Typhus Fever.

A general review with some observations on a local epidemic.

John Bell Fisher.
Typhus Fever.

Typhus Fever is an acute specific disease, highly contagious, usually in an epidemic form, under circumstances of destitution associated with overcrowding and defective ventilation, characterized by sudden invasion with marked nervous symptoms, rigors or chilliness, headache, early and great prostration, heavy, flushed countenance, injected conjunctivae, compressed pulse, furred tongue becoming later dry and brown, constipated bowels, and a rubefaciént mulberry-colored rash appearing between the fourth and seventh day, the spots never appearing in successive crops, at first elevated and disappear ing on pressure, afterward not elevated and permanent frequently passing into true petechiae, the fever terminating by crisis or as about the fourteenth day.
Lack of fullness and obtundness of the mental faculties is usually followed in the second week of delirium, which may be acute and vary or more frequently, low and muttering, with tendency to stupor or coma, subniveous, involuntary evacuations and contracted pupils.

In fatal cases no specific lesion is found. There is general congestion or hyperemia of critical organs, softening and disintegration of heart and voluntary muscles. The blood is dark and fluid and rapidly decomposes, the spleen is often enlarged and pulpy, the brain congested and sometimes oedematous. The mucous membranes usually congested, and the tunics contain mucous. Some of these appearances, however, are specific to certain diseases.

Typhus Fever has been described under many names. The name Typhus (from τύφος = smoke) has reference to the confused mental
State characteristic of the disease.

From its other symptoms, eruptions and origin, it has been called
Brain fever, hydrophobia fever, spotted
fever, camp, hospital or jail fever
Ship fever and many other names.

Typhus fever has probably
occurred in wide spread epidemics
from very early times, and the
pestilence accompanying or
following war, famine, and
other conditions of general
miserie were in large measure
made up of Typhus, though
Enteric fever, diarrhea,
Dysentery, Fever, Malarial
fever, and other diseases played
their part also. Possibly the term
pestilence in the Sacred Writings
referred, in some cases at least, to
epidemics of Typhus, as the pes-
tilence occurred in circumstances
now known to favour the outbreak
of Typhus in epidemic form.

One of the earliest epidemics which
can with some degree of definiteness
be considered as being really
Typhus occurred in the year 1883.
at the monastery of La Cava, near Salerno—"pessima feluricem, pr.
-teriniis ex parotibus ... hoc anno
omnes plenius a vermis consumpti
sunt." In Bohemia in 1096 there was
an extraordinary mortality and
infection among the people; no
plague-slands ( buboes) were to be
seen, but the complaint was of
soreness in the head. In the preceding
year, 1095, there had been a swarm
of grasshoppers which covered the
whole country and laid waste the
fields. (Häberl, Historical and Geo-
graphical Pathology, 1883, Vol. 1, p. 546).

Similar epidemics of fever
with "head-dickens" occurred in
1481-82 in France, in 1494 in
Italy, and in 1502-1504 in Germany.
In most instances the disease is
mentioned as occurring in connec-
tion with war or famine, and the
absence of "plague-slands" is re-
ferred to thus distinguishing the
disease from plague.

In 1489 a disease, which the
Spaniards, from its spotted
character, called "El Tabardiglio", 
which name was certainly afterwards applied to Typhus, is said to have
destroyed 13,000 of the troops of
Ferdinand, then besieging Granada.
(The name Tatarndios or Tatarndillo is
from "Tatar", the Spanish name
for a cloud made of coarse material
born by country people.)
Fra. Antonio in his work "De
Morbis Contagiosis" (1546) describes
an epidemic fever under the name
of "Lentica" "Lentica" or
"Petica" that prevailed in Italy
in the years 1505 and 1528.
He considers it a Contagious fever
communicable to Cyprus and the
adjacent islands but more ob-
erved for the first time in Italy.
Its appearance on both occasions
was preceded by very inclement
seasons and almost total de-
struction of the crops. It was very
fatal. The rash he describes as
reddish spots like flea bites,
often looser, and occurring on the
arms, back, and chest from the
fourth to the seventh day. There
was great prostration, feeble pulse,
Furces on the tongue, injected conjunctivae, blunting of the mental faculties, and later mental aberration & low mental delirium. The disease lasted from seven to fourteen days, and occasionally longer. The identity of the disease with Typhus is confirmed by the fact that the eruption is said to have been liable to the imitation for measles, and the differences were pointed out by writers of the time.

In the year 1558-54 a pestilential fever which prevailed in Tuscany claimed upwards of 100,000 persons. In 1557 epidemics occurred in France and Spain & in the latter country, where we again find it called "Tabardillo," it did not die out for many years.

In 1566 an epidemic of war-Typhus occurred in Hungary—hence called "Morsus Hungariensis"—and spread over Austria, Bohemia, Germany, the Netherlands and Italy. It was eminently contagious and among its symptoms were intense headache, followed by delirium, they black
tongue, with in many cases an
eruption upon the skin consisting
of spots resembling flea-bites, but
differing in the absence of a central
pustule. Its duration was from
fourteen to twenty-one days.
In 1572 and 1574 it was again
prevalent in the Netherlands,
Germany, France and Switzerland.
These epidemics were also
associated with famine and
the failure of the crops.
During this period there occurred
the notorious outbreaks on the
occasion of the assizes held at
Oxford in 1573 (Black Assize) and
at Exeter in 1586.
In 1580 Verona was visited
by an epidemic of Typhus
described by Petrus a Castro (1584).
It was contagious, prevailed chiefly
during the winter months, and
was associated with famine.
The symptoms were small, weak pulse;
clay black tongue; stupor passing
into coma; tremors and subcutane;
and an eruption similar to re-
semble flea-bites. This epidemic
seems to have extended over Italy.

During the seventeenth Century, pestilences, mostly connected with great wars and favoured by famine due either to the devastation of war or the failure of crops from other causes, spared no country in Europe, and in their pestilences Typhus as well as plague, dysentery and scurvy played a leading part. The worst of these outbreaks occurred during the Thirty Years War (1619-1648) and devastated Central Europe, Germany suffering first and most severely. The symptoms and eruption were those of Typhus. In England Typhus appeared under similar conditions either during the Civil Wars.

In the beginning of the Eighteenth Century three severe epidemics of Typhus occurred in Ireland, where however it had been known long before this as "Irish Lague". The first of these was in 1708-10, the second in 1718-21, the third in 1728-31. The first was observed at Cork by Rogers (Essay on Epidemic
Fries 1734) the second by O'Connell
(Molectrum Acad. et Chimic. Nov. Dublin 1746)
and from their accounts there can
be no doubt that the disease was Typhus.
The third epidemic followed a
succession of three bad harvests, and
and of all roots was so scarce that
victims occurred all over the country.
The second and third of these
epidemics spread to England and
Scotland.

From 1734 to 1744 Typhus was
prevalent over a large part of
Eastern and Central Europe
mainly as a war pestilence together
with Dysentery, Malarial Fever
and Typhoid.

From 1757 to 1775 Typhus is
recorded as consequent upon the
Seven Years War, the war between
England and Spain, and the
severe famine which at this
time visited a large part of
Europe. But the worst period
of Typhus in the eighteenth cen-
tury occurred the last ten years
of it, commencing with the
Revolutionary War in France.
and extending into the second decade of the nineteenth century, ended with the death of the Emperor of Napoleon and the restoration of peace. During this period pestilence, particular Typhus, spread over the whole of Europe attaining its greatest severity in those places where the excitement of war had been most acute; though it spread also through peaceful intercourse to other regions, finding in the universal distress consequent on the wars suitable conditions in which to flourish. From 1797 to 1803 Typhus was again epidemic in Ireland—owing to failure of crops and consequent famine, and spread to England and Scotland. The fever during this epidemic was mainly Typhus, although in Ireland relapsing fever was also observed. Macleod in his Treatise on Contiguous Fevers says that it was mainly in consequence of the fever prevalent at this time...
that numerous hospitals for
the separate treatment of fever
cases were first established
throughout the country.
Since the peace of 1815, Typhus
has frequently occurred in different
parts of Europe, but only once,
in 1846-47, has it attained
anything like the wide-spread
prevalence of former times.
It has rather been confined to
particular places where it has
more or less of an endemic char-
acter, breaking out from time
to time in epidemic form
under the influence of those
conditions, over-crowding,
deficimen and want, which
have at all times favoured
its extension, and spreading
beyond its ordinary limits,
but not to the same extent
as formerly.
Of all countries in Europe
Ireland is the one in which
Typhus may most truly be
said to be endemic. In the
large towns it is said to be
never extinct but somewhat on until some spark kindles it into a flame. In Ireland
Typhus has several times since 1815 spread widely in addition to
many smaller epidemics.
In 1816-19 after two very severe winters followed by a cold and
erly summer, leading to almost complete failure of the harvest
Potato crop, an epidemic commenced in Ireland and spread
to England and Scotland. It first
became prevalent in Cork toward
the end of 1816 and spread within six
months of Ireland, reaching Dublin in Sep
tember 1817. In March 1817 it
appeared in London, and in the
autumn of the same year in
Edinburgh. This epidemic
however seems to have been of a
mixed character for Mitchinson
days "although many cases of
Typhus were observed during this
epidemic, the fever which marked
characterized it, in Ireland and
Scotland at all events, was
Relapsing Fever," and mention,
the reports of Welsh and others as bearing out this statement. This is chiefly interesting in connection with the question of treatment. Ploncquet (1801) and Clutterbuck (1807) had advanced the view that continued fever was "a pyrexia, symptomatic of inflammation of the brain," while at about the same time Broussais attempted to localize fever in the bowels, and Beddier maintained that continued fever was always an inflammation "though of variable seat." In consequence of these views rhins depletion was largely practiced. And Dr. Mills of Dublin who treated a large number (604) of cases of "fever" by venesection in 1812, had a mortality of only 1 in 28. In the Edinburgh Medical and Surgical Journal in July 1814 however it was shown that Dr. Mill's results were in reality less favorable than those of other physicians at the same time. Nevertheless
In 1819 Welsh published the results of his observations on the epidemic in Edinburgh and strenuously advocated the practice of blood-letting. The quantity of blood taken by him averaged 24 ounces, but much more was taken in some cases, well may we believe Sir Robert Christian, who also observed this epidemic, when he says "A true unmistakeable typical typhus, as all physicians have understood it in this county since the days of Cullen, could scarcely be said to form part of that epidemic." (Christian 1858 p. 384)

The small mortality in the epidemic of 1817-19 was held to prove the value of blood-letting, but there can be no doubt that the real explanation is to be found in the fact that the disease in question was not Typhus but the much less fatal Relapsing Fever. We now know that even in
Relapsing Fever blood-letting is not of benefit and some observers even in the epidemic of 1817-18 perceived this, though it would not be so disastrous as if the fever had really been Typhus. Dr. William Brown of Edinburgh and B. Graham of Glasgow did not bleed, and in the latter's wards the mortality was 1 in 11½ whilst in the wards of the institution in which bleeding was practiced it was 1 in 9. (Graham. Practical Observations on Contagious Fevers. 1818) Others protested against the practice.

Another Epidemic of Typhus associated with Relapsing Fever commenced in Dublin in 1826, and spread to Glasgow and Edinburgh where it reached its acme in 1828. It also spread to London but was not so prevalent there. True Typhus was much more a feature of this epidemic than of the previous one.
and some cases of Typhoid Fever seem to have occurred also, as Dr. Stokes writing in 1854 speaks of diarrhoea of the intestines being observed and perforation. But Alison noted a sneezing eruption in most of the cases treated by him, and observed that the danger was from anthemia far more frequently than in the previous epidemic (1817-19) and that home and diffusible stimulants were more frequently and decidedly useful. A review in the Edinburgh Med. and Surgical Journal 1828 Vol xxx p. 411 stated that in 1827 it was discovered both in Edinburgh and London that cases of fever could not bear blood-letting. This observation coincides with the increase in the comparative prevalence of true Typhoes. So that at this time it is evident much difference of opinion existed as to the treatment of fever, some advocated bleeding, other stimulants.
And this is not so much to be wondered at. Whilst Relapsing Fever and Typhus existed side by side, but from 1828 until it reappeared in 1843 Relapsing Fever seemed to have completely disappeared. And then the first extensive epidemic of true Typhus occurred in Glasgow and Edinburgh in 1836; blood-letting was generally condemned, though some few physicians still practised it. This epidemic commenced in Dublin in 1836, and by the end of 1838 had almost disappeared. In 1837 alone 11,685 cases of fever were admitted into the hospitals of Dublin. 5,387 cases were admitted into hospital in Glasgow. The causes of the epidemic were, as usual, want and over-population. In 1836 Typhus was prevalent in Philadelphia, W.S. and bleeding was found to be injurious, and stimulants useful. The epidemic which occurred in Scotland in 1843 differs
from those that preceded it in our larvin originating in Ireland and in a year of great difficulty among the Scotch poor. In Edinburgh it was calculated by Alison that the cases numbered 9,000. The majority were cases of Reckoning Fever, though some cases of Typhus occurred, and I mention it principally because though this was the same fever as prevailed in 1817-19 bleeding was rarely resorted to, and in many cases stimulants were considered necessary.

The most severe epidemic of the Nineteenth Century however commenced in Ireland during the last three months of 1846 and lasted for two years. In Glasgow it appeared at the close of 1846, in Liverpool in January 1847, in London and Edinburgh in March, and in Manchester in April. Macfarlane says there is abundant evidence that the fever was imported from Ireland, for not only did it commence there, but its first
appearance in Britain was in the large towns most accessible to Irish immigrants, and it at first was most prevalent in the Irish quarters of those towns and among persons recently come over from Ireland. The epidemic was general throughout Ireland, the number of cases being estimated at upwards of one million, or about one-seventh of the whole population. A few of the earlier cases seem to have been enteric fever, or rather it should be said, the epidemic followed closely on the heels of a somewhat--unusual prevalence of enteric fever which was observed in the latter part of 1846 at many places to which typhus never extended, but the epidemic itself consisted mainly of typhus and relapsing fever. Typhus predominating in Britain and relapsing fever in many parts of Ireland. Depletion was scarcely at all resorted to, and stimulation was the treatment almost invariably adopted in the typhus cases, as well as in many of those of relapsing fever.
In 1856 there was a great increase of Typhus in London due to temporary distress and artificial scarcity among the poor (Murchison) and probably connected with importation by troops returning from the Crimea (Hirsch). Where Typhus had been prevalent among the English troops, though not to the same extent as among those of France and Russia. This epidemic "was confined to London and was not of Irish origin" (Murchison). During 1858, 1859 and 1860 Typhus was so rare in London that serious thoughts were entertained of converting the Fever Hospital into a hospital for general diseases. A similar decrease in the number of Typhus cases occurred in Scotland, while in Ireland the disease was much less prevalent than formerly though cases were not so rare as in Britain.

In 1861 however Typhus again
became epidemic in London and continued until 1870. Between January 1862 and December 1869 nearly 14,000 cases were admitted into the London Fever Hospital. There was no failure of cases in England preceding this outbreak, but great children had been produced among the poor of London by a system of organised strikes, whilst over-crowding had been aggravated by the influx of labourers from the country in search of work.

In 1862 Typhus became epidemic in Preston, Liverpool and Manchester on account of the cotton famine consequent on the American War. Simultaneously with the London outbreak, Typhus became more prevalent in Glasgow and later on. Epidemics occurred in Dundee and Aberdeen. All these outbreaks appear to have been due to overcrowding and destitution. There appeared no reason to believe that they originated in Ireland, though Typhus did subsequently
The conclusions to be drawn from the historical study of Typhus are admirably stated by Marchion in his Treatise on Continued Fevers (p. 54) 1873.

Chief among these we may note that the disease occurs for the most part in wide-spread epidemics during periods of general scarcity or want, where there is overcrowding, or amidst hardships and privations; that sporadic cases occur between the great epidemics; that Typhus has always been a disease characterized by debility, forbidding depletion and demanding support and stimulation; that there has been no "change of type" of Typhus — the appearance of this being due to the co-existence of Typhus and Relapsing Fever in varying proportions in different epidemics; and that
although some of the great epidemics of Typhus have commenced in Ireland and spread thence to Great Britain. This has not invariably been the case, but the disease may appear wherever circumstances favorable to its development are present.

As regards Geographical Distribution, Typhus has been observed in nearly every part of Europe. It is said best to occur amongst the Lappish and Eskimos; in Denmark it is extremely rare; and in Switzerland it has not occurred in recent times. It appears to be uncommon in France, but the opinion which has sometimes been expressed that true Typhus never occurs in France is erroneous. It was common enough in early times. In 1557 it was extensively prevalent, as France alleged Fidele, and was denounced by Castelarus.
Again in 1641 Typhus occurred in the north of France (Fouchère, p. 29).

It was not uncommon at the end of the 18th Century in the hospitals of Paris and many nurses and young surgeons were attacked by it. And in the beginning of the 19th Century epidemics occurred in different parts of France. In 1856 it occurred in Marseilles, Paris and other parts of France among soldiers returned from the Crimea. It is possible also as Fouchère suggests that some sporadic cases are mistaken for the more prevalent "fièvre typhoïde," and this would be more likely to occur up to 1840 when Stewart first pointed out the differences between Typhus and Enteric Fever, as before that time the tendency was to let down all cases as belonging to the same class. The French physicians contending for its essentially enteric character while those of Britain and Ireland maintained that in many cases no intestinal lesions were
present. No doubt then, as many enteric cases were much the more common in France and Typhus comparatively rare.

In Belgium two severe epidemics at least have occurred, one in 1840-44, the other in 1846-48 (Hilde).

Before and after these dates it may or may not have occurred as Belgian official reports include both Typhus and Typhoid under the term "fièvre typhoïde," and the same ambiguous equity in the case of the Netherlands and also of Sweden. In Norway Typhus occurred in 1864 and subsequently but there appears to be no reliable information as to its occurrence before that time.

In Iceland Typhus occurred in 1857-61 and probably also to former times associated with enteric which is endemic.

In Austria severe epidemics have occurred in 1842, 1853, and on other occasions.

In Germany since 1873-74 when war typhus was severe only slight-
Epidemics have occurred. In Berlin the outbreaks have been mostly slight and unimportant from without.

Some of the greatest epidemics on record have occurred in Spain and Italy. Some of these have been already referred to. Forty-five epidemics are known to have occurred in Italy in the thirty-five years from 1816 to 1850.

Russia is a great endemic centre of Typhus but reliable data are difficult to obtain.

It is in Britain, however, that Typhus has its special habitat and more particularly in Ireland where it is more distinctly endemic than in any county in Europe. Sporadic cases occur in Ireland more than in any other county during the intervals between the great epidemics. In Great Britain too sporadic cases are frequent enough, and in both Great Britain and Ireland the epidemics that have occurred
have been as severe as any that
have been recorded on the Continent.
The earliest Irish English and
Scottish Epidemics of Typhus
have owed their origin to impor-
tation from Ireland has been
much discussed. In the
which describes as "one of the best
observers of Typhus Epidemics
in Britain," says "when Typhus
occurs in Scotland or English towns
it is always in consequence of
importation of the disease from
Ireland." But, as I have already
mentioned, the Epidemic which
occurred in Scotland in 1843
was an exception, and though it
consisted largely of Cases of
Relapsing Fever, there can be no
doubt it included also Typhus.
And again in 1856, Punch, says
(p. 51) "the great increase of Typhus
in London --- was of Irish origin."
And of the Epidemic which commenced
in London in 1861 he says almost
all the first cases were male tramps
of no fixed abode and that "only a
small proportion of them were
Irish, and none had arrived recent from Ireland. The truth seems to be that although some of the first epidemics have commenced in Ireland and subsequently extended to England and Scotland, appearing first in those towns which had most intercourse with Ireland, it has not always been so, but the disease has sometimes become epidemic where circumstances were favourable to its development without being imported from Ireland.

Beyond the limits of Europe, we find Typhus has prevailed extensively in the United States and British North America; but not in Africa or the tropical parts of America, nor in Australia or New Zealand except on rare occasions among the passengers landed from Emigrant Ships. In India several epidemics resembling Typhus in many respects have been recorded, but their identity with Typhus has not been clearly established in most cases, and there has usually been no death.
The exciting Cause of Typhus is "a specific poison emanating from the bodies of furs previously injected (contagia) or generated elsewhere" (Murchison) (1873). 79

What the nature of this poison is we do not at present know. Analogy points to its being a micro-organism or its products.

In 1868 the discovery was announced by E. Hallier, of Geneva, of a Typhus fungus (Rhizium).

In 1873 Mott described actually mobile dumb-bell cocci in the blood of Typhus.

In 1891 Heine, of Prague, discovered a bacterium, to which he gave the name of Streptobacillus which he believed to be the cause of the fever.

In 1892 Lewuschen described two forms of organism, possibly two forms of one microbe, which he regarded as the cause of the disease.

In 1893 a diplococcus was found by Dubious and Bruhl in the blood and spleen of Typhus cases of which they gave the name of Diplococcus Exanthematis.

(Abridged System of Medicine Vol. 11 p. 356 J.W. Moore 1877)
These observations, however, have not led to any definite result. The may however consider from a clinical and practical point of view the question of the contagiousness of Typhus and its origin do now.

Since Bacastoria wrote of Typhus as one of his "Morbi Contagiosi" in 1546 most observers have attested the contagious character of the disease, as exemplified in the synonyms by which it has been known, e.g. "Parish Infection" (English Bills of Mortality 1600-1700), "Infections fever" (died 1763), "Typhus Contagious" (J. S. Pace 1811), "Contagious Fever" (Bateman 1818).

And the belief that Typhus is contagious is supported by frequent observed facts. Amongst these are the rapid spread of the disease, once it has broken out, amongst members of the same household, or dwellers in the same neighborhood. The prevalence amongst the latter being directly proportionate to the degree of intimacy between
the healthy and the sick; the
frequent occurrence of attacks
in persons, living in healthy
districts, where the disease has
not previously occurred, but who
have visited the sick; the outbreak
of the disease in districts previously
unaffected following the advent
of persons suffering from the
disease or who have been in
contact with the sick; and the
success which attends measures
taken to prevent its propagation,
more especially the early removal
to hospital of the sick.

Instances of each of these facts
occurred in an epidemic which,
as Medical Officer of Health and
Medical Attendant at the Fever
Hospital, I had the opportunity of
observing in Whitehaven in 1890.

One of the earliest cases proved
fatal at the end of the first week
of the disease. Two days after his
death a person in the neighborhood
who had been intimately associated
with this patient was taken ill with
Typhus, and in a few days several
Others in the same neighbourhood all of whom had been brought in contact directly or indirectly with him. A fortnight later I was called to see two patients living five miles away in a healthy, well-ventilated house in the country where no previous cases had occurred, but who had visited the house of the first-mentioned case. And this patient who had been taken ill whilst residing in the same court as the first-mentioned was taken, whilst still ill, to the house of a friend in a separate part of the town, and a fortnight later this friend was attacked by Typhus, whereas the still convalescent patient was removed to a third house at a distance from either of the other two, and in another fortnight two others were attacked by Typhus in this house also.

At the commencement of the outbreak we were very inadequately provided with hospital accommodation.
and it was impossible to remove all the cases that occurred at once. In those cases that were treated at home on this account, in houses ill-adapted for the purpose, two or three other cases occurred in due course; but when we had provided a suitable temporary hospital and were enabled to remove all cases as they occurred, the epidemic began to abate and in three months had entirely ceased.

Two medical practitioners who had attended on some of the cases were attacked by Typhus and one of them died.

All the nurses engaged in the fever hospital who were not protected by previous attacks suffered from Typhus, most of them commencing a full night after entering upon their duties.

Many instances on a much larger scale are given by Jenner, and leave no room for doubt of the highly contagious character of Typhus.
As to the manner in which the Typhus fever is transmitted from the sick to the healthy, it appears that the cutaneous and pulmonary exhalations are laden with it, and it is inhaled by the breath or swallowed with the saliva, actual contact with the patient being unnecessary. Many cases of Typhus have a characteristic unpleasant smell and probably these cases are most apt to communicate the disease to others. Several of my patients associated their own illness with particular occasions on which this odour had strongly affected them, though, as they were in continued attendance on the cases, it is impossible to say more about this suggestion that, that the interval that elapsed between that occasion and the attack corresponded with the usual period of incubation, which in cases under my own observation has invariably been from twelve to fourteen days. Whenever it was possible to fix with certainty the date of infection.
The distance to which the Typhus fever can be conveyed has been set down as not more than half a yard (Haygarth, 1794) and it is generally believed that it "cannot cross an open space." One case that came under my observation did not support this belief.

The patient was living in a house on one side of a court, only about three feet wide, and her bedroom window was always open owing to the smallness of the room. A young woman, living on the opposite side of the court, whose bedroom window faced that of the patient, and was also usually open, contracted the disease, and both she and the patient were very positive in the assurance that there had been no other communication, direct or indirect, between them, as they did not know each other. The former of these had the offensive smell very well marked and it was from her that the medical attendant who died of Typhus believed he had contracted the disease during her convalescence.
designated more profusely than any other case of Typhus I have seen, and during the fever her rash was very profuse and dusky red. These two cases were not in the area of infection generally, and were the only cases in that part of the town, the infection having been carried to the homes of the earlier of the two by a convalescent.

An instance of the carrying of infection in the clothes of a person not herself suffering from the disease, but protected by a previous attack years before, also occurred during the same epidemic. A nurse from the hospital, in this case, infected a person living in a healthy and well-ventilated home, who had not been in any other way exposed to infection. This carrying of infection in fomites occurs much less frequently in Typhus than in Scarlet Fever, but that it does occur sometimes is proved by several cases that have been recorded by Murdoch and others.
This case corresponds with one mentioned by Marchion (1873 p. 89) in which a nurse in the Middlesex Hospital who was in attendance on a Typhus patient conveyed the disease to a bedridden patient in a different part of the hospital. But in the case I have mentioned the nurse conveyed the disease, in her clothes no doubt, to a young woman at her residence nearly a mile away. The young woman had not been in any way in contact with other cases, and the nurse detained her in conversation for a considerable time, once against her will, in a small room. She was afraid at the time of the interview of "catching" the fever and suffered herself to that effect before any symptoms presented themselves. This would as doubtless be a precipitating cause, as such mental emotion is admitted to be, but her attack was a severe one still marked me from the first with obvious rash and nervous symptoms and terminated fatally.
Many instances are given by
Inoculation of the communication
of Typhus by the clothes of persons
not themselves suffering from
the disease, notably the "Black
Assist" of the Old Bailey in 1750.

Typhus has not been successfully
inoculated, and there is no proof
that it can be communicated to
the lower animals.

The Typhus poison is lighter
than atmospheric air and
appears to be destroyed by a dry
heat of 204° or 205° Fahr. It is
readily neutralised, probably by
oxidation, or coming into contact
with fresh air.

The period of incubation has been
variously estimated. It is most
commonly about twelve or
fourteen days, occasionally shorter,
but less frequently longer. In
some rare cases there would appear
not to have been scarcely any latent
period at all. Mitchell says
"It would seem that the poison of typhus
maybe so concentrated, or the system
so susceptible of its action, that its
effect may be almost instantaneous."

In the cases in which I was able
to ascertain that there had been
but one opportunity of contagion
the incubation period was from
twelve to fourteen days, and in
no case did an attack commence
at a later period after the last
appearance of contagion.
The period during which Typhus
in acute infection is probably
from the end of the first week
up to convalescence. Sometimes
it would appear to last through
a somewhat prolonged convalescence,
but in many such cases, if the
Clothes have not been disinfected
or thoroughly exposed to fresh air,
the contagion may remain in the
Clothes after the body has cleared
itself of the poison. When a case
of Typhus is removed to hospital
during the first week of an attack
the diuretics do not often spread
if they is not detained in families,
and amongst them, dark coloured,
rather than light coloured, wooden
articles are used to retain the poison.
Whether Typhus can be communicated by the dead body is not very easy to determine with certainty. In the Epidemic I observed, persons certainly got the disease by attending a "waste". They came at the home where a patient had died and was lying corpse and after the usual period of incubation developed Typhus at their homes away from the neighborhood, but of course there was the chance of the poison being retained in the room or furniture. In cases dying in hospital also the attendants who placed the bodies in the coffin attributed their subsequent illness to this cause, but they also had been referred to infection apart from this.

The protection afforded by one attack of Typhus appears to be in the majority of cases complete. A second attack with eruption in the same individual is extremely rare even among hospital nurses.
Mitchell relates that he himself had two attacks of typhus with the characteristic eruption and severe symptoms on each occasion, an interval of ten years elapsing between the two, and refers to other cases. But these are very exceptional.

1. In view of our present ignorance of the nature of the Typhus fever, the question of the possibility of its generation de novo, though presenting an attractive field for argumentative speculation, admits of no positive or final answer.

Mitchell says "I believe it may be generated independently" (1873, p. 93), whilst Dr. J. W. Mohr in Allbutt's System of Medicine 1847, p. 355, expresses the opinion that "The doctrine of the de novo or spontaneous generation of typhus is opposed to all analogy."

The conditions under which typhus is by Mitchell believed to be developed de novo are over and
Equal and deficient ventilation he supposes that "the poison is generated by the concentration of the exhalations from living beings whose bodies and clothing are in a state of great filth."

It is true that Typhus flourishes most under these conditions, but the greater prevalence of the disease during epidemics in the most crowded localities is what might be expected of a contagious disease, especially one as violent as Typhus, the specific poison is so readily destroyed or rendered harmless by free access of fresh air. Once the disease has originated or been introduced it would naturally be most apt to spread where there was overcrowding and deficient ventilation, and where the poison would consequently be most concentrated and, as scarcity of food would be most likely to be prevalent amongst the dwellers in these over-crowded localities, inability to withstand
the poison on account of the lowered vitality of such pests would also favour its propagation.

Greater support is given to the view of the origin of Typhus due to such epidemics as that which occurred in 1862, first at Preston, and afterwards at Liverpool, Manchester and other places. This epidemic had been predicted on account of the distress produced by

the Cotton famine. The people, unable to procure adequate

and proper food, were dreadfully overcrowded; in many cases

several families occupied one small home, thus liability

to pay rent for separate homes.

Many other cases are recorded in which famine and over-

crowding were followed by epidemics of Typhus in which

it was impossible to find evidence of the importation of

the fever.

Outbreaks of Typhus or "Ship"

fever also in many cases have
occurred under circumstances that seemed to preclude the possibility of any infection from previous cases, but always where over-crowding was excessive, and frequently associated with scarcity of food, filthy conditions and depressing mental conditions, such as fear where large numbers of persons were kept under closed hatches on account of stormy weather, or the naturally depressing condition of prisoners.

In 1810 typhus occurred in the prison-ships in Plymouth harbour. The disease was not prevalent at Plymouth, and the prisoners were cut off from all communication with the shore, but were shockingly overcrowded. For thirteen hours out of the twenty-four they were confined in a space allowing only 29 feet of cubic air space each, the only ventilation being through the four holes, which were
Covered by thick fogging. The atmosphere was so bad that a lighted candle appeared in it as if seen through a thick mist. Of 4,000 persons, 1,050 took Typhus and 150 died of it. The recorded cases of hospital fevers and "military" fevers, all of which are somewhat similar character as regards causation, total over 200, of which too many instances are known in former times appears to have been not only fostered but generated by over-crowding, poor food, filthy conditions, bad ventilation, and a depressing mental state. The "Black Assize," of which 87 are on record, seem to point to the products of the disease under these conditions, and in some instances are remarkable in the fact that whilst the prisoners themselves did not suffer from the fever they communicated to the Court that tried them most violent and fatal Typhus.
The argument that in many cases where there has been the greatest overcrowding Typhus has not been generated is not of much weight, since it is not contended that mere overcrowding itself is sufficient to produce it. There must be, in the opinion of those who believe in its independent origin, associated with overcrowding certain other conditions which are more or less essential. Of these defective ventilation is most important. For what would constitute overcrowding if there was little or no ventilation, might be no overcrowding at all if the air were frequently renewed. Filthy clothing saturated with exhalations from filthy chimneys and not removed for long periods would aggravate the effects of overcrowding and may be incen- sory to the production of Typhus. And this latter fact might account for the alleged freedom from Typhus amongst overcrowded but naked negroes in slave-ships.
If this accumulation of thecutaneous exhalations be really
applicable in thegeneration,
as distinguished from the
propagation of the Typhus
fever, it would appear necessary
that the overcrowding and equal
must exist for a considerable
time to permit of such accumulatio
and this would explain why
the most extreme overcrowding,
such as that of the ordnance
"Black Hole of Calcutta" on the
night of June 20th 1756, which
came the death during the
night of 123 out of 146 persons,
apparent from asphyxia, may
fail to produce the Typhus fever
because sufficient time is
not allowed for its development.

It may be suggested that
in a debilitated state of the consti-
tution, such as results from
protracted starvation or other
debilitating causes, may not only
reduce susceptibility to the
Typhus contagion but may
favor its production.
Against the facts which seem to favour the view that Typhus may originate under certain conditions we must set the analogy of other specific fevers. It is probably true that Typhus is of microbial origin although the specific organism has not been discovered. We know that the "returning state" of some pathogenetic micro-organisms possesses great vitality, and that some such organisms are capable of maintaining an existence outside the human body, or in other words that the disease may be due to facultative saprophytes or parasites: organisms capable of thriving outside the animal body or facultative parasites or saprophytic organisms capable of acting as parasites. There are so many differences between the behaviour of one of the infectious diseases and another that it would be as
unjustifiable as to set aside analogy altogether and assert that Typhus must be capable of generation de novo because many outbreaks occur in which no source of previous contamination can be discovered, or because epidemic Typhus occurs with such uniformity under certain well defined conditions, therein differing from such diseases as Smallpox or Scarlet Fever in which no such uniformity of conditions exists. Murdinov says "If the independent origin of Typhus be objected to, it must be admitted that the specific poison is always and everywhere present, ready to take effect, whenever (and only when) the causes supposed to generate it are present." If the micro-organism of Typhus is capable of living outside the human body, this admission may not be so unreasonable as it seems to think, and possibly the organism may only become parasitic under the conditions he refers to.
Whether this be so or not, it is quite certain that overcrowding is one of the most potent of the predisposing causes of Typhus. If the diseased be conveyed to the healthy by emanations from the sick, it follows that overcrowding and deficient ventilation must favour its propagation by concentrating these emanations. Destitution and deficiency of food are also among the chief, if not the chief, predisposing causes of Typhus, and it is evident that these two conditions of poverty and overcrowding must frequently go hand in hand.

The history of Typhus Epidemics, as already shown, proves the close relationship that exists between these epidemics and destitution and overcrowding. The statistics of the London Fever Hospitals show that the patients are mostly from the lower classes, whilst in Edinburgh, where the classes are more distinctly separated than in most cities, it has been
Found that even in the worst epidemics the disease has been almost entirely limited to the worst parts of the Old Town.

All the great epidemics in Great Britain and Ireland have been associated with times of scarcity, sometimes with general famine, sometimes with want and destitution from local or artificial causes such as strikes and commercial depression. Whichever of these causes has been in operation, it has been amongst the poor, who suffer most from scarcity, that the disease has been most prevalent.

The uniformity with which Typhus epidemics have followed great and devastating wars on the Continent of Europe, distance or near is but to demonstrate.

Typhus epidemics have occurred in every variety of climate, season, and weather, in peace and in war, the only circumstances common to all being overcrowding and want.
Graves in his Clinical Lectures on the Practice of Medicine, published by the Rydenham Society (Vol. I. p. 106 et seq.) has some very interesting remarks on the relative importance of overcrowding on the one hand and depopulation of the other in the Causation of Typhus, and condemns the view taken by Many in this day that famine was even an exciting cause of Typhus Fever in Ireland. The dictum that "if there be no famine there will be no fever" had, he said, prevented proper precautions being taken to combat the real causes of the propagation of the disease; and the measures taken were the want of the people had really led to the aggravation of their causes by bringing in swarms of half-starved hogs from County districts to overwork the meagre and depleted for the distribution of food.
Famine then is a great predisposing cause of Dysentery epidemics and acts both by rendering the constitution less able to resist the poison, and also by aggravated the overcrowding on which the spread of the disease so much depends.

Other predisposing causes of Dysentery are:

1. Bodily fatigue and want of sleep which lower the vitality and so render a person more liable to take the disease. It is probable that a person is more susceptible of the effect of the poison during sleep, and for this reason nurses should never sleep in the same room as their Dysentery patient.

2. Mental fatigue and depressing emotions act similarly by lessening the resisting power of a person to the poison. A dread of the disease is very apt to have this effect.

Previous illness in the same way predisposed to Dysentery. Pithiri was thought by Hildembrand to have some sort of incompatibility with Dysentery, but this opinion is
not borne out by the experience of other observers.

It does not appear that persons acquire any immunity from continued exposure to the influence of Typhus unless they actually have the disease. It is known that persons exposed to the fomites of Kulei Hoq are less readily affected by it than new comers, but this does not seem the true of Typhus.

Intemperance dulls the senses and depresses the tone of the nervous system, and so renders persons more liable to attack. It is an error to suppose that a free use of alcohol is any protection to those exposed to contagion as nurses or attendants. Habitual intemperance also renders the prognosis much more unfavorable. Idiocy or age does not appear to have any very decided effect. All persons seem to be liable, and even those who escape contagion when first exposed will may be attacked at any subsequent period. Some persons are perhaps more
susceptible than others and take
the disease more readily, and this
may account for the rare cases
in which a previous attack does not
prevent but is followed by a
second.
Occupation of any kind does not
predictive of Typhus except it
involves actual exposure to the
poison. Butchers are believed
to be specially exempt, probably
because they have usually a
sufficiency of nourishing food.
Temperature and moisture have
little or no effect as predisposing
causes of Typhus. In this, as in
many other diseases, we often
find the patient accounts for the
attack by exposure while at
setting or, but except in so far
as there may have a debilitating
effect on the nervous system and
render the patient less resilient
or contiguous, they have no effect.
The seasons have less effect on the
prevalence of Typhus than on that
of Enteric Fever which is more
prevalent usually in autumn.
Typhus appears to occur irrespective of season so long as the known causes exist. The records of the London Fever Hospital for a period of twenty-three years show the greatest number of cases to have been admitted in winter and spring, the smallest number in summer. This is probably owing to the greater overcrowding and defective ventilation of the homes of the poor in winter. The epidemic which I observed began in September and ended in December.

Typhus may occur at any age. The records of the London Fever Hospital show that cases have been admitted from one month to eighty-four years. It is for the most part a disease of adult age. The largest number of cases for any ten years of age occurs between fifteen and twenty-five and half of the cases between ten and thirty years of age.
Sex has no apparent influence as a predisposing cause of Typhus. From the records above mentioned it was found that more cases had occurred amongst females than amongst males, but the difference was fully accounted for by the excess of females in the general population.

Race or nationality confers no immunity from Typhus. In an epidemic at Boston (America) as many negroes as whites suffered, and in the Philadelphia epidemic of 1836 considerably more negroes and mulattoes than whites. (Garland quoted by Hulse 1883 p. 542). And Murchison says ("Contagious Fever" 1873 p. 60) "I have known several Africans and East Indians admitted with Typhus into the London Fever Hospital, the rash being distinct."
I have already referred to the length of the Period of Incubation, which may be so short as the almost instantaneous, the attack following immediately upon exposure to infection. Most commonly however it is about twelve days or fourteen days. It is often shorter but rarely if ever exceeds twenty-one days. Murchison says "I know no reliable facts showing that it can exceed three weeks and statements to the effect that it may extend over many months require confirmation." This seems to be now the generally received opinion.

Of five patients seen by one who had only once visited the home of a Typhus patient and who had had no other chance of infection two were attacked on the 12th and three on the 13th day. Three others who received an infected person into their own homes commenced on the 12th day so that the incubation period in
These cases was not more than 12 days, though it may have been less if they were actually infected at first. One who had been in attendance on a Typhus patient before removal to hospital and who was then received into the workhouse and kept under observation was attacked on the 14th day after leaving the Typhus case. This person could probably be infected on the last day of his attendance on the patient. All the nurses employed at the hospital who were not protected by a previous attack were taken ill from the 12th to the 14th day after entering upon their duties and had well marked Typhus. Several others whom I saw during the same epidemic probably had incubation periods of the same duration, 12 to 14 days, as this period was covered by the time of their exposure. It seems, but as their exposure was prolonged, it was impossible to be sure of this.
It is probable, as the late Sir Thomas Granville Stewart taught, that the urine concentrated in the poison the cholera is the period of incubation, and the condition of the patient may render him more or less susceptible and so affect the duration of incubation. This seemed to have been the case in the Whitehaven epidemic, the earlier cases, which occurred before the nature of the illness was recognised or precautions taken, following each other in quick succession, though it was impossible to fix the exact state of infection when the people were living in close intimacy and under circumstances of poverty and over-crowding. Towards the end of the period of incubation the patient may feel "out of sorts" and "as if something were going to happen" (Granville Stewart). There is frequently some headache and lassitude and loss of appetite. The invasion of Typhus is sudden, marked by chilliness or distinct rigors.
Frontal headache, with pains in the back and limbs. The patient is at first perfectly clear minded but can not eat, he often feels a desire for stimulants; his headache is often very severe, his appearance dull and heavy at first; his tongue white + furred, bowels constipated, pulse quick and full, usually compressible, his urine scanty, dark coloured and sometimes albuminous. He complains of thirst and giddiness. His temperature may be up to 104° on the first day but usually it is about 100° or so at first, and rises higher later on. He becomes vacant and bewildered and his face flushed. The facies typhosa is often very characteristic. The flushing is general over the entire face, it is not circumscripted like the hectic flush or the cheeks, it is even pink, but dusky, earthy or leaden, or in severe cases livid. The conjunctivas are injected and suffused. He gets completely exhausted and almost the third day takes to bed.
Before he takes to bed he has a sense of chilliness and fits me the fire, although his temperature may be several degrees above normal. From the first there is vertigo, tinnitus aurium, and restlessness, with in many cases complete loss of sleep. There is no pain in the abdomen. The respirations are somewhat quickened and occasionally there is slight cough. The rash appears usually on the fourth or fifth day, sometimes not until the sixth or seventh day. It consists of spots or maculae of irregular shape, varying in size from a mere speck to three or four lines in diameter, which are sometimes isolated, sometimes grouped together in patches of irregular outline, often closely resembling the eruption of measles, and hence described as “Morbilliform” “Measly” or “Rubéoleux.” The spots are at first slightly elevated above the surrounding skin, are of a dirty pink or flavid colour, and disappear
on pressure with the finger. After the first or second day they usually become darker in colour, resembling reddish-brown stains, are no longer elevated above the skin, and do not disappear on pressure. They have no defined margin but merge insensibly into the colour of the surrounding skin. The spots usually first appear on the anterior folds of the axillae and sides of the abdomen, afterwards on the chest, back, shoulders, thighs, and arms. In some cases they are first seen on the wrists or backs of the hands. They are most common on the trunk abdomen and are very rarely seen on the face or neck. Along with these spots there are others, paler and less distinct, which appear to be beneath the cuticles and produce a characteristic mottling or motting of the skin, "subcuticular motting." The spots and motting together constitute an eruption called by Sir W. Jenner the "Mulberry Rash" of Typhus.
The typhus eruption varies considerably in appearance according to the relative abundance of the mottling and more distinct spots, and also according to the isolation or confluence of the distinct spots.

The eruption of typhus is very rarely absent. The spots situated on the dependent parts of the body are always the darkest, and maybe found in these situations when they are scarcely visible elsewhere. For this reason the back should always be examined in doubtful cases. The quantity of the eruption, its depth of colour, and the earliness with which it becomes livid or petechial, are in direct ratio to the severity of the case. (Anthemis, p. 13.)

Typhus has often been designated "petechial fever" but the term "petechial" has been used in very different significations; petechia as the term is now understood mean purplish spots, or sub-cutaneous ecchymoses which do not disappear or remain, are often developed
In the centre of typhus spots but they are not essential as peculiar to Typhus. In many cases of typhus the eruption never becomes petechial (and this is particularly the case in children) whilst petechiae are observed in the course of many other diseases. The peculiarity of Typhus, so far as the rash is concerned, is that the eruption in its earlier stage is a true lymphem and in the later stages the maculae are converted into petechiae by the escape of blood-pigment into the cutis from the broken red corpuscles. Or these cutaneous hemorrhages may be due to the blocking of the vessels by the skin by bacteria, as Klebs & Almanna believe, - a bacterial coagulation themselves. This conversion of the spots into petechiae was first described by Halmarch (1838) Stedward (1840) and Jenner (1849), though the different stages of the eruption had been very accurately described by earlier writers.
The temperature does not come down when the rash appears. It remains high or rises higher. But between the seventh and tenth day it commonly falls to some extent.

About the end of the first week the headache usually ceases and delirium supernances. Sometimes the delirium is acute and crying, the patient shrieks or talks incoherently, and is more or less violent if not restrained he may get up and walk about. The medical man to whom I referred as dying during the Epidemic I observed managed to elude the vigilance of his nurses and came down stairs. This violent stage is followed by a great collapse or low manic delirium. Much commonly the delirium is not violent even at first. In either case there is usually sleeplessness. Sometimes the delirium is like that of acute alcoholism with muscular agitation, trembling and talkativeness.
The countenance becomes more dull, the conjunctivae more injected, the effusion more dull and stupid, and the vision steadily increases. The mucus, entanglement is usually worse in the evening and during the night; the vision is greatest in the morning. At the same time the tongue gets brown and dry and rough along the centre, and is tremulous. He is parched and thirsty. Constipation continues, sordes collect on the teeth and lips, respiration is quickened (20 or 30 a minute). The breath has a peculiar fetid smell, the pulse rapid (100 or 120), the heart's action is not strong, there is a tendency to bronchitis or consolidation. The skin may be cooler than during the first week; it may be dry as clammy; and it gives off a characteristic and unpleasant odor. The blood becomes darker and almost the eighth or tenth day true.
Petechiae may appear in the centre of many of the spots. The urine is apt to be scanty, and may neglect to empty the bladder and require the use of the catheter. There may be a sense of area, sometimes desiring from interference with the action of the kidneys. Deafness is a common symptom.

He may continue in this condition until about the fourteenth day and then recover by crisis. But at any time, commonly about the tenth day, he may pass into the Typhoid, Paralytic or Malignant Stage sometimes called the "Late Malignant Stage." Fervor, prostration succeeds delirium excitement, at first stupor and delirium alternately, delirium being marked at night. The prostration is extreme, he lies listlessly on his back, indifferent and unconscious, moaning or muttering, or still and motionless with a tendency to sink to the bottom of the bed. His face...
is dusky and expressionless. He cannot raise himself or even turn on his side. Tremors, sub-clusus, and picking of the bedclothes are observed in some cases. The eyelids are usually closed and the pupils are often contracted (the “pinhole pupil” of Graves), when spoken to loudly he may open his eyes and stare vacantly at those around him, sometimes he does not even do this. His temperature may keep up at very high. The pulse is quick and often there are more beats of the heart than pulsation that can be felt at the wrist. His mouth is often, showing his tongue as it were a glazed gum ball, his teeth covered with brown spots, his lips and gums cracked and sometimes bleeding. His thirst and constipation continue. If the bowels act after medicine the stools are loose and are formed. If the urine is still sometimes scanty but may be more copious, pale, and of low specific gravity and often
passed involuntarily. Sometimes he has retention and requires the use of the catheter. Petechiae become more numerous, and the odor given off by the skin more marked. The parts subjected to pressure, especially the skin over the sacrum, become red and tender and are liable to slough. The pulse is frequent (112 to 140), small, weak and indulating; not infrequently it becomes intermitting, irregular, and scarcely perceptible. The cardiac impulse and systolic sound of the heart may become faint or imperceptible. This condition may last for many hours or for several days and may pass either suddenly or gradually into profound and fatal coma; or sudden engulfment of the lungs and asphyxia may supervene; or there may be failure of the heart, with coldness and lividity of surface and a profuse watery and death from syncope and coma combined. There are two quite different conditions to which
The name of "Coma Vigil" has been applied. In one of these he falls into a sleep, which lasts, for several hours, it may be, and on awaking insists that he has never closed his eyes. In the other, to which the term "Coma Vigil" is more appropriately applied, the eyes are open but their sense is shut; the patient lies gazing into vacancy; his mouth half open; his face pale and stiff; the pulse rapid and feeble, or imperceptible; the breathing almost imperceptible; and the skin cold and bathed in perspiration. He is evidently awake, but he is indifferent and insensitive to what is going on about him. This is the condition to which Sir Wm Jenner applies the name of "Coma Vigil"; it may or may not supervene on semicorrection and is invariably fatal.

Complications may occur during the course of the disease and may be fatal; sometimes virulent ophthalmia; or hypertrophic eruption of the lungs; or inflammation of the kidneys with uremia; or bed-sores; or gangrene.
But on or about the fourteenth day there is often a remarkable change for the better. Favorable symptoms set in and the temperature falls, not gradually but quickly. The patient falls into a quiet sleep, which may last for several hours, and awakes another man. He is at first bewildered and confused, but the delirium has ceased, he recognizes those around him, and is now for the first time conscious of his extreme weakness. The pulse, as well as the temperature, has fallen; his tongue gets clean and moist at the edges and there is a desire for food. These favorable symptoms are occasionally accompanied by slight perspiration, relaxation of the bowels, or an abundant deposit of lithates (urates) in the urine which is copiously secreted. In few acute diseases is the crisis so distinct and well marked as in Typhus. The fall in temperature has been well
described as "precipitons." And the general improvement in other respects is not less striking and speedy. In a large proportion of the cases I have seen, the haggard expression, low muttering delirium, stupor, tremor, submucous, the rapid, thready, tremulous and intermittent pulse, the partially open mouth revealing the dry glazed tongue and sordes-clouded teeth, and all the threatening symptoms which seemed to foreshadow a speedy and fatal termination, have been exchanged within a few hours for the clean and intelligent countenance, the steady hand, the comparatively slow and steady pulse, and the returning appetite of approaching convalescence. When improvement has not been quite so striking, it has still been wonderfully rapid, and in two or three days after improvement has once commenced the tongue has been clean and moist all over, the
Appetite ascensions (boulimia) and
strength has been regained with
great rapidity. No permanent
harm to the constitution having
resulted. Relapses are almost
unknown in uncomplicated Typhus
and patients who have had the
most severe attacks often express
themselves as feeling better than
they had felt for years.

Many varieties of Typhus have
been described depending on the
severity of the attack, the prominence
of particular symptoms, the
presence of complications, and the
circumstances under which the
fever appears; but none of these
give any support to the theory of
a real change of type having
occurred in the fever itself.
They depend rather on previous
habits and condition or constitution
of the patients, or the circumstances
under which they are placed.
Thus we have the "Inflammatory
Typhus" in which there is great
febrile reaction, much heat
and flushing of skin, severe headache, and often acute delirium. This occurs chiefly in the young and robust, and in persons of the upper classes.

"Typhus or Acute Typhus" is characterized by predominance of nervous symptoms, such as delirium, somnolence, tremors, and subcutaneous tenderness. The eruption is usually dark and petechial.

"Adynamic Typhus" is marked by the early suppression of heat, prostration and tendency to collapse. The skin may be cool and the pulse slow; the heart's action impaired, and involuntary evacuations occur.

"Ataxo-Adynamic or Congestive Typhus" is the most common form.

"Typhus Liferans or Blasting Typhus" is the name applied to those cases which terminate fatally on the second or third day, or within a few days, or it may be even in a few hours.
Cases of "Stiff Typhus" occasionally occur in which the fever is of short duration, and unaccompanied by severe symptoms of any sort. They may commence in the ordinary way but come rapidly to a crisis in a few days (Granite Street). Such cases may occur when the disease is not epidemic, and persons constantly exposed to contagion may, without suffering through an actual attack of typhus, suffer from malaise, slight fever, gastric disturbance, headache, disturbed sleep, and occasional confusion of the mental faculties. This condition may pass off on removal from the typhus atmosphere, or may be followed by an attack of true typhus. "Catarhal Typhus" is the common name of typhus in Ireland owing to its frequent complication with bronchitis. "Scabulitic Typhus" is the designation of those cases in which the lobud is so defibrinated or altered as to escape from the vessels, County
The petechiae are very large and producing purpuric spots or ulcers beneath the skin. Episcleritis, haemorrhage from the gums, hæmoptysis, melena, or other bleeding may occur.

In one of my own cases profuse episcleritis was only controlled by plugging the rectum, and the patient died afterwards from severe haematemesis. "Bubonic Typhus" is not uncommon. The inflammatory swellings occur chiefly in the parotid and submaxillary regions, as well as on the substance of the gland so much as in the subcutaneous circular tissue.

"Dysenteric Typhus" is probably a combination of dysentery and typhus, the one complicating the other. It has been contended by Sir Gilbert Blane and by England that these two diseases are sometime, incidents, dysentery in the black taking the place of typhus in the white man. Dysentery prevailed among the Africans in crowded slave.
Syphilis and Typhus. But the African is known not to be exempt from Typhus. It is more reasonable to believe as Marchion suspects ("Continent Fever" 1875 p. 189) that the same conditions may favour the development of two separate poisons, than that the same poison should give rise to two diseases. In many instances, notably in the French army in the Crimea, Typhus and Dysentery often prevailed together and complicated one another.

"Jail fever", "Ship Fever", "Military or Camp Fever", and "Hospital Fever" are names indicative of the circumstances in which Typhus originates or spreads rather than distinct varieties of the disease, overcrowding and deficient ventilation being an essential factor in each case.
In descriptions of Typhus we read of different "stages" of the disease. All such divisions are arbitrary. Some authors describe three, others five or eight stages. Murchison speaks of six, viz:—

1. Incubation
2. Invasion
3. Stage of nervous excitement
4. Typhoïd Stage
5. Depravation or Crisis
6. Convalescence.

This division is in many ways convenient and applies to the majority of cases; but some of them may be absent, and all may vary in length; and in some cases they may run one into the other, so that it is difficult to say when one ends and another begins.

1. I have already referred to the stage of incubation and its duration.

2. The stage of invasion lasts from the commencement of the illness, which is usually sudden in Typhus, to the appearance of the eruption. Cold shivers,lassitude and
Discrimination for ejecting mark its commencement; sometimes distinct rigors occur; sometimes merely a feeling of chilliness; then follow pains in the limbs and back, headache, loss of appetite, white scurfy tongue and thirst.

It is usually easy to fix the time of commencement of this stage, but there may be some difficulty when premonitory symptoms have been present. This stage usually lasts 4, 5, or 6 days.

3. The stage of nervous excitement attends from the appearance of the eruption until the appearance of somnolence and is characterized by restlessness, sleeplessness, and delirium. During this stage the headache ceases and the tongue begins to get dry and thick.

4. The typhoid, or hectic or malignant stage does not occur in every case of typhus, but the early advent and pronounced character of this stage mark the severity of the attack.

5. The stage of disappearance of symptoms...
has been already described. The rapid change from unfavorable to favourable symptoms is most striking, and in accordance with this newly acquired appetite be practised with safety so soon after the disappearance of bad symptoms as in Typhus. The crisis usually occurs in or about the fourteenth day of the illness. It may be much earlier in mild cases but is seldom much later. There does not appear to be any necessary connection between the disappearance of fever and the so-called critical discharges. There is often slight purgation, diarrhoea and effusion of mucus in the cranium, but there would appear to be rather a result than a cause of the change. The effusion of mucus may occur at any time during the attack, without any favourable change in the patient's condition; and Currie and Say says crisis by perspiration is the dreaded in Typhus.
6. Convalescence usually proceeds rapidly and uninterruptedly once improvement has commenced. In three or four weeks perfect health and strength are restored, if the patient were not in a weak state before the attack, and if no complication occurs. Typhus rarely lays the foundation of any serious organic disease.

The mean duration of Typhus is thirteen or fourteen days. It may be shorter, especially in the young, but in uncomplicated case it rarely, if ever, exceeds twenty days. Of five hundred uncomplicated cases which recovered, Murdoch found that the mean duration was 13.43 days. In nearly one half the cases convalescence commenced on the thirteenth or fourteenth day and in more than three fifths on the thirteenth to the sixteenth day inclusive. Similar observations have been made by others. In one case convalescence commenced on
The seventh day and in three cases not until the sixteenth day.
Of one hundred fatal cases
Murchison found the mean duration to be 14.6 days. The duration of individual cases however
was much less uniform than in those cases that recovered. Two
died on the sixth day, four on the
ninth day, seven on the sixteenth day.
Whilst thirteen died (from complications) after the twentieth day.
In fifty-three cases treated by one
in Hospital in 1830 sixty-six recovered and seven died. In the
cases that recovered the improvement never commenced before
the twelfth day, and in uncomplicated cases never later than
the sixteenth day of illness.
The mean duration of the fatal
cases however was much shorter.
Thus four died on the fourth day
after admission to Hospital,
one on the fifth, one on the sixth,
and one on the eighth day after
admission. Three of these however
had been ill three or four days.
before admission and the day on which they commenced. The illness could not be quite accurately ascertained.

Relapses are extremely rare in Typhus. Dr. A. P. Stewart, in the paper read before the Parisian Medical Society in 1840, in which he presented it more clearly than had previously been done, the distinction between Typhus and Typhus-like fever, says: “a second attack of Typhus does not occur in the course of one and the same illness”; and again: “I have never, among thousands of cases, seen a single case of relapse, in the proper sense of the term, after the symptoms had begun to decline”.

Stiles and others have recorded the same experience. Some cases recorded by Baraillier (1861) of relapses within a few weeks of the first attack are not very conclusive as neither the presence of leucopenia nor the absence of complications in both attacks are referred to.
Only one instance of a true relapse was observed by Dr. Buchanan out of 18,268 cases of Typhus at the London Fever Hospital, although a genuine attack has in several instances been preceded by an abortive attack. Another case recorded by Eblein is referred to by Murchison, who had not, however, himself over a single instance of true relapse.

The complications of Typhus are due for the most part to the weakened condition of the heart, and the impure state of the blood produced by the typhus poison. They are not an essential part of the disease but modify its course, and are the immediate cause of death in many of the cases which terminate fatally. After convalescence is fairly established, it is occasionally interesting the occurrence of sequelae of constitutional peculiarities, and family idiosyncrasies peculiar to
To certain complications such as convulsions or pneumonia, different members of the same family suffering from the same complications even when they are not among the commoner complications of typhus.

In different epidemics, also different complications are prone to occur. Among these are parotid swelling, erysipelas, jaundice, dysentery, and diarrhea, all of which at other times are rare.

In the alimentary system, cataracts of the stomach sometimes occur, and occasionally there is jaundice. Diarrhoea also sometimes occurs, but in fatal cases it is not found to be associated with the lesions of Entame tinea in the ileum. Dysentery also complicates typhus in some cases as already referred to. Glomeruli and Phlegmonitis have also been observed. Halitotus is occasionally met with as in one case an enteric fever, a disease, which is formed mostly fatal following on profuse diastasis.
Pericarditis is rare, as also is intestinal haemorrhage.

In the circulatory system we find oedema of the heart from hypertrophy, the heart itself being found after death flabby, soft and easily torn, owing to a granular atrophic change of the muscular tissue. Pericarditis and endocarditis are extremely rare. Venous thrombosis is occasionally present, followed by phlegmasia dolens, which differs somewhat from ordinary cases of that condition in being attended by little or no pain. It is also certain that in some cases of phlegmasia dolens the cause is not to be found in venous thrombosis. In some cases it has been shown by Bézrio that the lesion exists in an obstructed state of the lymphatics, in others to inflammation of the areolar tissue.

A true thrombosis and embolism are occasional serious complications or sequelae and may cause gangrene of various organs and necrosis of bone.
Haemorrhages may occur from the deteriorated condition of the blood causing purpura fulminans, siliceae, Eustachian melanoma &c. Pneumonia with pustulent deposits in the joints is rare but fatal, occurring about the time of crisis or during convalescence. Its occurrence is marked by repeated ecchymoses, rapid rise and fall of temperature, extreme prostration, heart failure, purpura and profuse sweating.

In the Respiratory dyspncea Pneumonia is rare. It was the cause of delay in the diagnosis of one of the earliest cases in the Whitechapel epidemic as there was no doubt of the existence of the Pneumonia, and the patient was an intemperate man with extreme prostration which at first was not seen incompatibly with pneumonia alone, so that saline purgatives were not taken at first against infection, and it was only towards the end of the illness that Typhus was suspected.
Bronchitis is a common and
dangerous complication and
sequela, and from it we derived
the synonyms of "Catalethal
Typhus", "Bronchotyphus" and
"Pneumotyphus".

Hypostatic congestion of the lungs
is rather a symptom than a
complication of Typhus, and is
present in all severe cases. It
is this condition more than any-
thing else which determines the
fatal issue. It usually commen-
ces about the middle of the second
week, but occasionally earlier.
It extends with great rapidity.
It is quite distinct from Pneum-
monia with which however it is
sometimes confounded. It is
due to the paralyzed state of the
pneumogastric nerves and the
weak condition of the heart, leading
to passive congestion in the most
dependent parts of the lungs.
Serum is effused into the tissue
of the lungs, and there is increased
secretion from the ciliary mem-
brevae of the bronchial tubes.
There may be little or no expectoration or cough, and this is an
unfavorable indication. This
and the inability of the patient
to get rid of the bronchial effusion.
The respiration are accelerated
and labored; the pulse quickened
weak and irregular; the pulse
may continue rapid and the
temperature fall considerably;
the face and extremities get cold;
the surface cold and clammy;
and the patient may pass into
a state of stupor or coma.
Ascultation at first reveals
crave, expectoration. Rales at the
base, and most dependent parts,
gradually extending upwards and
forward, until they may be heard
over the whole of both lungs. As
the congestion increases there is
whiteness on percussion, cupidity
at first at the bases and most-
dependent parts of the lungs,
but gradually extending in all
directions, accompanied by feeble,
but not intercostal, breathing, over
the same area.
Genus of typhus occasionally occurs, usually in persons who have been very poorly nourished. It is almost invariably fatal. Pneumonia is not common. It may be latent. There may be no sharp pain, and as the effusion is usually fluid no friction is to be heard.

Tubercle may complicate typhus though some have doubted this, or may be a sequel. Jenner, Stewart, and Murdoch have observed cases in which pulmonary phthisis has commenced during, or immediately after, an attack of typhus. More commonly however there has been a previous history of phthisis.

Hemoptysis may be due to tubercular deposits, or it may be one feature of the hemorrhagic tendency. It is exceptional.

Laryngitis is uncommon but serious. It may be acute, but more commonly it takes the form of acute oedema of the glottis. It may require laryngotomy.
The cerebral symptoms of Typhus are almost invariably independent of inflammation. Hemiplegia does occur however in rare cases. Imbidity or Mania may occur after Typhus, but is not often lasting. The intellectual faculties are usually completely restored during the early days of convalescence, but occasionally the mind does not recover so quickly as the body, and the patient remains fatigued for some time. Paralysis is rare. Paraplegia is more rare than Hemiplegia. Occasionally localised paralysis occurs, such as the muscles of one limb or of certain muscles. They are probably due to arterial thrombosis of the central organs of the nervous system or of individual nerves, but this is uncertain. The patellar reflex is sometimes exaggerated, and ankle clonus may sometimes be found during convalescence.
Muscular palsy may occur during convalescence in different parts of the body. They usually pass off in a few days.

Aphasia has also been observed. In one case of Rovetz-Jackson's aphasia with left hemiplegia supervened on the fifth day of convalescence; the hemiplegia passed off in five or six weeks, but the aphasia was still present ten months after the attack.

General convulsions may occur and constitute one of the most formidable complications of Typhus. It is now well ascertained that convulsions occurring in the course of Typhus have their origin in uremia. In most cases there is albuminuria. The kidneys after death from convulsions in Typhus present in some cases evidence of oedema of all standing, but more commonly the only appearance are clearly recent and secondary to the fever. They very often present the characters of acute nephritis.
Cystitis may occur during convalescence, especially after neglected retention of urine and over-distension, and may be accompanied by haematuria, which may also occur with haemorrhages elsewhere, apart from Cystitis.

Of the Organs of Special Sense the Ear is most commonly affected. Deafness is very frequent, especially during the fever, and occasionally permits during Convalescence.

Sometimes chills and shivers in the ear prevent sleep. There may be associated with ototubous, or with inflammation of the Middle ear, but often no abnormality of the ears can be discovered. Rigors, fever, Convulsions or delirium may in rare cases precede a discharging from the ears. In some cases inflammation of the ear spreads to the membranes of the brain but this is rarer than after scarlet fever.

There is occasionally slight Drenery of urine during Convalescence but this ceases after a few days.

Slightness of Corneal Occasionally occurs.
Complications referable to the organs of generation are not frequent. The Catamenia may occur during the early stages of the disease, and during the later stages may be so profuse as to increase the prostration and retard convalescence. Pregnancy is not necessarily interfered with by an attack of Typhus. Women advanced in pregnancy may pass through an attack without miscarrying.

There are many complications of Typhus affecting the sinuitis, tissues, intestine, etc.

Erysipelas is an occasional complication of Typhus. It may occur at any stage of the disease. It usually affects the face or head and is sometimes accompanied by a similar condition of the pharynx or larynx, but may occur on any part of the body. It may be attended by chills and fever, and other local symptoms, and adds greatly to the danger of the case.

Edema sometimes occurs about the feet or ankles, but soon passes off.
Gangrene from pressure shows itself in the form of bed-sores which occur in cases prostrated by other complications, but are rare in uncomplicated Typhus. Their most common situation is over the sacrum, but they also occur on any part of the body subjected to pressure. Spontaneous Gangrene, probably due to thrombosis of the arteries, may occur in parts not subject to pressure and usually occurs in patients who have been subjected to prolonged starvation. Slaughtering of the colonae with escape of the humour has been noted with by Metchnikoff, Jenner, and others. Para or Cankerous Bric is a destructive and fatal form of gangrene which attacks the mouth, cheek, tongue and face, especially in delicate ill-fed children. It occurs also in other ulcers than Typhus, such as bad cases of Smallpox and Measles. Hospital Gangrene attacks wounds and ulcerated surfaces not only in patients who contract Typhus themselves,
but in those exposed to typhus fever.

Dacryocystitis also occurs, though rarely, as a sequela of typhus, probably, like spontaneous Purpurae, as a result of arterial thrombi.

Accidental lesions also occur occasionally, such as Hayfever, bullae, articular and boils.

Diptherite Cellular Inflammation is an occasional complication of typhus. It usually attacks the lower limbs and leads to purulent infiltration.

Inflammatory Swellings or Buboes are not infrequent at or after the crisis. They most occur in the Parotid and submaxillary regions. These swellings often form very rapidly, and may suppurate and form an extensive collection of matter in from two to four days, or may recede without suppuration. They occur in other parts of the body, such as the axilla, groin, mamma, and in the substance of muscles. Some writers have regarded these swellings as critical and unfavorable, but
Prinzhorn says "now and then they are seen in the first week of the disease, and as a rule they add greatly to the severity of the case, if they be not the immediate cause of death," and this opinion seems very fully confirmed by the figures he quotes from the records of the London Fever Hospital, as well as by the observations of others. He regards them as constituting a connecting link between Typhus and Oriental Plague. He says "there is a strong resemblance between these two diseases in their causes, as well as in their symptoms" and concludes "in fact, Typhus is probably the plague of modern times". He enters somewhat fully into his reasons for this belief, one of which is the apparent generation of the microbe of plague, which he also contends for in Typhus. Apart from the greater reluctance at the present time to admit this mode of origin in any specific disease, we may refer to his own argument previously quoted in reference to the supposed etiological relationship of Typhus and Dysentery
"That two poisons are developed under similar circumstances is far more probable than that the same poison should give rise to two diseases." (Continued Times 1873 p. 209)

Finally amongst the occasional complication of Typhus must be reckoned other specific diseases. Hunter's doctrine that no two of the so-called specific diseases could co-exist if the body has been fully approved. I myself recently saw a case in which the invasion of Measles coincided with the appearance of Scarlet Fever—both diseases being well developed. The patient was removed to Hospital with Scarlet Fever, and as the rash was fading and other symptoms improving, the temperature rose, the suffusion of the eyes and appearance of the face suggesting Measles, which only developed with omission of rash, so that allowing for the difference in the incubation period there could be no doubt—though it was running their natural course together each unaffected by the other.
That the same thing does occasionally happen in Typhus is proved by the cases quoted by Marchion in which this disease co-existed with Varicella, Scarlet Fever and Diphtheria.

The Diagnosis of Typhus must always be doubtful before the eruption appears. The pain and aching in the limbs, headache, feeling of prostration and lassitude, chilliness, and loss of appetite and furled tongue, may suggest Typhus even when the patient has been exposed to Contagion, but, in the absence of such exposure, are somewhat indicative. Fortunately the rash to return absent.

The diseases most liable to be confounded with Typhus are Relapsing Fever, Enteric Fever, some forms of Remittent Fever, Purpura, Measles, Meningitis, Delirium Tremens, Pneumonia, Disease of the Kidneys, Pyelitis, and other blood-poisonings.

Relapsing Fever and Typhus have often prevailed together in
Great epidemics and have been regarded as varieties of one disease. Their clinical histories however are widely different when the whole case is before us; but in the earlier stages of the attack, before the appearance of the rash, it may be very difficult to come to certain diagnoses. Regardless of the nature of other cases of fever occurring in the same house or immediate neighborhood. Relapsing fever differs from Typhus in the suddenness and severity of the primary fever; the absence of the heartthunder, stupor, and countenance which is so characteristic of Typhus; the absence of cardiac phenomena, indicative of softening of the left ventricle; the greater heat of the skin and absence of the typhus rash; the frequency of jaundice, vomiting, and tenderness and enlargement of the liver and spleen; the rarity of delirium. The Celebrated Symptoms: the almost invariable occurrence of abortion in pregnant women; and especially the sudden
fall in temperature about the fifth or seventh day, accompanied bycopious critical sweat, and followed by apparent convalescence; the occurrence, after a complete intermission of about a week, of a relapse or about the fourteenth day, lasting some three days; the marked difference in the rate of mortality; the presence of the spirillum in the blood.

Euticic Fever and Typhus are often mistaken in the early period of the disease. Typhus may be complicated with diarrhoea, and Euticic may be accompanied by constipation. When the eruption appears there can be no difficulty in forming a diagnosis, the isolated elevated, rose-colored spots, disappear on pressure, and appearing in successive crops (which Typhus spots never do) are very different from the eruption of Typhus. Unfortunately the eruption is not always present in Euticic Fever, but as the Typhus rash rarely fails to appear by the seventh day at latest, the absence of rash at this time
points to the case being one of
Enteric and not of Typhus.

Typhus also is marked by more
sudden commencement; by the
absence of the decided morning re-
mission and evening rise of temperature;
by the shorter duration of the fever;
and by its terminating by crisis rather
than by lysis. In Enteric fever we have
the abdominal condition and chemic
stools; and clearer facial expression
and mental condition in contrast to
the mental dulness of Typhus. The

circumstances in which the crisis
appears will often aid the diagnosis.

The Remittent forms of Remittent
fever occasionally simulate Typhus,
but arise under different circum-
stances, apart from overcrowding or
contagion, and the macular rash
of Typhus is not present.

Dyspnea is distinguished from
Typhus by its being non-contagious,
by the absence of pyrexia, by its be-
ning unaccompanied cerebral symptoms,
by the size of the spots, which are larger
than in Typhus, and by their being not
preceded by the characteristic Typhus

...
Rash, and by the occurrence of haemorrhage from the different mucous membranes.

Measles differs from Typhus in its protracted catarchial symptoms, the blanched colour of the rash, and the fact that it is usually confined to children, whilst Typhus rarely attacks children before the adult members of a family.

Meningitis: Encephalitis.

Typhus was at the beginning of last century believed by some to be due to inflammation of the brain, and we still sometimes hear it spoken of as "Brain Fever." In Encephalitis the headache is much more intense and the delirium more acute and violent than in Typhus. In Encephalitis the headache and delirium alternate or accompany each other; in Typhus the headache has usually ceased before delirium comes on. The loud cries and screams observed in the delirium of Meningitis do not occur in Typhus. Intolerance of light and sound, nausea, vomiting, thirst, inequality of pupils, strabismus, spastic paraly and partial palsy are more
Common in meningitis than in typhus. The pulse is usually firm in meningitis, in typhus it is soft and compressible. The red-streak on the skin after pressure with the finger-nail (tache cerebrale) has not the persistence once attacked as it. The rest of typhus on the fourth or fifth day may settle the question as to typhus, but of course there may be meningitis also. It is to be remembered however that first matter examination shows that meningitis or inflammation of the brain are rare even as complications of typhus.

Delirium tremens and D. alcohol is not accompanied by elevation of temperature, nor with the dry, thick tongue seen during the delirium of typhus, but with a moist tongue covered with a creamy fur. The skin is moist, there is no eruption, and the attacks do not commence with rigors, headache or pain in the limbs. The circumstances preceding and giving rise to the delirium will usually show its true character.
Asthemia or Typhoid Pneumonia is apt to be confounded with Typhus. Drury'son says: "The symptoms of the local disease may be entirely masked by those of a general typhoid condition. I have known many cases of this nature sent to the Free Hospital as examples of typhus." On the other hand it is to be remembered that if the case turns out to be really Typhus complicated with Pneumonia, as in the case previously mentioned, much subsequent trouble may be caused by delay in sending the case to hospital, if it occurs, as such cases are apt to do, in circumstances to which isolation is otherwise impossible. In all doubtful cases the rash should be carefully looked for, and subjecting to examine the back, as until the characteristic eruption is observed there must be some uncertainty whether the general condition is due to the pneumoia or the pneumonia. Secondary, in importance at any rate, is typhus.
Disease of the Kidneys.—

Araemia from renal disease is apt to be mistaken for Typhus. All the characteristics of the typhoid state may be present in aaraemia as well as in Typhus; and in Typhus the urine may contain albumen and tube-casts, leucocytes may be detected in the stream of the blood, and the patient may die from convulsions or coma, although there has been no previous disease of the kidneys. The form of renal disease (contracted granular kidney) most apt to resemble Typhus occurs chiefly in persons beyond middle age, especially in association with gout. But the diagnosis must depend on the presence of the typhoid-rash, and the temperature, which is at or below the normal standard in the aaraemia of renal disease, unless some local inflammation be present, instead of being elevated as it is in Typhus.

Pyaemia and other blood poisonings may in some cases produce symptoms resembling
those of Typhus, and may also occur as complications of Typhus. The only certain means of determining the existence of Typhus is the presence of the characteristic eruption. When this eruption is observed Typhus is to be regarded as the primary disease and the pyaemia or as a secondary complication. But in uncomplicated Typhus the rash, it is believed, is occasionally quite rare, absent: at any rate, if present, it escapes observation. And there is no reason why the same should not be true of complicated cases. In some cases therefore it may be difficult or impossible to decide, especially during an epidemic of Typhus, whether the pyaemia, uraemia, erysipelas or typhoid jaundice is the primary disease or a complication of Typhus without eruption.
Before enumerating the particular symptoms and complications to be taken into account in forming a prognosis it will be convenient to consider the rate of mortality, the circumstances which influence the mortality, and the mode of fatal termination in Typhus.

Of 18,268 cases of Typhus admitted into the London Fever Hospital during the twenty-three years ending with 1870, there died 3,457 giving a mortality of 18.92 per cent. or 1 in 5.28. But 10 of the patients were dead on reaching the hospital and a large number more died on admission. Deducting 686 cases fatal within forty-eight hours the mortality is equal to 15.76 per cent., or 1 in 6.34. At Cork Street Fever Hospital, Dublin, in the years 1880-82 the death rate was 10.5 per cent. During the twenty years ending 31 March 1891 there were admitted to the same Hospital 2,895 cases, of which 363 proved fatal, the death-rate being 12.6 per

cent. or nearly 1 in 8. In fifteen hospitals in Great Britain and Ireland tabulated by Marchion, the death-rate from typhus varied considerably, but out of a total of 41,403 cases admitted, 6,246 died, equivalent to a mortality of 15.26 per cent.

The death-rate of typhus in the community at large, however, is much less than might be gathered from hospital statistics. Many slight cases and many children attacked are never taken to hospital; and among the patients in hospital are a large proportion of aged and infirm persons and those reduced by poor circumstances and want of food to the verge of starvation. Making allowance for these, the death-rate from typhus is probably not more than 10 per cent. of those attacked.

Of the circumstances influencing the rate of mortality age is one of the most important. Typhus is not very fatal in the
young, but as age advances the mortality increases. In the London Fever Hospital the mortality during the first five years of life was 6.69 per cent, in the second it fell to 3.59; between ten and fifteen it was only 2.28 per cent, and between fifteen and twenty 4.46 per cent. After twenty, it went on progressively increasing, until of those above 30 years of age 35.39 per cent died:

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>43.48</td>
</tr>
<tr>
<td>50</td>
<td>53.87</td>
</tr>
<tr>
<td>60</td>
<td>67.04</td>
</tr>
</tbody>
</table>

When Typhus was fatal it was almost always due to some severe complication (Infection). This increasing mortality of Typhus with advancing age has been universally observed.

Dep. twice as many males as females die from Typhus in proportion to the pusmo attached. This is true of every period of life above fifteen in spite of the supposed prejudicial effect of pregnancy and suckling.
But in this respect, patients between five and fifteen years of age presented a marked exception. At this period of life the mortality was twice as great among females as among males. The explanation seems to be that men have not only a larger amount of muscle for disintegration by the fecal process, but from intemperate habits and other causes are more likely to have morbid states of the liver and kidneys which impede elimination. Indeed, like these differences between the sexes do not exist, and then the mortality is less in males than in females. The smaller fatality of typhus in young males is not peculiar to the London Fever Hospital but is found to be the rule in Glasgow, Dundee and Ireland.

MONTHLY SEASONS AFFECT THE DEATH-RATE OF TYPHUS, which falls as summer advances, and rises in late winter and spring; the mortality is considerably less in the last five
then in the first seven months of the year. The nicene is probably due to the concentration of the fever in closer rooms. The rule does not hold good for every year and sometimes the rate of mortality has varied greatly without reference to months or seasons. It has often been found that the mortality has been greatest at the commencement and height of great epidemics, and has declined as the number of cases has diminished.

The station in life appears to affect the mortality of Typhus to this extent, that persons who think and intemperate have lived too well usually have the disease in a severe form.

Recent residence in an infected locality does not seem to affect the mortality of Typhus, nor does place of birth and race.

The intemperate, the sickly, the obese, or the very muscular, the over-worked, whether bodily or mentally, especially the latter,
and the under-fed, run the worst chance of attacked by Typhus. Pregnancy adds little to the danger of Typhus, but sucking increases anemia, and increases the risk of death by asthenia. Neglect of treatment increases the rate of mortality. Early removal from crowded homes to the cool, well-ventilated and of a hospital produces a marked effect in many cases in a few times. The longer the delay before the patient is taken to hospital the worse his chance of recovery, and this is not wholly due to the bad effect of removal at an advanced stage.

The mode of fatal termination in Typhus is important as regards prognosis and treatment. Death from the primary fever may take place by Asthenia or Coma. In the former, the heart's action becomes enfeebled from paralysis or disintegration of its muscular tissue; in the
latter the blood becomes formed by insufficient aeration consequent on pulmonary infection, or by the admixture of air and other products of the decomposition of albumen. Most commonly it is due to a combination of atonia and coma. The patient is almost always unconscious for a considerable time before death. In many cases the fatal termination is the result of some intercurrent complication or sequela.

The Signs and Symptoms affecting the Prognosis in Typhus are as follows. A presensiment of death, often entertained by medical men, is a very unfavourable indication, but not necessarily fatal. If the pulse exceed 120 in the adult, especially if it be very soft and compressible, or small, weak, irregular, intermittent or imperceptible the prognosis is unfavourable. A fall in the pulse is always favourable. But Typhus may be fatal in cases
in which the pulse has been slow all the time, not exceeding 100, as this points to serious involvement of the action of the heart.

Absence of cardiac impulse and weakening or disappearance of the "first" sound indicate poor danger. Accelerated respirations are unfavourable whether cerebral or pneumo-pulmonary origin.

Sleeplessness with delirium if continuing in spite of treatment is a very bad sign. Indeed the danger is greater the more severe the nervous symptoms and the sooner they appear, whether it be the headache that is more severe, the loss of consciousness, more complete, delirium more severe and constant, or the stupor more profound.

The state of Complete Coma is of Dr. Bum Jenner is invariably fatal.

A bad sign if the pupils are much contracted; Dr. Graves regarded the "pin hole pupils" as an almost fatal sign.

Extreme and early prostration is a very bad sign. It is a favourable
Signs when a patient turns on his side after lying, for some time, helpless and motionless, on his back.

Muscular tremors, subtilus, prickling at or fumbling with, the bed-clothes, and spasmodic twitchings of the muscles of the face are very bad signs.

General Convulsions are usually fatal.

Severe and persistent hic-cough is generally followed by death.

Rigidity of the muscles of the limbs and Strabismus are very bad signs.

Relaxation of the sphincters before the tenth day is of evil omen; after this it is not uncommon in severe cases which recover. Retention of urine is worse than incontinence.

Extreme tympanities with protrusion is unfavorable.

When the tongue is very, brown, hard, retracted and themselves, the case is severe; but if hopeless.

If the rent is very abundant and dark in colour, the case is severe.

If there are numerous purpur-
spills or ulcers the prognosis is unfavorable. Cases without rash are usually fatal.

Levity of the face and extremities and a dry or dry-gumminess condition of the skin on the dependent parts are unfavorable.

It is a bad sign when the temperature continues high (105°F) during the second week, and still worse if it rises during that period.

Great diminution in the quantity of urine, and the presence in it of collicumen, blood, or renal casts, are unfavorable signs.

Deafness is not an unfavorable sign, but it is not specially favorable as some have supposed.

Perspiration is not a favorable sign unless accompanied by other marks of improvement. Profuse and continued sweating, with chilling of the surface and rapid, hot pulse is most unfavorable.

Free excretion of urine and uric acid warrants a favorable prognosis; a diminution whilst the temperature remains high is unfavorable.
Favourable signs indicating the approach of convalescence at the end of the second week are a diminution in the rapidity, acute increase in the strength of the pulse; a slight return of appetite; the tongue becoming clear at the edges; the patient turning on his side when he has previously been lying on his back with his mouth open; the cherry colour of the face clearing up; the oppression becoming less stupid, and the conjunctivae less injected; while the patient begins to take more notice.

Complications always render the prognosis less favorable. Among the most dangerous complications are pulmonary hypo-stasis and bronchitis, pneumonia, gangrene of the lung, laryngitis, jaundice, pyaemia, cellulitis, parotid and other inflammatory swellings, bed-sore, gangrene of the extremities and the mouth, renal disease, and scurvy.
But whatever unfavourable symptoms or complications may occur, and however apparently hopeless the condition of the Typhus patient may be, the physician must not despair. The late Sir T. Graniger Stewart used to tell us “never give up a Typhus patient until he is dead and in my own limited experience I have seen several cases that I have from day to day looked at for the last time as I verily believed, but still they went on from day to day and finally recovered, as Typhus patients do, with wonderful rapidity once the crisis was passed.

The most important examination of Typhus cases reveals no specific appearance. Munchin says, “there is no lesion constant, or peculiar to Typhus.” The cadaverous rigidity is of short duration. There is not usually an extreme degree of encephalitis, as death occurs in a short time.
Putrefaction takes place more rapidly than after death from other causes.

There is livid discoloration of the veins, either general or in patches. The darker spots of the congestion, and petechiae, permit after-death. The muscles are darker in color and softer and more friable than usual. The voluntary muscles and heart are the seat of granular or muddy degeneration. The esophagus and Pharynx may be inflamed but not ulcerated. The Stomach is usually healthy; it may be somewhat reddened, mammillated, and softened. The Duodenum also is usually healthy, and the same is true of the Jejunum and ileum, in which there may sometimes be found small ecchymoses but no characteristic lesion. The Solitary glands and Peyer's Patches never exhibit the specific lesion found in Enteric Fever.

The large intestine and perineal glands are almost always healthy.
The Spleen is in some cases healthy, in others it is enlarged and softened. The softening is more common in persons over fifty years of age, and in cases that have proved fatal before the fourteenth day of the disease. The Liver is occasionally healthy. More commonly it is hyperemic or its consistence is reduced. The Pancreas is sometimes found hyperemic and softened. The Peritoneum is usually healthy. The Pericardium often contains an increased amount of serous fluid, which is occasionally of a deep red tint. Pericarditis is rare. The Heart is in a large number of cases flabby, soft and easily torn. The softening is independent of the age of the patient, the duration of the disease, external temperature or the interval that has elapsed between death and the examination, and is due to granular or fatty or occasionally hyaline degeneration of the muscular tissue. The Endocardium is often stained...
red owing to disintegration of the blood. Endocarditis is extremely rare.

The blood undergoes remarkable changes in typhus. It is darker and more fluid than natural, and is more apt to become putrid than healthy blood. The blood in the heart and great vessels is sometimes found perfectly fluid, with no trace of clot; sometimes there are a few soft, black clots mixed with dark fluid blood. Blood taken from a typhus patient during life after coagulates imperfectly. There are fewer red corpuscles than natural, they are often crescent and misshapen, and being aggregated in amorphous heaps, instead of forming rosettes. The white corpuscles are often increased in number and size, and have an unusually granular appearance.

In the Larynx & Trachea. The mucous membrane is sometimes of a bright or dusky red colour, swollen & coated with fibrillated mucus.
Edema plethoric is found in some cases.

In the Bronchi catarrhal inflammation is one of the most common of the post-mortem appearances. One with in Typhus. The mucous membrane is of a bright, ghostly red colour, and there is a large quantity of tenacious, frothy secretion.

The Lungs are rarely healthy. Hypostatic congestion is the most common post-mortem appearance met with, being seldom entirely absent, and in some cases the congestion amounts to complete consolidation, so that the lung tissue sinks in water and does not coagulate on pressure. This condition differs from pneumonia, for which it is sometimes mistaken, both in its localization and its appearance when carefully examined. It is limited to, or is greatest at, the most dependent part of the lungs, that is, not at the base of the lung, but in the hollows of the fourth, fifth and sixth ribs.
From the posterior surface of the lung the consolidation extends from one to three inches into its substance, and has no definite margin, but passes imperceptibly into the surrounding echinatant tissue. The cut surface of the consolidated lung is sub-granular but smooth, and of a dark purple or chocolate colour, and exudes a quantity of non-acrated chocolate-coloured serum. Both lungs are usually affected in about an equal degree, but sometimes one lung is more implicated than the other, and occasionally one lung only is found to be involved. It is sometimes associated with Edema of the Lungs, which however may exist alone.

True Pneumonia is not common in Typhus. It may be lobar or lobular. Lobular pneumonia is the more frequent, and may lead to abscess or gangrene. Signs of recent Pleurisy are rare after death from Typhus.
The Cerebral Membranes are often more vascular than natural, but rarely is there any pus or lymph indicative of inflammation. The vascularity is not a sign of inflammation but is mechanical and passive, and is not greater, or more common, in Typhus cases than when death results from diseases of the lungs. There appears to be no relationship between the amount of vascularity and the violence of the cerebral symptoms. Dr. Maclean says "I have repeatedly known the most severe cerebral symptoms during life, without abnormal vascularity of the Cerebral Membranes after death." He also states that he had only once, with two cases of inflammation of the Cerebral Membranes, and the experience of many others forever is to the same effect. So that in spite of the frequency and severity of cerebral symptoms it is clear that Meningitis is not among the ordinary serious causes of Typhus.
Haemorrhage into the cavity of the brachial sac, producing a conglomeration, in the form of a delicate film, usually on the convex surface of the brain, has been observed in some cases. The source of the haemorrhage was not discovered. Its occurrence does not appear to have been associated with any remarkable severity of the cerebral symptoms. Increased effusion of serum in the cranium is one of the most frequent morbid appearances in typhus. Most commonly it occurs beneath the brachial sac, or in the lateral ventricles, sometimes in the cavity of the brachial sac. It is not a sign of inflammatory action, and does not accounts for pressure or otherwise for the cerebral symptoms during life. There is no relation between the severity of the symptoms and the amount of fluid. The quantity of the fluid is not greater in typhus than in common fevers or in persons of an
Advanced age, or who have died from chronic emaciating disease. In these cases as well as in Typhus, the brain shrinks from want of proper nutrition, and the fluid is presser to fill the space. The Cerebrum and Cerebellum are often healthy. There may be increased vascularity and diminished consistence. This increased vascularity, like that of the Membranes is a sign of inflammation, and bears no relation to the cerebral symptoms. In some cases in which cerebral symptoms have been severe, no increase of vascularity, but even decided anaemia of the brain substance has been found. The activity of the Cerebellum has been observed in some cases. The remarkably indistinct, or almost completely effaced.

Increased vascularity of the Membranes of the Spinal Cord is less common than of the Cerebral Membranes. The Spinal fluid is in most cases somewhat increased. In the Cervical Sympathetic Complex, meningeal degeneration has been observed.
The kidneys frequently exhibit signs of recent disease. If death occur before the fourteenth day, the organs are usually hypertensive and hypertrophied; the tubes are gorged with granular epithelium, and sometimes contain blood.

Sometimes they present the appearance of acute nephritis. If death occur at a later stage, the kidneys are usually large and pale; the outer surface smooth; the cortical substance hypertrophied and soft; and the tubes full of epithelial cells.

The mucous membrane of the bladder is sometimes injected or marked by haemorrhagic spots. The genital organs do not present any appearance peculiar to Typhus.
The treatment of Typhus is divisible into Prophylactic, directed to the prevention of the disease by the removal of the conditions favourable to its occurrence and extension; and Curative, consisting in the application of individual cases of means favouring recovery. A consideration of the etiology of Typhus leads us inevitably to the conclusion that it is only under circumstances of overcrowding and bad ventilation, usually associated with defective nutrition, that the disease makes any considerable progress. These circumstances vastly increase the predisposition of the clinacore, and point to the removal of these as the most essential and effective of prophylactic measures.

It is not possible to state precisely what degree of curtailing of air space would in all cases constitute overcrowding, so much depends on the efficiency of the
ventilation possible in each case. Five hundred cubic feet per
space with two cubic feet of
ventilation per minute is little
enough for each individual
if we consider the matter from
the physiological standpoint.
It is usual however to permit
a minimum of 300 cubic feet
of air space per person in the
common lodging houses; and
in the dwellings of the poorer
classes in many of our towns
it is certain that even this
space, small as it is, is not
available in all cases. What
makes matters worse is that
such dwellings are often situated
in narrow courts surrounded
by high buildings, and are so
frail in construction that
adequate ventilation is impos-
able. It was in such circum-
stances that the local epidemics
were experienced in Whitehaven
occurred. The houses were small
and overcrowded, situated in a
court only three feet wide, and
the inmates were in a state of destitution.
The dwellings of the poor ought to be so constructed as to ensure thorough ventilation; all windows should be made to open, and in addition every room should be provided with means of constant ventilation not under the control of the occupants, for people of this class will close every opening they can, in spite of all advice to the contrary.

The prevention of scarcity of food through destitution is not always possible, but much might be done in mitigating it if it were done with circumspection. I have already referred to the admirable description given by Baines of the manner in which the ill-advised attempts to give relief to the destitute in Ireland during the epidemic of 1847 did more harm than good. The evidence he says, "had its origin in the congregating together large masses of people at public works and at destitute..."
for the distribution of food, and in the overcrowding the workhouses."
To be of real service relief of general destitution should be undertaken as soon as possible, before the disease has established itself; and care should be taken that the method of giving relief is not such as to lead to overcrowding of the recipients.

An adequate supply of fresh air is not only of the greatest importance in preventing the spread of the disease, but is highly essential in the treatment of the individual attacked. As it is impossible to obtain this in the houses of the poor, among whom the disease first occurs, early removal to hospitals is necessary in most cases. The house from which a case is removed should be thoroughly cleaned and ventilated. It is a good plan to first fumigate it thoroughly with burning sulphur or the bichromate of sulphur, acid or perhaps better formalin vapour.
and then to thoroughly ventilate it, for even if it be true that
tfree ventilation alone will destroy the Typhus poison, this is more
certain to be secured after the
fumigation.

When Typhus is prevalent all
persons admitted to buildings
should be submitted to a warm
bath and have their clothes dis-
infectant, whether they themselves
are ill or not.

When a patient suffering from
Typhus, or any other infectious
disease, is admitted to hospital
his clothes should be disinfected
before they are put away for his
future use. I have found
Reck's disinfectant very convenient
for this purpose. It is easily
managed, does not require a skilled
engineer to work it,
and is available for wearing
apparel, bedding, beds, mattresses,
and the like, excepting only boots
and other leather articles which
are rendered useless. The goods
are afterward freely exposed to the air.
In hospital Typhus patients should have at least 2,000 cubic feet of air-space each, and the ventilation should be perfect. A strong current of fresh air can usually be allowed to blow over and around a Typhus patient. Even in cold weather there is little risk of catching cold, and abundant access of fresh air seems rather to control the bronchial catarrh and pulmonary affections of Typhus, which renders out-flush cold but flush passive hyperaemia.

All nurses should be well fed and not over-worked, and ought not to commence their turn of duty on an empty stomach. Free indulgence in alcohol however, in the intervals within of breaking off the fever, is to be condemned. They should have ample time for sleep, and should never sleep in the same room as their patient under any circumstances.
All unnecessary visits of friends should be forbidden, whether to patients in hospital or in private houses. Such visitors as are admitted should be warned of the danger of coming too close to the patient or to inhale his breath or the emanations from beneath the bedclothes. After the recovery of a patient in a private house, his room should be disinfected and ventilated even more thoroughly than after removal of a case to hospital. The bed and bedding should be thoroughly cleaned and disinfected, and if this can not be done, it should be destroyed.

Curative Treatment of Typhus must be directed to the relief of symptoms and the removal of all circumstances that may interfere with the natural recovery of the patient. In this way much can be done to promote the chance of a favourable termination.
Medicines, so far as we yet know, are powerless to arrest the progress or shorten the duration of an attack, the main endeavour to sustain the vital powers of the patient by appropriate food and stimulants, and to bridge anything which would cause excessive or put an additional strain on organs already overtaxed and with impaired functions. Dr. Stokes says "we cannot cure fever, but will cure itself. If you keep the patient till the fourteenth, the eighteenth, or the twenty-first day he will recover." Churchman endorses this opinion, and says "a patient with typhus is like a ship in a storm; either the physician is the pilot or quell the storm; but by tact, knowledge, and able assistance, they may save the ship."

Good nursing is of the very first importance, and the friends or relatives should not be allowed to take the place of a practiced nurse, or rather
Nurses, for these should be one for the day and another for the night. All nurses should be if possible protected by a previous attack. They should keep a written record of temperature, frequency of pulse, respiration, times of taking food or medicine, and other matters as directed by the physician.

The room should be cheerful and airy, and it is well to have two beds, one for the day and the other for the night.

The skin should be damped frequently with tepid water. Considering the early and severe prostration of Typhus it is desirable that the patient should take a bed early in the attack and in bad cases should not be allowed to get up for any purpose. The nurses should therefore be strong enough to lift the patient.

The food should be nutritious and digestible, consisting of milk, eggs, arrow-root, sago, curd, beef tea, chicken-broth, meat extract,
Meat-jellies, and bread and milk. Milk is the most important and
suitable of all foods. I have recently used Helleiets Malted
Milk, considerably in enteric fever,
cases, as well as in other diseases,
and would be inclined to try it
in Typhus. I have found that
some few patients with whom
milk is apt to disagree can take
it without any inconvenience
and it seems to answer quite
as well as cow-milk. When
the digestive organs are very
weak, the food may be sterilized.
In some cases the milk agrees
better if boiled, or sterilized in
Agincourt's apparatus, or with
the addition of a little lime-water.
Ford should be given at regular
intervals, every three hours, then
two hours, and every hour. The
stomach should not be overloaded.
When in a state of stupor, the
patient should be rolled to take
Ford from time to time. He should
not be aroused if he has fallen
into a tranquil sleep after a
Period of wakefulness, nervous excitement or delirium. When he is unconscious or unable to swallow it may be necessary to pour food into the stomach by a long tube passed through the nose, or by the intestine enema.

The thirst may be assuaged by soda water, or by giving biscuit to suck, or he may drink cold water freely. It assists the kidneys, acts as a diuretic, promotes and eliminates, and given in moderate quantities at frequent intervals often allays delirium and induces sleep. The patient should be encouraged to drink water freely; he should not be allowed to drink his stomach by drinking large quantities at a time. Brandy, tea, toast, water, orangeade or lemonade or cold tea without sugar or milk may be given if the patient prefers these but he usually prefers cold water or plain unsweetened water in the long run. The drink called
"Imperial," consisting of one or two drachms of Bitartrate of Potash dissolved in a pint of boiling water, sweetened with sugar and flavoured with lemon; or "titter," prepared by boiling two drachms of titter in a pint of milk and straining, may be given to quench thirst and act as diuretics.

Whether and to what extent alcohol is useful in typhus is a question that has been argued and answered in various ways. Some have contended that it is an article of food and as such maintains strength and prevents emaciation; others that it is eliminated unchanged with the various excretions, and consequently acts not as a food but as a medicine. There can be little doubt, however, that it can increase the force of the heart, promote capillary circulation, and in many cases help to remove delirium depending upon impaired cerebral nutrition.
The condition of the heart and the radial pulse are the best guides in the administration of alcohol. When the flag alcohol is our first and surest remedy, but when they show no tendency to fail or strengthen, alcohol is unnecessary and may be injurious. A soft, compressible pulse, especially if it be undulating, irregular or intermittent, is a stronger indication for stimulants than mere rapidity. So also is a weakened circumference of the heart or an impaired aortic first sound. If under the influence of alcohol the pulse becomes stronger and less rapid, and the first sound more distinct, the alcohol is doing good. The cheeks and mouth crimson the rush the more is alcohol administered.

A dry, brown tongue is an indication for alcohol. If under its influence the tongue becomes clean and moist at the edges, it is dry wind. The more the typhoid state is
Developed, as seen by ulcers, low delirium, somnolence, tremor, involuntary evacuation. The mere need is there for alcohol.

The presence of complications usually increases the necessity for alcohol.

Persons who have previously been accustomed to take it freely require alcohol sooner in the disease than other people and in larger quantities.

Most patients over the age of forty are benefitted by alcohol after the first week of the disease.

Patients under the age of twenty as a rule do not require alcohol and are better without it.

A burning dry skin is an indication against alcohol; a profuse perspiration unaccompanied by any improvement in the general symptoms calls for alcohol. If the lethargies are cold, especially if the temperature of the trunk is much elevated, alcohol is indicated.
The propriety of giving alcohol in delirium depends on the state of the pulse. Delirium in itself is not a reason for giving alcohol. If the patient becomes more restless and delirious under its use it is probably doing harm; if more tranquil, it is doing good.

Alcohol should not be given if there is severe delirium or an throbbing headache with flushed face and凹凸不平的 eyes and no impairment of the pulse. It is also contra-indicated if the urine be scanty and of low specific gravity and if it contain much albumen, or if there be suppression of urine.

The amount of alcohol to be given in any case will depend on the nature and severity of the symptoms requiring its use, and the effect it may produce. When the condition for which alcohol was given begins to improve the quantity must be reduced.
Medicinal stimulants may be combined with the alcohols in cases of great prostration. The most commonly employed of these is Carbonate of ammonia, but the ethers,精神 and Camphor are also recommended. In cases of extreme prostration Sulphuric ether in doses of 30 to 50 minims has been injected subcutaneously with good results. Camphor may also be used hypodermically, a ten per cent solution in saline or oil being employed. It is said to give good results, and not to be followed by formation of ulcers.

In addition to maintaining the vital powers by suitable food and stimulants, different remedies have been recommended with the object of neutralizing the typhus poison, and improving the condition of the blood. Of these the mineral baths are largely used and are believed to have a beneficial effect, partly perhaps due to the ammoniacal
on an alkaline state of the blood. Acids have been recommended for syphilis in all countries for since the disease was first described. The acid may in some cases be advantageously combined with ether and guaifenesin. Antiseptics, such as Creosote, Carbolic acid, Chlorate and Permanganate of Potash, and Sulphur acids and salts have been recommended but apparently have not been productive of much good. Dr. A. P. Stewart used the Tincture of Ferric chloride of iron with apparently good results.

To promote elimination not merely of the fever poison but the products of metamorphosis fresh air is most important. In addition diuretics and diaphoretics, Saline diuretics, purgatives, emetics and purgeatives have been employed. Doubtless it is well to promote, as far as possible, healthy action of the skin and kidneys and
This can best be done by the free use of cold water and other drinks taken frequently and in small quantities as mentioned when speaking of the relief of thirst. The bowels too are usually constipated and should then be relieved by a purgative, such as rhubarb and Calomel, or castor oil, or by a simple enema, but systematic purgation as a treatment of typhus is now obsolete; and emetics are just as little likely to be useful; whilst copious diaphoresis is a symptom to be dreaded, and the action of the skin is, as a rule, sufficiently promoted by diuretic drinks and frequent damping of the skin.

The remedies that have been employed to reduce the temperature and the rapidity of the heart's action include Bleeding, the Cold water treatment, large doses of Digitalis, Cardiac Sedatives such as Digitalis andaconite, and certain hygienic measures.
How blood letting came to be considered the proper treatment for a disease like typhus which is essentially a disease of weakness, we have already seen in considering the history of typhus epidemics. The erroneous theory that typhus was a pyrexia symptomatic of inflammation of the brain, advanced by Blasgoner and Clutterbuck, and supported by Armitage, was followed by an epidemic in 1817–19 in which cases of relapsing fever largely predominated. At this blood letting was practiced and the low mortality of the epidemic was attributed to this treatment, whereas it was really due to the fact that the fever was relapsing and not typhus. In the epidemic of 1826–28 in which there were more cases of typhus it was found by many physicians that the patients needed stimulants and could not stand bleeding. Thus continued to bleed.
The epidemic of 1836-38 consisted entirely of typhus, without any relapsing fever, and bleeding was generally condemned.

The cold water treatment for continued fever was performed by Dr. Currie of Liverpool in 1887. The patient was seated in an empty tub or bath, and water at a temperature of 40° or 50° F. was poured over his head and chest. This treatment was said to cut short the attack in many cases if resorted to early, whilst in others it reduced the pulse and temperature and relieved many disturbing symptoms, especially headache, restlessness and delirium, and favoured a speedy recovery.

The practice was perseveringly followed by many in the epidemics of 1817-19, and the general result, according to Dr. Christie, was that few, if any, cases were arrested by it, that its advantages were transient and could be attained by frequent colds or
tepid sponging together with cold applied to the head, and that
cold affusion often produced an intense feeling of pressure
and pain in the head. Subse-
guent observations seem to show
that though cold affusion may
not shorten the disease, and
is often inapplicable, yet it is
sometimes useful for reducing
the temperature, and relieving
headache and other distressing
symptoms, and that the practice
is not here with the clampsers
commonly imagined. The
cold water treatment is chiefly
adapted to cases in which the
temperature rises to 104° F.
or upwards, and is contra-
indicated when the symptoms are
cold, and in aged persons;
and it must be employed with
cautious when there are signs of
Cardiac weakness, or stagnation
of blood in the Capillaries.
The application of cold in the
treatment of pyrænia may be
effected in other ways than by
Cold abrasion as practised by Carrie. Drenching in a cold wet sheet or immersion in a cold bath may be employed. The patient as soon as his temperature reaches 104° is placed in a bath having a temperature of from 50° to 70° F. or as Ziemssen recommends in one with a temperature of about 10° below that of the body. The temperature after the patient's immersion being gradually cooled down to 68° by adding cold water. He should remain in the bath half an hour or until shivering commences. This is repeated as many as eleven or eight times in the day if the temperature again rises to 106°. And this method, employed by Dr. Stokes, at the Meath Hospital, Dublin, is to pour cold water from a large jug over the patient's head and face while lying crossways in bed, his head and shoulders being supported over a bath placed alongside the bed. Ice may also be applied to the
head in a cup-shaped sponge. When these methods can not be carried out, frequent sponging of the surface with cold or tepid water will help cool the body and is often a source of much comfort to the patient. Special care should be taken that the genitals are frequently sponged and kept clean.

Quinine in large doses — 10 to 20 grs. — causes, within an hour or two, a fall of temperature, sometimes to the extent of three or four degrees, and to a lesser extent of the pulse. But the effect is transient. In twelve or eighteen hours the pulse and temperature are as high as ever. It does not appear to cut short the crisis. If these large doses are repeated delirium and collapse may ensue. It is especially when the crisis is at its crisis, and when the temperature is rising instead of falling, that this power of quinine to reduce the temperature is useful.
Of Cardiac Eclatines the most reliable perhaps is Digiditi. It increases the force of the heart's contractions, diminishes their frequency, reduces the temperature, and increases the flow of urine. It often appears to have a beneficial effect on the general symptoms. From 15 to 20 minutes after the mixture may be given in the twenty-four hours. Aconite and Bertram's vehicle are also given for the same purpose. Belladonna is said to have the power of reducing the pulse, moistening the tongue, and ameliorating the general symptoms in pyrexia.

Certain hygienic measures may assist in keeping the patient cool. He is best on a hair-mattress laid upon a woven wool or cotton mattress. At one local hospital I have found the best fibre mattress cool, comfortable, and cleanly. The temperature of the room should not exceed 60° F.
In many cases of Typhus Fever, if the symptoms which are always more or less present become so distressing as to call for special treatment, headache often becomes extreme. It may sometimes be relieved by an emetic or purgative, or by evaporating lotions applied to the forehead. In severe cases when the face is flushed and the conjunctivæ red, the hair ought to be cut or the head shaved and an ice cap applied, or the cold affusion already described may be employed. Cold water (50° or 60° F.) being poured from a height of two or three feet over the patient’s head which is supported over a bath placed alongside the bed. When there is no bath a blanket or sheet cloth or the forehead on back of the neck may give relief. In aged patients to whom cold affusion might be too depressing, a pad of lint dipped in warm water and vinegar, or vinegar, or balm of gomortation, as recommended by Graves, may be tried.
Sleeplessness, nervous excitement and delirium frequently require special treatment. Sleeplessness often occurs very early in the disease and may exhaust the patient very much. If it continues it is followed usually by acute delirium and is in itself a danger to life. These cerebral symptoms in Typhus are not due to inflammation of the brain or its membranes and are not due only by antiphlogistic treatment. It is important to make sure that the sleeplessness really exists; as before mentioned, it is not uncommon for a patient to awake out of a sleep. It may be of some help to relax; I insist that he has never been asleep at all.—Dr. W. J. Chmel. During the first week sleeplessness is usually associated with headache and may be relieved by the same measures. If not opiates should be given, combined if there be headache, hot sponging, and a pulse of good strength with digitalis or belladonna. Sometimes digitalis hydrate is useful.
When sleeplessness is associated
with delirium and other cerebral
symptoms, bright lights should
be excluded from the patient's eyes;
though the room should not be too
much darkened as the alternation
of day and night induces to sleep;
the room should be kept well ventilated
and perfectly quiet, and the patient
should not be too often disturbed
for taking food. If his hearing be
too sensitive, which however is rare,
the ears may be stuffed with cotton
wool; but there should be no
whispering, or creeping about in
the room, which nothing is
more irritating to a sensitive
patient. All necessary communi-
cations should be made in a clear
and distinct voice. The patient
should not be contradicted or argued with;
in his delirium, but cheered up and
prevented from despairing. If the
delirium be slight, attention to such
details may be all that is necessary.
If the condition approach one of
delirium fever, and the patient be
young and robust, with a good pulse,
Cold application, or the ice-caps to the shaven scalp, or the ether-spray, or Benzy's Ethyl Chloride frequently applied all over the head for a few minutes at a time, and clearing out the bowels may be of service. But in most cases some drug will be necessary and the best of all is

This condition is Chloral Hydrate, twenty grains of which should be given. This generally acts admirably, the patient falling into a quiet natural sleep. Sometimes it is necessary to repeat the dose in a couple of hours if the first has not had the desired effect. In some cases the Chloral even when repeated fails, and then Opium or Morphine should be given in combination with Digitalis or Antimony, which assists the Opium by their sedative action on the circulation whilst at the same time overcoming the objection to Opium that it tends to check up the secretions. Digitalis owing to its action on the kidneys is the preferred to Antimony.
When the delirium which accompanies the sleeplemen approaches to typhomania or delirium tremens, chloral hydrate is frequently useful. It may however produce alarming depression and irregularity of the heart's action, and must be given with great caution, if at all, when there are any signs of softening of the heart. Opium combined with stimulants and diuretics are suitable in some cases. Sublimate ether may be given with the opium and digitalis. A pill of opium (3 gr.) and camphor (3 gr.) every two or three hours until sleep is induced, is also recommended. Tinct. who commerce has been found useful, and mustard emulsion has the abolition of Baron Dupuytren and Graves that ointment emollients will in some cases produce sleep after ointments have been given in vain in large and repeated doses by the mouth. Opium in any form is contra-indicated when there...
is evidence of extensive engorge-
ment of the lungs; when the pulse
is persistently contracted; when
the urine is scant, as contains
blood, as much albumen; and
when the patient although
sleepless is in a profound
Typhoid condition, and quite
unconscious.

Other sedatives that may be
useful for the delirium and
deliriousness of Typhus, when
Opium and Chloral are contra-
indicated, are Belladonna,
Hemlock, Indian Hemp, Indian
Hemp, and Bismuth of Potassium.

The last mentioned is claimed
considered useful in delirium
per se, but of no use when there
is low-malarial delirium.

Stupor may supervene
upon the delirium which is
commonly observed in Typhus
and may threaten to pass into
profound and fatal coma.
As this is not due to any anatomical
lesion of the brain or its membranes
but dependent probably upon the
Weakened circulation and the "incrustation state of the blood," the treatment indicated is to promote elimination, to cause the patient by external stimulation, and to improve the action of the heart. Strong coffee is said to be useful in preventing, and perhaps in relieving, the condition. Dry cupping and mustard patches in the comae, followed by a wet compress, may also do good, especially if the urine be readily or suppressed, or if there be albumen in the urine. A purgative or a cathartic enema may be given, and the skin should be plunged frequently with tepid water. To warm the patient, lignum ammoniacum fungus may be applied to the scalp or a piece of lint covered with oiled silk for five or six minutes and followed by a bread poultice. Emphorium may also be applied to the inside of the thighs, the soles of the feet, or the epifascial. Cold affusion has been recommended provided there be considerable elevation of temperature and before
there is great exhaustion. The action of the heart must be supported by alcoholic or other stimulants. In all cases of cerebral oppression it is most important to ascertain that the bladder is regularly emptied. When the patient passes water in bed it may be that this is merely the overflow from an over-distended bladder. The abdomen should be examined by manipulation and percussion, and if there is the least doubt the catheter should be passed. Neglect of this precaution may lead to severe cystitis or even fatal convulsions.

Valerian and Phosphorus are said to have given good results in the treatment of the coma of Typhus. One minim of essential oil of Valerian was given in a little syrup, and this every half hour until five or eight minimos had been taken. The phosphorus was given in doses of 1/2 a grain dissolved in water every two or three hours.
For convulsions in typhus
we may have recourse to Cupping or digitalis
or the hot pack, digitalis and
other diuretics, a large dose of
opium or a drop of castor oil,
cathartic enemata, and external
stimulation, but treatment is
seldom of any avail. The state
of the bladder must of course be
seen to in all cases.

Muscular and neuralgic
pains and hyperaesthesia may
be soothed by warm fomentations
or amydyne liniments; quinine
and quinares or their amydyes
internally.

Thirst is best treated by cold
drinks. A weak bitter infusion is
sometimes useful, and camphor
water is praised by some.

Vomiting is usually checked
by an emetic or aperient. Some-
times it is necessary to give bicarb,
magnesia, lime-water or an efferv-
escing mixture instead of the
usual acid mixture. A sugar
syrup may be applied to the epigastrium.
Symptoms of abdominal origin, will usually be relieved by turpentine 
strips to the abdomen, or an enema containing turpentine; 
a turpentine may be given internally. Such small 
pieces of ice will sometimes 
relieve the hiccup. When these 
symptoms have a cerebral 
origin, they must be treated in 
the same way as the other 
cerebral symptoms which they 
accompany.

Pulmonary congestion is 
so frequent in Typhus as to be 
considered rather as a symptom 
than a complication. It is usually 
associated with more or less 
bronchitis. As soon as any 
signs of congestion are discovered 
at the back part of the lungs, 
and they should always be carefully 
looked for, mustard poultice 
or turpentine-striper should be 
applied to the chest once or twice 
a day, and during the intervals 
the chest ought to be enuffled.
in linseed poultices or in a wet compress. Stimulant expectorant medicines, such as Squills, Senna and Carbonate of ammonia should be given at the same time. Turpentine in doses of ten or fifteen ounces every three hours also gives good results. Creosote is said to act in a similar way. In extreme cases a mustard emetic may have a good effect by promoting free expectoration and permitting the air freely into the bronchial tubes. Dry coughing is said to do good when the congestion threatens to extend and in some cases where there appears the danger of asphyxia. The abstraction of a few ounces of blood by cupping is recommended, stimulants being given at the same time.

In the treatment of Complications of Typhus we must be guided by general principles and the symptoms present in the individual case, but must always bear in mind
that the great nervous prostration
and depression of the heart’s action
which are so characteristic of
Typhus forbid all depleting or lowering measures.

Bronchitis is especially
common. A certain amount of
bronchitis always accompanies
the hypostatic congestion which
is a constant symptom in
bad cases of Typhus. Slighter
forms occur in the early stage of
the disease or during convalescence
may be treated by bland and the
chest and the usual expectorants.

Pneumonia must be
treated in the same way as pulmonarv congestion. If it persist
during convalescence, blisters
and iodine to the chest, with
iodide of potassium and bell-,
or quinine and iron internally,
are the appropriate remedies.
When it leads to Gangrene large
areas of Chlorali of potash and
bath, antiseptic inhalation, and
free stimulation and food feeding
are indicated, but recovery is rare.
Pneumonia is best treated by digitalis and other cardiac stimulants, and symptomatic relief by blisters or iodine at the chest. If fluid accumulates under the treatment, paracentesis may be required.

Acute edema of the lungs may threaten asphyxia and require large doses of digitalis.

Paresis following the fever requires a firm bed, mineral acids, strychnine, and massage with iodoform or paraflin ointment, Sasser baths and sea-bathing. For incontinence of urine the best remedy is the injection of phenol chloride of iron. In the female the application of nitrate of silver to the orifice of the urethra is recommended.

Mental imbecility may permit some convalescence, but usually fails with good feeding, tonics and change of air. Sudden paroxysms of mania require stimulants and chloral and quina.

Diarrhea and dysentery are
to be treated in the usual way with astringents, salicylic acid, and oleum menthae.

Bed sores may usually be prevented when they occur. Charcoal poultices should be applied until the sloughs separate. The sores should then be dressed with an antiseptic.

Sponaneous gangrene is to be treated by enveloping the part in a warm and antiseptic dressing, such as boric acid, until a line of demarcation is formed. Then, as soon as the patient's strength permits, it will be necessary to perform amputation. In Cæcum Ulcer, nitric acid is to be freely applied to the ulcerated surface, boric acid, or tincture of iodine, over the cheeks, and the mouth washed out frequently with antiseptic lotion. Bleeding of the Colic may sometimes be avoided by placing wet-compresses over the closed eyes whenever the patient lies with his eyes constantly open. When ulcers have formed, warm fomentations of belladonna
or proper leads should be used. All forms of slaughtering call for a liberal use of stimulants and tonics. It is usually necessary to give opiates to relieve pain and procure sleep.

Erysipelas should be treated by stimulants and a mixture of perchloride of iron and covering the part affected with flour. When it attacks the face it is apt to spread to the pharynx and larynx. The throat should then be painted with tannin or glycerine, or a mixture of equal parts of the mixture of perchloride of iron and water.

For diffuse cellular inflammation, as well as for inflammatory swellings in the parotid and other regions, the same constitutional treatment is required as in Erysipelas. Opium is often required to relieve pain and procure sleep. As soon as pus has formed it should be freely evacuated.
Phlegmasia dolens and thrombosis of the veins of the lower extremity are best treated by applying a flannel-bandage from the toes to the hips and elevating the limbs above the level of the trunk. Strips of lint smeared with equal parts extract of belladonna and glycerin may be laid along the hard, painful, cord-like swelling which indicates the presence of thrombosis before applying the flannel-bandage.

Oedema of the lower limbs generally disappears under a course of tonics, such as eion, quinine, and strychnine, with a generous diet.

Convalescence is usually rapid, unless there be some complication. There is no acute chorea, probably, in which the appetite returns more quickly, or even so soon be gratified with impunity, as in Typhus. It is well however for the first two days
or three days of convalescence
to restrict the diet to animal
soups and farinaceous food,
with milk and eggs. After that,
if the tongue be clean and the
pulse quiet, boiled white fish
or chicken, or the central part
of a tender mutton chop, may
be allowed. If stimulants
have been very freely given
during the fever, they should
be gradually left off.
The bowels are usually entire
and may be kept open by mild
cathartics, or by sipping water
in mouthfuls frequently, or
by enemata of cold water. If
the pulse is abnormally slow
the patient should be warned
not to assume the erect posture
too soon, as sudden and fatal
syncope has sometimes resulted.
The mineral acids with quinine
and iron may be given as tonics,
but the best of tonics are exercise
in the open air, and change to the
country, the seaside, or the
mountains.

S. B. Frischer