact of importance is that they bear no relation whatever with the nature and degree of the disease, a slight cause producing as severe a form of the disorder as one of the greatest magnitude. Instances of this will be mentioned hereafter. At present I will consider what these causes are. They are found in most cases to be of two kinds.

1st. The infliction of some mechanical injury to the body and
2nd. The exposure to cold, wind or without humidity.

Other causes sometimes occur to bring the disease, but these are less frequent, still are less worthy of observation. Irritation of the intestinal canal by worms or other matter has been ascribed as one, and terror also has been mentioned as another.

Of these I will make a few remarks in succession and first I will commence with the most frequent of all—the infliction of mechanical injuries—that inducing the form of disease termed traumatic.
I have already stated at a previous page that a mere
bruise without the abrasion of the cuticle has been suffi-
cient to induce tetanus as well as the most serious injury
or surgical operation. The traumatic form of the disease
has arisen according to Dr. Reid from the stroke of a whip
lash under the eye, though the eye was not broken. In
the Edinburgh Medical and Surgical Journal Vol. II. it is stated
to have arisen from the extraction of a tooth. I have seen
it follow a slight wound of the finger and in another case
from the amputation of one of the phalanges. Mr. Samuel
Cooper says that "amputation and laceration are the
only great surgical operations to which I have seen tet-
anus succeed", adding however "that it may follow the
employment of the knife on less severe occasions." Excision
of the mamma; ligation of arteries for disorders to have
been the cause of the disease in several instances. According
to Sir James Mc Gregor during the Peninsular Cam-
paign it occurs in every description and in every stage
of wound from the slightest to the most formidable, from
the healthy and the brawny, from the incised and the
lacerated, from the most simple and the most complicated.
It would be needless to enumerate more instances, for
what has been adduced is sufficient to show that
the situation as well as the nature of the wound bears
very much. Yet it appears that in many cases the
situation of the injury does influence the frequency of the disease; for in the experience of Jenner, tetanus was more frequently produced on wounds of the arm and elbow than of any other part. Numerous instances of tetanus have followed wounds, especially of gaseous structures and nerves; injuries of the hands and feet seem to be particularly liable to produce the disease. Out of 328 cases of traumatic tetanus collected by Mr. Ludlow, 57 were occasioned by injuries of the hands and fingers and 38 by injuries of the feet and toes. In 64 instances the wounds were in some part of the lower extremities; in 72 of the upper extremities. So that injuries of the hands and feet formed more than one-half of the whole cases, and injuries of the extremities about seven depths; thus showing that the latter possess beyond any other part of the body a peculiar liability when the seat of a wound to originate tetanus.

Having thus briefly considered the influence of the first and most frequent cause of tetanus—bodily injuries, I will now advert to the second—the exposure of the body to cold. This is less frequently than the preceding the cause of tetanus, but is the most common origin of any of the true infectious tetanus. It is as well known to Aristeus, and he says: "that for this reason the winds of all the seasons is most productive of the
disease”. Holmes also says that cold sometimes is the cause of it and recommends “that the greatest caution should be used to defend the patient from cold”.

It is more frequently the cause of tetanus in warm countries than in the more temperate. In the former the disease often supervenes upon an exposure to the chilly night air and dew. In this country cold seems very rarely to have any influence in inducing tetanus and the deprecatory form of the disease is consequently not so seldom observed.

Cold applied to the body after the infliction of an injury gives a greater tendency to the production of the disease and many cases are mentioned to show the improbability of it occurring from injuries had not the secondary influence of cold been superadded.

The next case to be mentioned is the irritation of worms as still less frequently observed than the preceding, though some have asserted that their presence has a considerable influence in the production of all cases of tetanus. This doctrine however is quite untenable, for in very many bodies worms are observed in the intestines while death was in no way connected with tetanus. Again this source of irritation is a common complaint in many individuals without causing much annoyance. Still that it has had some agency in producing the disease...
we would not altogether deny, seeing that it is no
infrequent cause in the production of nervous disorder;
indeed the evacuation of a worm has been followed by the
cessation of tetanic symptoms.

Tetanus has been known to arise from the sudden checking
of an eruption upon the skin. A temporary opisthotonos
has been known to be occasioned by the sudden loss of
a great quantity of blood.
The effects of terror has been described as a cause of tetanus
in some instances, and in Dr. Holman's authority as it
good foundation. Mental anguish has also been said
to have a like effect.

AVERSION. — The period of acession varies considerably,
both in the traumatic and idiopathic form of the dis-
 ease. In the traumatic form, the disease has commenced
immediately upon the infliction of the wound as in the
case mentioned by Professor Robins; but in general a
considerable interval elapses between the infliction of the
injury and the acession of the disease. In most cases
the first symptoms present themselves during the second
week. Dr. E. R. L. have observed that the latest
period of the commencement of traumatic tetanus was
from the fifth to the fifteenth day, while a range of
four weeks is allowed by Dr. Gilbert Blane.
The idiopathic form occurs in general at a much earlier
period than the traumatic. Of arising from cold and damp, the disease usually makes its appearance in a few hours; thus there have been many instances where an individual having exposed himself to the chill night air awoke in the morning with tetanus fully developed. Progress. — This is in many cases exceedingly unfavourable, more so in acute traumatic tetanus than in the chronic idiopathic form. The former has indeed been treated on by Helsum, Dickson, Morgan and others as quite irremediable — always fatal. But this is incorrect. No cases of traumatic origin have been cured or at least recovered from. The period of attack and progress of the disease will influence us in giving an opinion. If sudden and rapid in its advance, the paroxysms frequent and severe the prognosis is bad. The climate also will modify our prognosis. Should the respiratory muscles be much affected a bad result is to be looked for. Again, Lavery has laid much stress on the critical treatments which he considered took place in the chest and abdomen and to forgo theirs is a happy issue. In the chronic and idiopathic forms, if the disease has been gradual in its accession and the paroxysms are slight allowing of lengthened periods of a remission, we would expect a recovery. Speaking of the acute form, Hippocrates says that those who survive the fourth day recover, while in
the idiopathic form recovery is considered uncertain unless they survive the 14th day.

Diagnosis. - From the formidable nature of tetanus it would hardly be thought probable that any other disease could for a moment be confounded with it; but singular to say there are some morbid conditions pretty closely simulating it, though to an experienced eye the diagnosis is not difficult. The countenance of the sufferer from tetanus is especially diagnostic, so are also the acute pains oft occurring at the lower end of the sternum and the spasmically contracted condition of the muscles. But hysteria even makes an attempt at these symptoms though her enunciation is readily detected. Hysteria is also sometimes also approaches to its appearance to tetanus but the nature of its origin, the degree of cerebral affection, the peculiar expression of countenance, and the muscular contractions which are of short duration and giving way to complete relaxation all sufficiently distinguish between the two diseases. Moreover the condition of the jaw is different, for in hystericalism it is actively moved about to get rid of the nucleus adhering to the mouth and throat, while in tetanus it is close and fixed. In the latter disease again it is rarely that any ichthiasis is felt to fluids, whereas in the former this repugnance is prominent. A degree of liriousness attends some minor
disorders in connection with the muscles of the lower jaw, but these need give us little apprehensions. The only other affection which simulates tetanus is that produced by the poison Brychium, huu bonica and other plants of the genus Brychium, the action of which is exceedingly similar to tetanus in the suddenness of its attack, spasmodic contraction of the muscles and the steady increase in frequency of this symptom, while at the same time the cerebral functions are as little affected as in the disease now under consideration. From the symptoms instead of poisoning from Brychium we could not easily, if at all, distinguish traumatic tetanus, and our principal means of diagnosis therefore lies in ascertaining whether such a poison has been given or from the habits of the patient we might have any suspicion that it has been taken. The suddenness of the symptoms arising Brychium might also in separating them from the true tetanus of traumatic origin.
Pathology

On this division of my subject it must be confessed that there exists the greatest obscurity; in fact observation has elicited almost nothing to account for the alarming symptoms exhibited during the progress of this malady. In most instances, as in other nervous diseases ending in death, every part has been found perfectly healthy, at least affording no satisfactory cause of death; while this should not deter us from prosecuting the search after a cause, which, though as yet unsuccessful in finding, we may at some future day as our powers of observation increase, be enabled to discover. In the mean time let us see what results have been obtained from the various researches, and in doing so I will first point out the usual appearances most commonly observed and make endeavour to show how far these agree with or account for the symptoms with which the disease is marked.

In connection with the brain and its membranes different appearances have been witnessed. In most general is a congested state of the sinuses and vessels of the meninges, an increased vascularity of the cerebral substance and an effusion more or less of serum within the ventricles. These appearances vary very much according as death occurred from hydrophobia or not, so that it may be doubted how far the should be regarded as symptomatic of tetanus. It
must be remembered also that the morted appearance may be able to be discovered. But some changes of a more permanent character than the preceding are in parts in
stances but with. It Bright in his Medical Reports mentions a case of tetanos which resulted from a blow on the head and where after death a collection of pus was found in the middle of the middle lobe of the brain and surrounded by a thick and highly vascular
lar cyst adherent to the Dura mater.

The appearances in the spinal cord are much more constant than in the brain. They are somewhat similar to those already mentioned as observed in that organ and its coverings, and hence some have said that tetanos is a purely inflammatory disease. But in the first place are we to consider they edema or ligeance after death as symptomatic of a previously existing inflammation? It must be remembered that in some bodies a degree of congestion is noticed altogether independent of inflammatory action, but owing solely to the position of the body immediately previous to or after death. Thus the lungs are often found congested at their anterior part when the body has been lying on its back, and the same may be laid in some of the instances of tetanos where the spinal cord and its coverings are slightly reddened. Again these appearances, though observed in some cases, are
but present at all in others. Baron Larrey states that he "constantly discovered evident traces of inflammation of the spinal cord with serous effusion more or less of a reddish colour within the sheath". Other authors again state quite the contrary. Thus Dr. Benjamin Brodie says that he never discovered any encephalic change in the spinal marrows or its coverings. Consequently we would be wrong in admitting the conclusion that inflammation is essentially the cause of the disease. Indeed similar marks of inflammation have also been found in individuals who have died from consumption, from excessive loss of blood, from cold and under every other circumstance where inflammation of the spinal cord or its membranes had no proofs of existence.

Still it cannot be denied that in some cases, tetanus is connected with inflammation of the spinal cord or its coverings, but where such is the case, the full head-pulse and other febrile symptoms which exist are quite expressive of the inflammatory nature of the disease, and the encephalic changes found in the spinal cord and its coverings are no less conclusive and distinct from what is in other cases observed.

Obeseous deposits have been found occasionally in the spinal membranes, but what relation their presence may have with tetanus we cannot well say, as they are observed in other instances not at all connected with
Thus, they may however increase the predisposition to be affected by tetanus.

The changes of the sympathetic system have also been looked to, and in some cases a degree of vasodilatation has been noticed while in others no another change could be seen.

The condition of the Nerves at the seat of injury is worthy of observation. They have in many cases been implicated in the wound, punctured, torn, ligatured or otherwise seriously injured, and the result of such an accident has frequently been seen to be increased vascularity and tenerness of their structure. This occurrence is not directly the cause of tetanus, in some cases, may justly be said to be a great source of irritation, tending in a great degree to the predisposition to the disease. The same explanation however is wanting entirely in cases of idiopathic tetanus or in those cases of traumatic origin where no marked change in the nervous structures can be seen.

Other appearances have been noticed in different parts of the body; thus according to Barron Larrivée, the pharynx and oesophagus were often found constricted, their mucous membrane in a state of inflammation and covered with a vivid reddish coloured secretion.

The lungs in some cases have also been found gorged with blood, but neither of these appearances are sufficient to
explain the cause of death, but only show the result of the violent action which had been going on in these parts. No better explanation is afforded by the appearances observed in the alimentary canal, the mucous membrane of which has at times presented marks of inflammatory action. The presence of worms in these parts has been already alluded to. So without mentioning many other anomalous appearances which have been noticed in other parts of the body, it may be said that what has been already mentioned are the principal pathological changes known to occur in cases of tetanus, and these we have been forced to uniformity. Sometimes they exist, at other times they do not. Hence there are no specific changes which can be considered peculiar to tetanus, and such being the case, the formation of any theory of the disease will be no easy matter.

That it is an affection of the nervous system however I do not hesitate to say, for though all the symptoms of the disease are manifested in an abnormal action of the muscular system, these may be readily suspended in any part of the nerves supplying it are divided. Having therefore ascertained that the nervous system is the seat of the disease, it may now be asked if any part of it is more involved than another, and from the absence of any derangement of sensibility or of intellect
In tetanic patients we may readily exclude the cerebrum from having any participation in the motor act. So far the cerebellum may be connected with the disease it is not easy to say, for the function of this organ is yet imperfectly known; but from the researches of Flourens and Magendie we know that there is an intimate connection between the cerebellum and muscular motion, so that it would be wrong to exclude this organ altogether from consideration. As yet however we cannot explain what share it may have in the development of tetanus.

The first cerebellar as it is more particularly a medium of connection than a sensory centre does not appear to have much relation with the tetanic symptoms and must therefore detain us. I have then only the medulla oblongata and spinal cord left to consider and it is in these the disease seems principally seated. In the former indeed the tetanic symptoms in most cases originate, for the parts of the body first affected by the disorder are generally the muscles of respiration and deglutition, and these derive their nervous influence from the medulla oblongata. The spinal cord next manifests its early involvement by abnormal action of the voluntary muscles which are all subject to it for their stimuli to contraction. A further proof that these are the seats of the disease, experiments on animals sufficiently show,
for Strychnine introduced into the lower parts of the body after the Medulla has been severed from its inferior connections excited the tetanic spasms as powerfully as when a free communication exists between it and the Brain.

Having therefore ascertained that the spinal cord and Medulla are the principal seats of the disease, let us next inquire how they become so and how when once they are affected they continue to develop the tetanic symptoms.

Inflammation of the spinal cord and membranes produces symptoms closely alike to those manifested in tetanus, but in most cases of the latter disease as we have seen no such cause exists; consequently some other explanation must be sought for and this I conceive is afforded by the action of a certain pathologic process or irritation directly or indirectly upon the spinal cord.

Thus in traumatic tetanus we have the extremities of the nerves injured by the wound and the irritation thus produced we can readily understand to be conveyed to the spinal cord and thence reflected by motor nerves to the muscles which they supply and which then present abnormal contractions. The same explanation may be given in cases of idiopathic tetanus resulting from cold. In such the extremities of the sentient nerves may be so affected as to furnish a motion stimulus through
the spinal cord to any part of the muscular apparatus. Worms in the intestines may also act on the same principle and produce the tetanic spasms. These therefore are instances where we can trace the motoric impression from the extremities of the nerves onwards to the centre of nervous influence and thence to give origin to muscular actions of a disorderly and involuntary kind. But in many instances the perversity of the nerves cannot be found at fault. The irritation which is conceived to be the origin of tetanus must then exist in the nervous centres themselves, and though in many cases no motoric change is there observed to prove the existence of this irritative stimulus, still we can find no better or more probable assumption to account for the phenomena of the disease.

Again when the irritant impression has lasted for some time at the extremities of the nerves, even especially in the case of traumatic tetanus, it is conveyed to the nervous centres and there becomes established, so that the convulsive action of the muscles continues independ-ent, and even after the removal of the cause which excited them.

Hence there are two sources from which tetanus may originate; in the one case the irritant causation operates directly upon the spinal cord, in the other it is ef-
plied at a point distant from that organ. The first according to Marshall Hall is termed centric, the other eccentric tetanus. But there must be something more than the irritation to produce the disease, for many sources of excitement occur in the spinal cord and its nerves without inducing tetanic symptoms. Consequently a certain predisposition must be present in the body which renders it in some way susceptible of the disease on the application of an exciting cause, and the "real mystery" as Dr. Watson remarks "lies in this predisposition."

With these remarks I would now conclude the pathology of tetanus, considering it to be a disease of the eunoto-motor system dependent upon an impression or irritation resident in any part of the nervous tract, either centric or eccentric, and occurring in most cases when a suscepti-

bility of the disease had previously existed.
Treatment

The treatment of tetanus must receives consideration and this I may premise by a few words in the means which may be in our power of removing predisposing causes. This is done in the case of traumatic tetanus by due attention to the injured parts, by bland in-\n
itivating dressing of wounds and proper adjustment of fractured bones, matters of especial importance in Military practice where tetanus is of very frequent occurrence.

In regard to remedial measures, in the disease indeed have they been applied with such diversity and con-\n
sideration as in the one now under consideration. Pretty much the same result has followed every kind of treat-\n
ment adopted, so that it is modifying to say that no cure has as yet been discovered for this disease. In fact there are several instances on record where the disease ran its regular course and terminated in recovery without the use of any treatment. Others again have got well under medical care, while by far the greater num-\n
ber of cases have proved fatal under every kind of treat-\n
ment, and hence some have doubted whether a cure or a recovery is the more appropriate term to apply to those cases which do terminate favourably.

But let us examine and see what are the means...
and with what success they have been tried. These resolve themselves into two kinds Local and Constitutional. The Local treatment applies only to Traumatic injuries and consists of Amputation or excision of the injured part and division of the principal nerve proceeding from the seat of injury. Either of these it was natural to think would prove effectual in counteracting the evil effects of a local irritation while in operation and maintaining a direct communication with the nervous centres: but as we have already seen, if that irritation has continued for a certain time till it becomes established in the Medulla or Spinal Cord then the disease is quite independent of its primary cause and no Amputation of a part or division of nerves will succeed in arresting the course of the disorder. Consequently if any such interference is to be thought of, it must be early to have any beneficial effect. But even then certain limits ought to be observed. If we can make up our mind that an irritation is seated in a wound of a finger or toe, Amputation of either part should be immediately resorted to with a chance of success and the operation ought to be performed as skilfully and mildly as possible, no cultures should be applied and the simplest dressing of the wound afterwards adopted; but should the injury exist in the arm or leg, the infliction of such an operation
As amputation of that limb would prove so serious and perilous to the system, the consequent exhaustion, shock, loss of blood so great that the means adopted would be a hazardous and doubtful expedient. All interference therefore by amputation should be limited to the minor and early cases of tetanus.

The other local expedient—division of the principal nerve proceeding from the injury—has, in the few cases in which it has been tried, proved very successful. It is not in every case of traumatic tetanus that this measure can be resorted to, but in some there is no doubt it may, and is used with great hope of success. A very good example of the application of this mode of treatment is afforded by a case which occurred to Dr. Murray*. A seamen, while walking on the deck of a cold evening, trod upon a rusty nail which penetrated his foot and twelve hours after the infliction of this injury, symptoms of tetanus commenced, evidenced by spasms of the muscles of neck and jaws. As soon as these were observed Dr. Murray divided the posterior Tibial nerve and immediately the (patient) opened his mouth with an exclamation, and on looking at his countenance was astonished at the striking improvement in it. The stiffness of the jaws and neck continued slightly for three days after which all tetanus symptoms disappeared.
symptoms ceased and he was quite well.

From this case alone we might be fully justified in recommending the adoption of this mode of treatment, but others are not wanting to prove the efficacy of the division of the principal nerve proceeding from the seat of injury; so that in some cases of traumatic origin it is well worthy of trial—the same result being obtained as by amputation and with much less hazard and operation of the body.

The medical or Constitutional treatment may now be considered and here the almost diversity has pre-

The surgical cases, hemorrhages, antispasmodics, anti-

Urgatives are strongly indicated in the subjects of

States as from the great torpor of the bowel, which al-

most invariably exists as well as from the very frothy nature of the feces which in many cases have been found to occur. It is often with difficulty however that they can be made to act at all, and frequently require to be administered in almost incredible quantities for

this purpose; though at other times this difficulty is not experienced. In some examples of diuretic tet-

anus, probably dependent on the presence of worms or

other irritating substances in the intestinal canal,
Purgatives alone have afforded almost immediate relief, and in others their continued use has proved of service and aided towards a recovery.

Some however have denied the utility of purgatives in this disease, arguing that constipation is no cause for their exhibition; but it must be remembered that though constipation is a prominent symptom of letans, it is not the sole one which by purgatives we aim at relieving. It is the viscous irritating matter existing in the intestinal canal which we wish by these means to get rid of, and so to remove what might otherwise continue an exciting cause of morbid action.

Another advantage to be derived by the evacuation of the bowels is the liberty thereby allowed of the action of remedies subsequently to be given, as well as the correction of morbid secretions of the purulent kind. These results therefore are sure to obtain by administering purgatives at the very commencement of the disease.

Various kinds of purgatives have been used, but as many of these are long in operating, such are on that account ineligible in the treatment of so rapid and fell a disease as the one now under consideration, and those which act most quickly and powerfully are always to be preferred. Senna oil answers this purpose better than any other cathartic, at the same time that
its bulk is inconsiderable, a very great desideratum in most cases of tetanus, where deflation is always more or less impeded. And should this medicine be long in acting, the dose may be repeated or a hæmochromoæna administered to obtain a free evacuation.

Having therefore premised our treatment by attention to the favourable sign, sedatives or other remedies must be commenced with, and of these opium has been very extensively employed, perhaps more so than any other remedy in this disease, but with a very variable and in most cases an unhappier result. Some however would have it to be the sheet anchor of the practitioner in this malady; and from its well known sedative effect in diseases depending on nervous irritability it was not unquiet to look for a similar action in such a disease as tetanus; but such expectations have been far from realized. Indeed many have discarded it as being entirely useless in this disease. It is not from a strictened administration of the drug that its failure has depended, for in many cases it has been given in enormous doses. In one case* four pounds, seven ounces and six drachms of Laudanum, and six ounces, four drachms and forty five grains of solid opium were given in ten days without any benefit. Instances however have occurred of a recovery following the use of large doses of this drug, and such a one...
is recorded by Dr. Watson in his Principles and Practice of Medicine. The patient a female took in twenty successive days upwards of 40000 drops of Laudanum—In all more than two imperial pints. But it must be confessed that most of the cases of recovery from the acute gum are either of a chronic nature or idiopathic in their origin. The traumatic variety seems little amenable to its influence, though in it also a recovery has been occasionally obtained. As an example of this a case is recorded in the Lancet for 1852.

The patient was a coloured Creole of Demerara and on the morning of the 13th December 1851 received a wound in the upper surface of the great toe of the left foot by the fall of a sword. At the same time he was exposed to cold. On the following morning, 22 hours after the infliction of the wound, he first felt a sensation of stiffness about the neck and face, and this symptom gradually became more marked as well as other symptoms of a hectic nature. Much pain was complained of in the foot, extending also up the thigh and leg. A poultice was applied to the wound and a strong dose of Calomel, Saltp and Opiate oil administered. At the same time quick friction was made over the jaws, throat and breast. The symptoms however increased, delirium becoming affected, muscles of
abdomen very tense, acute pain at the region of the
diaphragm, body cold and strength much prostrated.
Three dractions of laudanum in hot brandy and water
were then given him and one draction in barley water
by enema. The laudanum was afterwards given in
dractions doses every two hours and after taking this
for four times he fell asleep and slept for three or
four hours. On awaking he felt greatly baxed and the
symptoms were much lessened. The laudanum was con-
tinued and a second enema was given as his bowels
had only moved once. Next morning the bowels after the
injury he was greatly improved; the laudanum was
therefore less frequently repeated and on the proceeding
day was conalacent.
In this case then the sedative action of opium proved
wonderfully efficacious and manifested itself with
great rapidity, so that to it entirely must be ascribed
the sudden abatement of the tetanic symptoms.
Few cases however even of chronic or idiopathic tetanus
have been found to submit so readily to the influence
of opium as in the preceding one, and much less fre-
quently do those of traumatic origin; so that though one
of the latter may occur at a time, still from the many
instances in which opium has been tried and failed, as
a remedy for tetanus it can be but little trusted to.
Another medicine of powerfully sedative property is tobacco; and this has been much lauded by some in the treatment of tetanus. Mr. Frasers says that it "may be employed with signal effect in calming the spasms of tetanus. It may be used twice or thrice daily with perfect safety in the onset of the disease. It produces nausea, perspiration, and sleep often of hours continuance, but above all it diminishes the force and frequency of, if it does not arrest, the violent action, and gradually restores the pliancy of the fixed and bound little muscles." Mr. Burling has an equally high opinion of this substance considering it to be the best remedy that we at present possess. At the same time however it must be remembered that its action is often excessive and unmanageable, and that if not cautiously administered fatal prostration may result. Undoubtedly it sometimes relieves spasms, but often it does not, and when the latter is the case, a deal of injury is inflicted - an amount of exhaustion, the occurrence of which we should most especially avoid, seeing that by exhaustion is frequently masked the "tendency to death." For these reasons Tobacco may be looked upon as a fickle remedy and sparingly to be recommended.

Other medicines of a sedative action have been tried, but with less benefit than those already mentioned,
and may therefore be passed by.

Among the Antispasmodic remedies which have been resorted to in the treatment of tetanus two have been latterly tried and are worthy of notice, 

Hannabis indica and chloroform.

Hannabis indica has been used in the East Indies for the cure of tetanus and with favourable results. In some it has seemed to effect a cure. In this country it has passed untried without service, and instances of recovery under its use are mentioned. The following is a case of traumatic tetanus which occurred in the Dian-

Maculée Hospital and which appeared to be benefited by the use of this drug, though its action was complicated by 

mercurialism at the same time induced.

Mary McCanney 12 years of age. Admitted 22nd March 1887.

Patient received an injury of her hand for which the in-

deer finger was amputated at the metacarpal joint. On the 3rd April symptoms of tetanus came on and gradually manifested themselves with increased severity up till the be.

The treatment during this interval was purgatives, 

calm and opium and counterirritation to the spine, but as these produced little mitigation of the symptoms, 

Hannabis indica was resorted to in grain doses every three hours, and on the following day, after having taken ten 

grains, they became less severe, delirium attended with
greater ease. On the 8th they were also much abated and patient passed the night with considerable comfort. By the evening she had taken 24 grains of the drug, though the spasms still continued but with less severity and frequency. On the 9th however patient became worse and died at midday apparently from exhaustion.

In this case therefore though the Indian Herb did not succeed in curing the patient it certainly appeared to afford relief.

Professor Miller records three cases of Traumatic tetanus which terminated favourably under the use of this drug, and states that in other examples he had seen it fail to cure, but never to relieve.

It should not be passed in the solid form as impaired digestion is a marked symptom of tetanus, and the drug should therefore lie in the stomach undissolved; but it is better to give it in the liquid state and the best form is the tincture, given in full doses, as 25 or 30 drops every half hour, hour or two hours.

The other remedial measure Chloroform has since its introduction been tried in many cases of tetanus as well as in other spasmodic diseases. In the latter it has proved of very great service and in some cases for a cure, and similar results would fondly be hoped.
to accrue from its use in the more aggravated disorder of the spinal system--tetanus. These hopes have not being disappointed. One case indeed is recorded, which yielded very satisfactorily to the influence of this drug. The patient received a severe laceration of hand by machinery, and five days afterwards decided symptoms of tetanus presented themselves. The body became universally rigid and the power of articulation and deglutition gone, so that no medicines could be taken. But Chloroform was then happily thought of and administered. Anaesthesia was maintained for three quarters of an hour and during this time the paroxysms were absent and the muscles considerably relaxed. After the inhalation of the Chloroform was discontinued, the patient remained asleep for an hour longer and then awoke with the freedom of two limbs restored. The patient gradually recovered, and six days afterwards, feeling considerable pain in his finger with slight convulsive twitches, had that part amputated, and no symptoms of the disease again returned.

This is a very satisfactory example of the efficacy of Chloroform, more especially as it was one of traumatic origin. In other instances however in which it has been tried, its beneficial influence has not been so
fully obtained; but in general, if not always, it has palliated the tetanic spasms and the accompanying pain, and in this respect it cannot but be considered as a great step gained in our treatment of this affection.

In a case of traumatic tetanus recorded in the Lancet for 1849, it was given at regular intervals every eight hours for seven or eight days, and is said to have acted both as a prophylactic and to have checked the symptoms indicative of the approach of spasms. The case terminated however fatally apparently through exhaustion.

It has been tried also in other cases and with a little palliative effect.

A case came under my own observation (mentioned in a previous part of this thesis) where Chloroform was administered, not at lengthened intervals as in the preceding case, but continuously for 7 hours with the exception of a short intermission at the end of the fourth hour of inhalation. I may be excused giving the case at length as I am not aware of any other instance of this disease in which Anaesthaeia has been so long maintained.

Catherine Hart, age 10, 5th September 1850 was admitted into the Dundee Hospital at 12 Welbore avenue suffering from tetanus. Her body was in a state of paralysus, jaws nearly closed and whole system
Highly irritable. There are two cases in puzzle of toes containing pus. Four days previous to admission she got a hurt on her back from the falling of a stone but this caused her little complaint. The day following she complained of pain in chest and difficulty of swallowing.

She was seven opened and a warm poultice applied to the face. A dose of castor oil was also given but was not retained for any time.

6th Sept 12. O clock A.M. Symptoms to day increased in severity. At this time it was thought that chloroform might prove of service in allaying the spasms and for this purpose it was administered by the attending surgeon to keep the patient under its influence. She was readily anaesthetised and the muscular rigidity became a little relaxed and the spasms less frequent than before. O clock P.M. Limbs less rigid, lower jaw not altogether relaxed. Has had several paroxysms since last report. Pulse 87. full and regular.

9 o clock P.M. Patient still anaesthetised. Little improvement in tetanic symptoms. There still exists a great tendency to spasms when the slightest motion is made.

2 o clock P.M. The use of the Chloroform was at this time relaxed for a short period and the patient became
much worse. A paroxysm of extreme suffering came on affecting the whole body; the thorax was immovable and death from asphyxia seemed imminent. The chloroform was therefore immediately resumed and the former state of relaxation again produced. While under the influence of chloroform a full dose of laudanum and horehound oil was given, the whole length of the spine brushed over with mixture of iodine and a boric balsamic enema administered.

If Decker P.H., M.D., operated freely bringing away a quantity of hardened feces. Muscular rigidity still masked, and spasms occasionally. Pulse accelerated. If Decker P.H., continued the Chloroform up to this time. The spasms have been less severe and not so frequent, but total relaxation could never be obtained and a degree of opisthotonos still continues. The patient was much weaker. Pulse very rapid and scarcely perceptible. The Chloroform was not therefore persisted in further and the patient allowed to regain her consciousness. On the return of sensibility however all the symptoms returned greatly aggravated and occurred in frequent paroxysms, and so they continued for about an hour when in a convulsion patient expired apparently asphyxiated.

Now in this case chloroform though it failed to
case, certainly proved a valuable palliative; it ameliorated pain and checked the spasms to a great extent and throughout produced a degree of relaxation not at all observed when total insensibility was allowed to return.

On the whole, therefore, chloroform may be rated as a valuable adjuvant in the treatment of tetanus, not however with the expectation that it alone will prove a remedy for this disease, but only as a means of palliation, and when combined with others, of leading the disease onwards to a favourable termination.

It should be given so as to keep up insensibility and this should be maintained for a considerable time by repeated inhalations.

Among other remedies Bloodletting has had many trials, but as we have seen that tetanus is rarely a disease of an inflammatory nature, it is no matter of surprise that this agent has in most cases failed to be curative. However, when the malady has an appearance of inflammatory origin as in some cases of idiopathic tetanus it really has, then Bloodletting is advisable but must be performed early and so as to produce some sensible impression upon the system, yet with some degree of caution as we must remember the disease tends to terminate by exhaustion. So traumatic.
Tetanus which very rarely manifests any inflammatory character, depletion does not seem expedient and its use ought therefore to be confined to those cases bearing an aspect of inflammation.

Mercury has repeatedly been used in the treatment of tetanus and has in some cases seemed to effect a cure. More frequently however it has shown no power of controlling the progress of the symptoms and indeed its use in this disease cannot but be considered as possessing very little efficacy. Sir James McKeen found it quite inert, and Dr. Larrey even states that it rather aggravated the symptoms in some cases in which he tried it. It has been pushed to inurealism, (and the action is in general readily obtained) but even then will no marked improvement. In the case mentioned while treating of lassanatics indica the specific action of the medicine was fully manifested, yet no relief was thereby obtained. Indeed several cases are on record when the disease began while the patient was labouring under mercurial influence. Consequently it is a remedy to which we can place little if any trust in this disease.

Among mercuric carbonate of iron has been recommended by Dr. Elliotton and was given by him in three cases of tetanus, two of which recovered. But this
The drug must be given in large and oft-repeated doses - a matter of extreme difficulty, and even in some cases, of impossibility to the unhappy sufferer from tetanus. Its action also is far from being rapidly produced, often requiring days or even months, so that little benefit can be looked for from this drug in acute cases of tetanus in which a remedy is especially desirable.

Of other remedies little more need be mentioned. They have been equally variable in their effects with those already treated of, and with some of them failure has been even a more frequent occurrence.

Hydrocyanic acid from its peculiar action on the nervous system has had a few trials. Dr. Elliotson applied it, but it failed. In his lectures on materia medica during this session, Professor Bichat stated that in the true traumatic tetanus it is of no service, but that in the chronic form arising from cold it is exceedingly useful. He saw a case in the hospital where it was used with great abatement of the symptoms and ultimate success.

The cold and warm bath have each been made trial of. The latter has produced momentary relief in some cases; in others instant death has followed its use. The former has afforded better results and some cases
of recovery are stated to have occurred from its condensation, though it also has in other proved useful and been harmful. Sir J. McGeor says that it is worse than useless and Mr. Morgan mentions a case where it produced instant disappearance of the symptoms but death at the same time.

The application of cold to the spine affords a better chance of success. In convulsions it has been found very beneficial, and in some cases of traumatic tetanus Professor Millar has used it in the form of ice with a degree of success sufficient to entitle it to fair trial. It is a powerful sedative and should be used continuously though cautiously lest excessive depression ensue.

Lastly, counterirritation to the spine has been tried but with little success, indeed the failure of this agent does not be wondered at, since it only excites a degree of irritation with which the system is already too replete. The only good which we could expect from it would be its affording an absorbing medicine for remedies of a sedative nature such as opium, Belladonna,aconitum &c. The latter was used in a case treated by Mr. Hutor* its constitutional action was induced, exhibited in numbness and tingling of the extremities, but though with little marked relief to
the symptoms, it did not fail to mitigate local 
pain when applied to the seat of suffering.

From the foregoing observations therefore we come 
to the conclusion that as yet no means have been 
found which can be trusted to for the cure of tetanus 
in its various forms; but some general rules may 
be stated applicable to its varieties and which per-
seemingly adopted may lead the disease to a fa-
avourable termination.

In all cases the patient should be kept quiet 
and removed from all sources of irritation or annoy-
ance likely to induce a paroxysm; he ought to be 
placed alone in a darkened room, no foreign visi-
tors to approach him and all noises studiously 
avoided. Then the constitutional or local treatment 
is to be followed according to the form of tetanus 
under our care.

1st. - In acute traumatic tetanus these may be 
arranged as follows. Early removal of irritation by 
the proper amputations or incision if applicable. 
Maintenance of the free action of the bowels by pur-
gatives. Abatement of the symptoms by laudanos or indica 
seeds administered and the sedative effect of ice 
applied to the spine. Further anesthesia should 
be induced by chloroform to state or ward off
the paroxysms, and lastly though not the least im-
portant, support must be afforded to the system by
duly administering nourishment.
2nd In the chronic form of the disease less active
treatment is in general required. Purgatives are
here also necessary and should be followed by various
remedies of a sedative and antispasmodic nature as
blankets, indies, opium, chloroform &c. Shewing to
prevent too great debility after abatement of the
symptoms, tonics or stimulants may be demanded.
In this form as well as the preceding nourishment
must always be kept in mind.
3rd When the disease can be discovered to partake
of an inflammatory nature, another line of treatment
must be adopted viz. Antiphlogistic by Bloodletting,
purgative, counterirritation to the spine, mercury,
and opium and these must be as actively and
frequently used as other remedies are in the acute
traumatic tetany.