

The Hist-Pathology of Scarlet Fever.

We regard Scarlet Fever as an epidemic and contagious disease.

Caused and propagated by a peculiar and specific poison, the effect of which, when taken into the system of one susceptible to it is to produce the peculiar type of phenomena known under that name.

Of the causation of the disease however we do not propose to speak further in this paper. For the present we shall

interest ourselves in, and call
especial attention to the histo-
pathological characteristics of the
affection.

In this view of the case
we would define the disorder
to be a contagious and epidemic
disease caused by a peculiar
and specific poison, the first
effects of which are seen upon
the constitution at large, acting
probably as a blood poison: the
final and essential feature of
which is an altogether peculiar
and characteristic effect upon
the Epithelial Structures

(We beg in the beginning, that if any of the views presented by us should prove well and out of the beaten track of writers, God will show us through various perceivable opinions for the time that we may reason together with unbiased minds: examine the facts carefully in all their bearings and leave God to show whether these things are true.)

We trust that we may the better understand each other, and the presentation of what we have to say it will be necessary that we consider at

briefly as possible, some points in
the development of the tissues.

It is necessary in considering
a subject like this that we keep
the peculiar characteristics of the
tissues, their origin and mode
of formation closely in view.

It is a well known fact
that tissues of like origin and
structure, are liable to be similarly
affected by like constitutional causes
although their position may
be widely separated.

The Ovary!

The first thing
noticed after the formation

of the Oviduct is what is called
its segmentation which continues
dividing the mass into smaller
and smaller particles until it
becomes a mass of globular cells.

With the growth of the egg
these globules recede from the
central part to the circumference,
leaving a fluid center, where
they form a membrane by the
conjunction of their margins,
then a peculiar thickening
occurs at one point called the
germinal spot.

Plastron | Now this membrane
membrane splits into two and

are then known as the ^{Ectoderm and endoderm} external
and internal blastodermic membranes,
and at this time constitute the
body of the animal. The outer
one, the external blastodermic mem-
brane, now grows more rapidly than
the internal, and a third or
mesial membrane is formed,
now from these all the tissues
of the body are formed except
the nervous structures. From
the outer and inner membranes
are formed the tissues of function
and from the mesial membrane
the tissues of support and motion
For the formation of the

nervous tissues but plates rise
simultaneously along the back
of the fetus and arching over,
come together forming a tube
which fills with a substance
from which the nervous tissues
are developed. with this we
have little business except
incidentally in this paper.

It is especially with the
internal and external membranes
that we have to deal, we must
therefore note the tissues ^{formed} from
each portion of them, and
will call special attention to
their varieties; first upon

an understanding and due appreciation of these will depend on appreciation of the peculiarities manifested by the disease under consideration.

Divisions of the blastodermic membrane	The plates of the (2) internal blastodermic membrane rapidly close
	together forming a short closed tube, and simultaneously a partition is thrown across it at its anterior third.

Epithelium of Alimentation	It is the office of the lower segment of this to form the organs of Alimentation from the cardiac
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orifice of the Oesophagus to the
 Rectum, with all the glands
 which minister thereto except the
 Liver which seems to belong
 to the blood vascular system.

In this system we have a
 peculiar columnar epithelium,
 which constitutes the epithelium
 of Alimentation, a distinct type
 Epithelium | From the upper
 of respiration | ~~part~~ ^{portion} of the original
 tube we find the
 formation of the tubal respiratory
 system and the lungs to
 proceed which determines its
 peculiar type cell tissue.

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The columns ciliated of
respiratory Epithelium which is
the functional tissue of respiration. From this is formed all
the glands and tubes that
minister to this function.

These cross the upper alimentary
tract at the Pharynx which constitutes
a point of very especial
interest in the disease we
are to consider as we shall presently
see.

Dermal | From the external
Epithelium blastodermic membranes
is formed the Squamous
or horny covering of the skin.

and its derivations and constitutes
 an especial variety of epithelium
 with various and wonderful
 modifications which enable it
 to serve the animal in widely
 different forms.

First it forms the sweat
 glands by buds or ingrowths
 into the tissue beneath, which
 ingrowth consists of the inner
 or Malpighian layer of its-cells
 which form the function cells
 of the sweat glands shedding
 the surface of the whole body
 by millions. It also forms
 in this way all the glands

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that pushes to the skin in
any way. At the same time that
epithelium of respiration forces
its way outward to form the
posterior and anterior Canals

The dermal epithelium
by an ingrowth forms the mouth
at first a wide open hole.
and crossing the track of the
tubal respiratory system, forms
the oesophagus down to its
junction with the stomach,

this is the squamous mucous
epithelium and you will please
notice that in the pharynx it
comes directly in contact, or is

in juxtaposition with the respiratory epithelium

In the mouth this epithelium forms all the salivary and mucous glands, while the respiratory epithelium forms the Eustachian tubes and the Bar of the Tympanic cavity a very important point for us to remember in this disease,

There is yet another important tissue in the mouth formed from dermal, it is its derivatives the ^{Muco} squamous epithelium by certain ingrowths of its Rete-Malpighii, the Emanuel of

the tooth is produced by the
differentiation of its cells! a point
to which I will call your attention
hereafter.

Again on the skin by
ingrowth it forms the Crystalline
lens of the eye, the Meatus
Acusticus, the Aur, and
Utricle and the Vagina

The Kidneys | The exact origin
of the kidneys and
their epithelium is not yet
agreed upon by histologists

They are undoubtedly derived
secondarily from the Wolffian

bodies, but the origin of the
 wolffian bodies is the question:
 as the results of direct investigation
 has not yet fully settled this
 point in the one way or the
 other, there are strong histological
 and functional reasons, as well
 as anatomical for believing the
 wolffian bodies to be originally
 derived from the external blas-
 todermic membrane. These reasons
 are found in the nature of the
 glands themselves, their
 functional office, their histo-
 logy and their anatomy
 1st! As to their function,

It is more closely allied to that of the sweat glands of the skin, than the function of any other organ of the body

2nd! In their histological elements they are almost synonymous with the sweat glands in both the form and general character of their cells

3rd! The anatomy of the Kidneys shows a striking resemblance to grouped and intermingled sweat glands. They are both long and tortuous tubal glands each tube of which ends in a glomerule, that of the Kidney's

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being much the more perfect

These with the post-lingual glands and the Leberkittchen and the Tonsils, are the only glands in the whole animal economy, that possess this character, all others while possessing tubes as the rule, to serve as ducts are composed of lobules when ever or reach the gland proper

There are yet three other orders or kinds of Epithelium

The Peritoneal & Serous

The epithelium of the blood vascular system and the epithelium of the lymphatic

system. The origin of these we
need not attempt to trace.

We have no facts which point
directly to especial effects upon
these last varieties, in this disease
except the lymphatic in a secondary
way.

With this brief review of the
derivation of these tissues we will
be able to understand each other
in considering the disease in
question. And my reasons for
considering it peculiarly an
epithelial disease, these
reasons are to be found in the
typical character of the typical

lesions, their order of development
and sequence. We shall only
speak of the Symptomatology incidentally.

Character of the Rash is a prominent
and typical phenomenon of Scarlet fever.
It is very peculiar in the seeming
fact that it is an ~~inflammation~~ inflammation
affecting a tissue which in itself
has no blood vascular system
and cannot therefore, except
secondarily exhibit one of the
principal features of inflammation
namely redness. And yet
redness or crimson color

is the distinguishing peculiarity
of the rash

The Rash | This color however does
not belong to the tissue inflamed
the epithelium, but to the capillaries
underneath immediately
beneath covering very close to
but not touching this tissue.

It is here that we may find
one explanation of the peculiar
crimson color of this rash.

The tissue inflamed being the
epithelium which has no blood ves-
sels the capillaries themselves are
not involved in the inflammatory

process but being in very close proximity to each other ministering to the support of this tissue through endosmotic or lacunar circulation outside their walls they are much expanded; so that the volume of blood just beneath the surface is largely increased, hence the blush. While it is thus largely increased the expanded capillaries, not being vigorously involved in the inflammation, the free motion of the blood through them is not ^{so much} impeded as in ordinary inflammations.

Color of the Rash

The blood therefore

obtains more nearly its arterial color, hence the peculiar scarlet-crimson brilliancy of the rash as compared with those inflammations in which the tissues supporting the bloodvessels themselves are

involved, the functiform appearance of the Rash

The functiform appearance of the rash seems

to be due to the first or original seat of the inflammation being in the swal glands, at least

this theory seems to best explain existing phenomena especially when taken in connection with the light shown

upon the involvement of these glands by post-mortem examinations Fennick (Jensen, Page 211) found the basement membrane of the sweat glands thickened, the lining epithelium entirely gone, when not gone it was in many places so increased in size as to entirely fill the canal. Some of the sweat glands were irregularly expanded with blood. This seems to offer an explanation of the bleeding surface sometimes seen in Scarlet Fever.

Other Authors speak also of these glands containing Casts

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Casts in | These changes are
the Sweat Glands | all in the superficial
layers of glandular elements
not extending beyond the basement
membrane of the sweat glands, the
corium being normal. From these
observations we see the serious nature
of the lesions of the sweat glands
and find^a explanation of the
well known benefits derived from
inunctions with oil. These glands
are blocked with epithelial and
fibrinous, sometimes even as it
seems with blood casts, the outer
ends of which become dried in
the form of parched skin which

prevents their egress

The union with oil tends
greatly to dissolve and
loosen them - certainly to prevent
the drying of the coats and the
choking of the mouths of the glands
thus giving exit to their abnor-
mal contents affording great
relief to the sufferer

From the sweat glands which
give us the first red points
(the punctiform apparatus) the
inflammation as a rule quickly
extends to the epithelium between
them, rendering the rash
confluent, or completely involving

the epithelium. But even when this is accomplished the color is often deeper at the original points still marking the more grave implication of the epithelium of the gland tubes

Relations of the Feet to the Rash. We may here speak of the connection existing between the feet and the rash

The feet is known to precede the appearance of the rash from a few hours to a day or more

and the manner of the invasion of the rash just described as to the visible phenomena suggests

the thought that they may
in fact begin together and that
the fever is largely a consequence
of the rash although seemingly
to precede it

The most serious effects of
the epithelial inflammation is in
the deeper parts of the renal glan-
d or in the tortuous glomerules
and a little calculation will
show that if the epithelial
inflammation begins there, which
is strongly suggested by all
that is known of it

The time that elapses after
the beginning of the fever

until the appearance of the eruption would be occupied in the progress through the length of the tubal glands. Thus we have a strong suspicion that the dependence of the frost may be largely upon the rash after all. We will speak farther on of those cases in which no rash appears

We ^{will} now examine more closely the condition of the epithelium Meriol (Jenkinson's 204) found that the Epidermis was softened and in cadavers three days during the stage of

Eruption it was more easily removed than from those who had a healthy skin.

Lächner (ibid) ascribes these phenomena to a chemically peculiar exudation into the Rete Malpighii the nature of which he could not ascertain. He seems not to have thought of its being a true inflammation of the epithelial structures.

Fenwick (ibid) found the Rete mucosae quite thickened (the cells enlarged) and containing numerous round cells containing large nucleoli.

On this point there

is such a close agreement between the different Authors who have examined it that it is useless to quote more. They all agree also that the Corium immediately beneath the Rete mucosum is found to be healthy except in some very rare cases where isolated spots show signs of the extension of the inflammation to the tissues beneath.

These spots are marked by ^a dark color during life and mark the extension of the inflammatory process to the true skin.

~~Each Spot~~ | it would seem

that these examinations quoted
above would sufficiently settle
the nature of the lesion

We will only add a few more
for the purpose of showing
that the affection also extends
to the alimentary epithelium

Thomas (Dermis 212) says
very justly that the process
is not concluded when the
eruption has faded "Other
disturbances which have arisen
during the inflammation of
the superficial cutaneous
layers must run their course
These result in an excessive

2.
formation of new epidermis
which is followed by an
abundant exfoliation."

Of course this is well
known, and if we find this
result in the epithelium of the
Alimentary Tract we have good
reasons to believe that the same
processes have been going on
in that as well as in the Skin

Those dying in the midst
of the rash, do not show a
rash on the mucous surfaces
of the Stomach or intestines
neither do they on the
Skin, for in a very short

time after death the surface
pales and we suppose the
same things to occur on the
serous membranes as may
be actually seen in the mounts.

Thomas remarks that by
injection with a colored fluid
a picture of the exanthem
very similar to that in life
may be reproduced. Here we
have a peculiar proof that
the inflammation is especially
of the epithelium, and that
the blood vessels themselves
are not involved. There is
no stasis as in ordinary

inflammation, and after death,
the expanded vessels near
the surface are for the most-
part emptied of their contents
leaving the inflamed parts
practically unobscured with blood,
Upon injection however the
expanded but now collapsed
vessels are again opened and
refilled reproducing the rash

Now by these various means
I find that numerous authors
have furnished the facts
which show that the exanthem
is not confined to the squam-
ous epithelium, but that

the columnar epithelium
of the alimentary canal
sometimes very slightly or
perhaps not sufficiently to cause
any trouble in a large majority
of cases, yet in others is
very seriously involved.

Several authors, Fennick Hille
(Pumphrey) Simons Lee have
found the gastric tubules filled
and distended with fatty
and granular matter, and
with cells, also casts of these
in the contents of the stomach
also casts of the Lieberkühn
glands of the small, and

the follicles of the large intestine (Kernage) have been found in these cavities

So prominent did Dr. John Harley of London find the intestinal lesions, that he considered that there was a close connection existing between this ~~disease~~ disease and Enteric fever.

So close indeed that he seems to have considered the early stages of the two diseases identical.

It is not possible that we may yet find that in chosen cases of swarms death from

Scarlet-fever or severe Scarlet-fever without a rash upon the skin, that we have a very severe epithelial inflammation in hidden parts, and that the difference is only in the location of the inflammation.

It hardly seems necessary to stop to argue the point as to whether or not this affection of the epithelium be a true inflammation. It presents as many of the characteristics of inflammation as, from its nature it is capable of; namely, Heat and Swelling. There is

plainly a superabundance of heat and ^{the} swelling of the individual histological elements is abundantly proved by microscopic investigations. Other marks newly found in the microscopic study of inflamed parts are all found here. Such as exudation globules - how elements

too, This tissue cannot show pain because it possesses no organs of sense, it cannot show redness in and of itself.

because it has no blood vascular system. Therefore the absence of these two signs must not

be regarded as excluding it
 With these facts in view
 the inquiry into the condition
 of the other varieties of epithelium
 is very important. In reference
 to the parameal or serous epithelium
 and the endothelium of the
 heart and arteries, I have
 no report whatever that I
 have been able to find except
 that they are found healthy
 which would undoubtedly be
 the good appearance

I have so far read no Author
 who reports having critically
 examined these structures to

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determine whether or not the
characteristic Epithelial changes
could be also found there

The fact that these melan
are widely separated from the
synovium and lining
in their histological origin
and function
and no affection of them

having been noticed would
seem to indicate that they
are exempt. Yet the very
unremarkable disturbance of the
circulation still holds out
a suspicion that the endo-
thelium of the blood vascular
system may be involved

Special examinations in this direction are certainly to be desired

In case of the Respiratory Epithelium we have more definite information. Almost every author who has written upon the subject, has said his say on this point; not with the same end in view, that we now have; i.e., as to the histological elements involved but as to whether or not the infestation of the throat extends into the air passages without the presence of true

W. Black

2.
lymphoma or leucop.

without in any way taking
up this point, we can easily,

from the abundant writings,

glean the facts as to ~~whether~~
the order of the involvement
of these structures. We have

the most sufficient testimony
that the respiratory Epithelium
is exempt in this disease

except at and extensive from
those points where it comes
in contact with the squamous
epithelium. At these points

the inflammation crosses the
line of demarcation only in

Case of long~~er~~ continued
very severe inflammation of the
adjoining squamous epithelium
or, possibly, only after the sub-
-epithelial tissues have become
involved, it seems that
when this epithelium does
become involved in the scarlet-
-fever process, the nature of
the inflammation taking place
in it, is of a very different
character from that occurring
in the squamous variety, in
that the tendency is to the
rapid destruction of the ep-
-ithelial covering and inflammation

and elongating of the
subepithelial tissues. The points
of junction of the two varieties
are at the openings of the
Nostics, at the Lottis, at the
posterior border of the Soft-Palate
and circling the Pharynx
about at a line with the
soft Palate where it is raised
up. The point of crossing
is almost always over the
border of the soft-palate or
in the Pharynx with rapid
extension from behind forward
usually involving both the
posterior and anterior waves

is a very destructive inflamm-
atory process, which destroys
large portions of the columnar
ciliated epithelium and
gives rise to an ichorus pus
It thus leaves a surface
denuded of epithelium which
necessarily heals with difficulty
and is prone to leave perman-
ent Catarrh

Eustachian | The very many
Tubes | cases of destruction
of the organs of Hearing
occurring from this disease, make
it of importance that we trace
its progress thither. The

Eustachian tubes and the greater part of the tympanic cavity of the ~~ear~~ are lined with the respiratory epithelium and it is undoubtedly by this route that the ear becomes involved, which not only involves loss of hearing, but is one point of danger to the life of the patient. After the line is ^{once} crossed and the respiratory epithelium is involved the invasion of the Eustachian tubes may readily occur and the inflammation be thus communicated to the tympanic

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for this reason the physician who is treating scurvy should
grasp with his otoscope and punching lance - and when he
finds the tympanic membrane bulging from pressure - and
the punctum and the edge of the perforation of his perforation

Cavity setting up an ulcerative
process with abundant purulent
formation, the inflamed
and blockaded condition of the
tube has shut the door of exit
and the pus is retained in the
ear, setting up violent inflam-
mation of all its parts until
the pressure forces an exit through
the tympanum, or it may be,
through the very thin partition,
or a foramen into the brain
with the consequent destruction of life.

The crossing of the line
of demarcation at the glottis
is of much more rare occurrence

but when it does occur it is characterized by the same des-
tructive inflammatory process as
is seen in the menses and
marks a very grave complication

Now whether this involvement
of the respiratory epithelium
should be considered a symptomatic
complication or not is a question
I will not now discuss

You will find this point dis-
cussed at length in many
of the text books without resulting
in any unanimity of opinion
among medical men.

The involvement of the

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Tonsils and the post lingual
follicles is a point of the
utmost importance in this dis-
ease, as it is the most common
point from which serious inflam-
atory lesions take their origin.

We must examine for a
moment the compound nature
of these organs. Their his-
~~tology~~-tology has not until
very recently been made out,

Around the dorsum of the
root of the tongue there is
a multitude of small tubal
glands with quite narrow
ducts which dip down into

the subepithelial ~~and~~ tissues.

They are lined ^{Epithelium is} ~~with~~ and in-
growing of the rete Malpighii of the squamous

^{Epithelium} Each of these little tubes has
in immediate juxtaposition with
its epithelium ^{basement membrane} entirely surrounding
and inclosing it, a setting of
minute lymphatic glands, so

that if we remove the epithelial
layer ^{with its basement membrane} these glands are exposed.

The tonsils are constructed
in a precisely similar manner
except that here the ^{tubal} glands
are larger and bifurcated.

These glands present a
striking similarity to Peyer's patches

in the small intestine and
not very infrequently ulcerate
in or as a sequence of lymphoid fever
according to the statements
of various authors.

Now it seems that when the
epithelial inflammation is se-
vere in this locality, as it is
in most grave cases of scarlet
fever, it is communicated to
these lymphatic settings of these
glands both on the root of
the tongue, and on the tonsils
ulceration and extension to
the cellular tissue adjacent
and extension through the

modum of the lymphatics
is the result. This gives
rise to what is known as the
Anguine type of scarlet-fever
which is always to be dreaded
on account of the swelling and
ulceration of the tissues about
the throat and the adjacent
lymphatic glands.

This type of the disease
is so much dreaded, and thus
so well known that we need
make no quotations. That this
is the manner of the invasion
at this point scarcely admits
of question. A comparison

of the minute anatomy of the parts with symptoms. Keeping the pathological law as to the involvement of tissues of different natures in inflammatory processes must be sufficient to convince any one as to the tract and nature of this departure from the epithelium.

Considerable discussion is found in the text books as to whether or not the Salivary Glands are involved in the inflammation; to me it seems clear, that

if they were any thing like generally involved in any serious degree, the question could not remain in doubt & therefore take it that the involvement of these glands is an occasional accident of the disease and in no wise an essential feature of the affection.

The comparative freedom of these glands together with all other lobular glands; the clinical history of the disease as well as Post Mortem examinations seem to prove beyond

question. This is somewhat surprising when we consider their origin and the derivation of their epithelium directly from the ^{Squamous} epithelium of the Wart. We must remember that the epithelium of these and all other lobular glands is very markedly modified.

So far as we have been able to glean, the lobular glands throughout are the more affected in this ^{any more} than in other severe forms.

We have now to refer to the Kidneys

The prominent and dangerous character of the involvement of these important

organs - is too well known,
and too much feared to require
any proof.

Kidney states that he has
in almost all cases found the
affection of the kidneys to be
as intense as that of the skin
and of the same character.

We have abundant evidence
however that there is a wide
difference in the different epi-
demics as to the severity of the
inflammation in the different localities.

In one epidemic we may
find the Anguinous variety, in
another the Renal and in

the third it may be confined
almost entirely to the skin

There is however an evident
error in the minds of many,
as to the nature of the kidney
affection. To our mind it
does not differ materially from
that of the skin, except
through the accident of foam
and location as to moisture.

In the early part, or stage,
of the eruption when the
epithelial inflammation is in
progress in the kidneys the
fluids pass readily through
and no great difficulty is found

There are no dried and
parched ends of the tubes ex-
posed to the air: all is moist-
and doubtless in the vast
majority, really a less intense
inflammatory action especially
when the surface mucus is intense

But when the rapid proliferation
and exfoliation of the epithelium
comes, the long and tortuous
tubules can no longer free them-
selves; they become blocked,
and in consequence, then arises
an inflammation from this
mechanical cause which is not
especially epithelial, but an

inflammation of the general substance of the organ, which during its continuance prevents the epithelial repair. (154)

we will not now however attempt to follow the resulting kidney trouble further

We find that the epithelial tissues involved are the Squamous

Both the Horny of the skin and that of the mucous membranes. The Columnar of the digestive tract, and that of the urinary organs, involving every tubal gland in the body not-excepting those of the Uterus.

The secondary inflammations
 are of the respiratory epithelium
 giving rise to Coryza, Otitis,
 Laryngitis, and of the lymphatics
 giving rise to the Anginous
 forms of the disease

Fever

We will now consider briefly
 the fever and the blood.

The fever is especially intense
 forming the characteristic
 of the disease. This does not
 seem to be always dependant
 upon the severity of the rash
 upon the skin, but from

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what we have seen, it appears
to us to be very closely related to it.

The severity of the blow may
be received by the alimentary
or urinary tract and not be
apparent; or it may be confined
to the glomerules of the sweat
glands and escape prominence.

Therefore, we cannot say there
is no rash, because none is apparent.

The Sweat Glands 'I
must be remembered, have as
one of their functions, the
elimination of superfluous heat
from the body, hence their
greater activity when we

Become heated in warm weather
or in unusual physical exertion

This is one basis from which
we may do something toward
accounting for the intensity
of the fevers. Another is the
serious nature of the lesions
in and of themselves, involving
as they do such large tracts
of tissue.

When we think of the in-
volvement of the entire surface
of the body and of the alimen-
tary tract and urinary system
in an inflammation of their
functional tissues we should

not be surprised at the severe
constitutional disturbance

What the effect of
the Scarlatinae poison
may be upon the constitution
at large, through its specific
effect upon the blood itself,
we have no means at hand
for determining.

The great elevation of
temperature accompanying the
affection is one of its great
sources of danger. There seems
to be little doubt that death
often occurs directly from
Sun Stroke, or as a result

of our heat upon the nerve centers, the essential nature of which is not yet well determined.

In the disease we are now discussing there are no typical lesions of the nervous system. All authors who have made extensive post-mortem examinations, so far as we remember agree that the nervous structures are found healthy (except occasional slight congestions, notwithstanding this very severe nervous phenomena

is not an uncommon occurrence

The Blood

The condition of the blood is found to be very similar, or incidental, to that found in other affections characterized by great heat. It therefore does not offer any peculiarities which would agree with the direct effect of a specific blood poison. We therefore conclude that the nervous phenomena are due to the intensity of the heat, coupled with the intense arterial excitement which drives

the blood with unusual force and rapidity through the system

The effect upon the Teeth

The effects left upon the Enamel of the Teeth by this disease is very peculiar

of the disease occur when the formation of the enamel is in progress upon any particular teeth a mark is left encircling the tooth at a point where cells in a certain stage of growth have been destroyed. These marks

are very characteristic and I am often able to tell persons at what age they had the disease from them alone.

Suppose the line, to run around the the middle of the central incisors, it will be found nears the cutting edges of the lateral and just touch the points of the cuspids. In other cases it will take off the cusps of the first molars and touch no others, as the formation is just begun in these, if the disease have occurred later the

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This may be seen crossing
the Bicipitis disappearing
under the gums as it
approaches the front of the
heart. Later still the
second valves alone
will be marked.

This effect upon the
teeth is not constant
and is no indication as
to the severity of the disease
giving another indication
as to the habit of the
effection of expending its
force sometimes in one
place, again in another

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In some instances the
Hair drops off. In rare
cases the Nails of the ^{toe} fingers
and toes are exfoliated,
and rings of imperfect
structure in these, which how-
ever soon disappear with the
growth is not infrequent.

Warts are usually ex-
foliated if they exist.
