An Experimental Inquiry into the Pathology ofpus in the Blood. by William Millington.
"Tota nos in contemplandiis rebus suspiciendis quae
ponimus, profiteres quod et natura inest mentibus
nostri insatiabilis quaedam expiditio veri visumne?"
(Cic. Tusc. Quest. Lib. 1.)

The conditions under which Malaria products may find their
way into the circulation, and the diseases which they may
produce, even in parts remotely placed from the original
source of their reception, have long engaged much attention;
and of these, the supposed effects of the absorption of pus, both
upon the blood itself, and especially upon the constitution
at large, appear to have excited earlier and more attention
than the consequences supposed to result from the absorption
of other vitiated matters. The Pathology, however, of the second
and affecting results from the adipose tissue of pus with blood
has been successfully investigated only within more recent
times; and though these distant effects are still involved
in some difficulties, yet the careful Pathological observation of
the moderns, is adding, almost daily, new facts to the mass
already accumulated in support of the opinion that they are
essentially dependent upon the mingling of putrid
matter with the current of Venuus Blood.

Within the last few years many elaborate works have
been published, illustrating the effects of pus and other fluids
When injected into the veins of living animals, these experiments have certainly thrown much light on this confusively obscure subject; yet it still appeared to me open to further inquiry, and with the hope of relieving many doubts that existed in my own mind, it was induced to make pretty numerous experiments with the view of ascertaining the effects of pus and other fluids on the blood immediately on its removal from the vein of a living animal. The careful observation of the nature of the symptoms resulting from the injection of pus and other matters into the veins of animals, the minute exams with which the post-mortem examinations were conducted, and recorded, seemed to me to leave nothing further to be desired on that head; whilst, on the other hand, I have been unable to report any series of experiments showing the effects of introducing any bodies into the veins immediately on its removal from the body.

I propose to consider Pythieemia under the following arrangement: 1st. The History; 2ndly, The Symptoms; 3rdly, The Anatomical Characters; 4thly, The Cause, and Nature of the Affection.
The History of Pyokemia.

In order to be in possession of the evidence on this important subject, it will be necessary to trace, in as brief a manner as possible, the progress of opinion respecting purulent infection of the cord. The fact of purulent matter being sometimes deposited without much sign of previous inflammation, in a part of the body remote from one in a state of suppura tion, has been long known in medicine under the name of affects by Metastasis; and it was formerly supposed that the matter was taken up and transferred, ready formed, to its new situation.

So early as 1766, Mr. Chetton, in his Pathological Observations, devotes a chapter to affects of the Seta, succeeding to injuries of the head, and after relating a case, and seeking for a special explanation of the occurrence, remarks, that "manifestations of matter from one part to another are by no means uncommon, but are frequently to be met with after amputation of the larger limbs, when the vis nervorum is impaired, and cannot support that discharge of matter, so necessary to complete the design of nature in healing a large wound; but, under such circumstances, there is very little, if any, appearance of an inflammation, and the matter is rather disseminated through the viscera on which it falls, than is collected into one or more large abscesses." The earliest distinct intimation of the doctrine of an infection of the cord by pus
is to be found in the works of Brechare, to both he and his
commentator Van Swieten appear to have recognized the
injurious effects due to the entrance of pus into the hood. They
supposed that pus was sometimes absorbed “by the eroded
mouths of lymphatic or sanguineous vessels, mixing with
the hood, infecting it, and becoming collected in the sacs.”
This gives origin to many venereal diseases, in reference to
which, however, they do not enter into details.
Missaghi, who wrote some years later, after distinctly ac-
rknowledging that Molinelli and Valsalva were well acquaint-
ed with the disastrous results of purulent infection of the
hood, and the serious abscesses consequent upon it, men-
tions a considerable number of fatal cases from this cause,
which had come under his own observation. From these
cases, he select the following one, which appears quite
conclusive:

“A boy, about 13 years of age, was wounded by the throwing of
a stone in the right part of the scapula, above the temporal
muscle. He immediately fell down with some obstruction of
the internal rectus and vomited. He was carried into the hos-
pital, but was not seized with any fever till the fourteenth
day. This coming on a great quantity of pustules was discharged
by the wound; and a little purulent matter came from the
mouth by spitting. About the tenth day a delirium came on;
and about the twenty-fifth he died. In separating the skin
from the cranium, about that and the pericranium small abscesses were observed: but there had no communication with the wound, which fell under the notice of the senses. Under the wound, however, the bone was broken and depressed, and adhered closely to the dura mater, in which it also had fixed some of its comminuted particles. Yet no irritation of this membrane discovered itself to the senses, nor yet any injury of the brain, if you except one or two ounces of serum, which ran out by the inferior cuneiform, while the brain was taken out. The thorax being opened, the lungs were found to be seared, and in them were found small abscesses full of pus.

These secondary deposits Monganu explained by supposing that the pus carried from other parts into the viscera, is not always deposited in the form of pus, but that its component particles were separated, and afterwards by causing obstruction of the lymphatic glands gave rise to a much greater generation of pus than was brought to them. He appears to have been led to give this explanation from observing that the quantity of pus contained in these visceral abscesses greatly exceeded that which could have resulted from the mere translation of pus from the original wound, which wound, he truly considered had been the source of the visceral complications.

Tuesday, by writing the doctrines of Brodie and Charlapni considered the origin of visceral abscesses to be due to the ab-
sorption and diffusion of pus through the blood, and the produc-
tion by it of inflammation in distant organs.

The fact, however, i.e., towards the true pathology of this
subject was made by Hunter. Previous to his researches, the
idea of a purulent infection of the blood must be regarded as
quite hypothetical, the admixture of pus with the circulation
having never been seen. In examining the bodies of persons who
had suffered from violent inflammations of the cellular tissue,
whether spontaneous or traumatic, his attention was arrested
by finding the large veins traversed the inflamed part also ni-
formed, and exhibiting in different parts the adhesive, sup-
purative, and ulcerative, forms of inflammation. He was
further led to the opinion that these veins would have had
abscesses formed in them but for the ready exit afforded to
the matter of pus along with the circulating blood to the
heart. This opinion was confirmed by finding in some cases,
abscesses in the interior of the veins limited by the adhesive
inflammation, while in other examples, when the inflamma-
tion had been more severe, he found pure pus, and on tracing
the column from his past, pus was discovered more or less
mixed with blood, and having the esculated parts of the
blood in it. In examining the arm of a man who died from
encephalitis in St. George's Hospital, Hunter found the veins
above and below the surface in many parts limited by the
adhesive inflammation. The veins near the axilla had taken
on suppuration, beyond which adhesion had not formed, and
thus had given a free passage for the matter into the circulation,
of which the patient, most probably, died. With his usual
caution, Hunter expresses his inability to account for the
fatal termination of these cases; he suggested it might be, either
that the inflammation extended itself to the heart, or that the
matter escaped from the inside of the vein passed along the tube in
considerable quantity to the heart, mixed with the blood, and
thus caused the fatal result. These direct observations
were certainly calculated to give great importance to the opinion
of purulent infection of the blood, as transmitted by Bochase
and Monapri; but Hunter does not appear to have been ac-
quainted with the observations, and opinions of these authors.
And when the subject of a transmission of purulent matter the opinion
was very decided; he discredited it as an occurrence, and, as
an operation, he declared it to be absolutely impossible; and
it is in some measure owing to the influence of this opinion,
that affection of the vesica, which had formerly been reported
as arising from metastasis, ceased for a time to interest
British Pathologists.

It is certainly a matter of surprise that the connexion of in-
fammation of the veins with the hypothesis of purulent in-
fecion of the blood leading to secondary affectes was not fully
received until long afterwards. Indeed this latter doctrine
appears to have been completely unnoticed by subsequent
writers; and even those who show an acquaintance with the connexion between the affection of the reins and certain constitutional states, such as, certain forms of intermittent fever, or diffuse inflammation of the cellular tissue, concerned in ascertaining the symptoms, and morbid appearances to the extinction of the inflammation along the internal membrane of the veins as far as the centre of the circulation.

In Italy, where this subject early attracted much attention, Montegieter observed that it can only be appreciated by those who, like himself, have frequently been patients, more especially surgical patients, very unexpectedly carried off by its occurrence; and who, like him, have made numerous morbid examinations, with the view to the investigation of it.

The morbid appearances in the vessels are referred by him to the absorption of pus and other disintegrated substances into the blood, in consequence of this having frequently found in the examination of blood which had been the seat of extensive suppuration, and, in cases of wounds, the neighbouring lymphatics and veins, but especially the former, filled with purulent matter.

I said that Mr. Aughton is the first author who has described a peculiar typhoid fever accompanied by some forms of Phthisis associated with a purulent infection of the blood.

He considers that the constitutional irritation, being accompanied by symptoms of greater debility than acute inflammation
in general, may probably arise from the extent of the inflamed surface in cases of phlegmon, but, that it is not unlikely it may be an effect produced upon the nervous system by the pus which is injected into the vessel, being mixed with the circulating blood. Mr. Bichat also appears to have sub- poled that the veins and venous blood are primarily affected in adenomyosis. More recently, he has described the marked appearance presented by the veins when inflamed, and the circumstances under which they become to; but although the pathological conditions of the different organs of the body in cases of phlegmon are mentioned, he does not trace the connexon between the local and constitutional affections.

Mr. Velspes in his inquiry into the pathology of secondary affections, concluded that the suppurring tubercles, so often found in the lungs and liver in persons who had died after operations, were the result of pus absorbed into the general circulation; that these affections, as also a peculiar empyema which occurs in such cases, were rarely attended by well marked local symptoms; and that when their existence was undoubtedly ascertain ed, they had always proved fatal, being uninfluenced by treatment, and, in particular, having their development favored by bleeding. He failed however to see the whole of the connexon between the internal complications and the suppurring wounds on which they were consequent; for he thought that the veins received the pus from the symphaties
which open into them by inflammation, or by numerous branches of veins which remain open in the wound; and that the fluids in the chest, and the matter in the secondary abscesses, are the results of an actual metastasis, having been brought from the part in a state of suppuration.

The Author who, in this country, has principally directed attention to the alarming constitutional symptoms attendant on affections of the veins is Mr. Anstatt. His paper appears to me chiefly valuable as containing a large collection of cases, and a careful account of the contents of the vessels in the post-mortem examinations. He refuted the opinion, suggested by Hunter, and afterwards generally adopted, that death resulted in phlebitis from the extortion of the venous inflammation to the heart. He adduced many cases which proved that the phlebitis rarely extended far along the coats of the veins in the direction of the heart; and, therefore, that the constitutional affections could not be owing to that cause. Mr. Anstatt further showed, that the dangerous consequences arising from phlebitis bear no direct relation to the extent of vein inflamed; and that the presence of pus in the vein, as first observed by Hunter, was by no means an uncommon event. From the very numerous facts that he collected, he was in enabled to conclude, that the inflammations and abscesses which arise in remote situations after injuries, whether of the extremities or of the head, or after the process of farction, are attributable to the
existence of phlebitis in the part of the body primarily affected; but he does not deem it essential that the phlebitis should have reached the purulent stage, as he believes that the introduction of the inflammatory secretion of a vein into the circulation is quite adequate to give rise to the symptoms usually considered to result from purulent infection of the blood. As to the manner in which pus or any other secretion gives rise to constitutional symptoms or to organic changes, Mr. Ansell purposely refrains from offering an opinion. Mr. Dance was the first author who fully connected the Anatomical Pathology of phlebitis with the theory of the purulent infection of the blood. He demonstrated the actual presence of pus in the blood as the result of various inflammation, and, as he believed, the cause of secondary atteries after operations or injuries. Mr. Dance alleges that three sorts of symptoms exist in phlebitis: The first, local, without fever: The second, with more or less of general symptoms superadded to the local, and caused by the extension of the inflammation: and the third, characterized by chills, prostration, pain, tachycardia, dyspnoea, delirium, soft pulse, difficult respiration, with other allied constitutional symptoms, and caused by the passage of pus into the blood, and the various complications to which it gives rise. These researches of Mr. Dance were deemed so important that phlebitis and purulent infection became synonymous terms; and
to such an extent was this the case, that the formation of secondary abscesses began to be attributed, not to the formation of pus, but to that of capillary phlegm.

The almost simultaneous publication of the opinions of Mr. Allot and Mr. Dane, led to the very final adoption of the view that phlegm and putridulent infection were identical affections; or at least that the latter was caused invariably by the former. Many modifications of this opinion, however, continued to be held by some Pathologists; some attempting either to explain the laws of sympathy and metastasis, the remarkable series of connected phenomena which had been repeatedly observed; whilst others referred the constitutional affections to the absorption of pus altered by putrefaction; and conceit the inflammation of the veins as a secondary consequence. The latter contended that pus was a fluid, unirritating fluid, incapable, unless in a state of decomposition or of a specific kind, of injuriously affecting the constitution; and the fact so frequently witnessed of the absorption of pus, in the form of local abscesses, without any subsequent deleterious effects being manifested, seemed to them unquestionably to counteract such an opinion.

This subject was now investigated by Mr. Arveulhe. He repeated many experiments which Mr. Gascard had previously performed; and embracing the opinion that the formation of vesicular abscesses was owing to capillary
Phlegmatics, he deemed him to be substantiated by the effects that result from introducing metallic mercury into the veins. He found that when this metal was introduced into any of the veins which go to form the terna porta, the whole or the greater part was arrested in the liver. The animal being destroyed at a certain period after the operation, small, circumscribed, inflamed spots, were invariably found, which gradually passed into small abscesses surrounded by a distinct line of inflammation; in the centre of each inflamed part a small abscess was a minute globule of mercury. These were commonly a few small spots or abscesses in the lungs. By introducing the mercury into the blood, in its direct course to the terna porta, these abscesses, inflamed spots or abscesses were mainly found in the lungs.

As the result of numerous experiments, Rueff then enunciated the opinion that any foreign body introduced into the veins, and whose elimination by the excretories is impossible, will produce exactly similar internal abscesses by the capillary phlebitis they give rise to; or in other words, that the necessary result of the absorption of pus would be precisely the same as that resulting from the introduction of mercury into the current of venous blood. He made however a distinction between absorption, in the true excretion of the form, as it takes place by secretions the coats of which are unknown, and the absorption or introduction of foreign substances exchanged.
into the blood. He refined the formation of secondary affections to the latter only; a distinction that was sufficiently established by his failure to produce vesicular affections in dogs, by rubbing mercurial ointment into the skin, although most violent salivation was induced.

These experiments, especially the one when mercury was introduced into the veins, have been quoted as a proof, according to the opinion of many Pathologists, the true explanation of the affections, dermatomated, small, vesicular affections so often found in Pyrexia. The lump or vesic returning, as on aullet, the pus flobules passing through its capillaries, in the same manner as the flobules of mercury were retained in the capillary vessels of these organs. Though sufficient reason will be found adduced in the last part of his essay, to show that we cannot altogether accept his mechanical explanation of the anatomical characters of the disease.

The experiments of Frenel were followed by those of Dr. Cattell and Lucett, who were the first to demonstrate experimentally, that pus when injected into the veins in sufficient quantity gives rise to multiple affections. They thought that previous failures to produce vesicular affections by the injection of pus were owing to the small amount injected. They found that metallic mercury, polarized gold, and a solution of corrosive sublimate were the only foreign bodies, beside pus, which were capable of causing multiple affections. They
further pointed out that those resulting from mercury have little analogy to those produced by pus, differing from them both in their small size, and in the absence of fluid contents. They discovered that each class of foreign bodies has its own mode of action; and as the result of many numerous experiments they arrived at the conclusion that no other substance except pus was capable of producing that peculiar form of affection, termed by these authors "surfeet," to distinguish it from those resulting from the injection of mercury and other foreign substances.

The most recent French author of whose experiments we have any account is M. Pedellot. He has made numerous and discriminated experiments, and the general result appeared to be that when small quantities of perfectly fresh pus were infected, the animals usually recovered; in some instances, after more or less febrile disturbance, and oppression of respiration. When a considerable quantity of pus was injected at once, the fatal effect was occasionally very rapid; but when the animal survived long enough, infectious lesions were always obtained, sometimes amounting to limited inflammatory points, and at other times well-formed abscesses were found. When various or mixed pus was injected, a much smaller quantity was fatal; out of eleven experiments only one animal recovered. In two cases erythine was injected; in both the animals recovered after serious symptoms lasting a week, and bearing
a considerable resemblance to those of purulent infection. Pilot\nwater was injected in two instances; with the effect of causing the\ndeath of both animals. The lumps were found in one case con\nverted and forged, in the other they were found pneumatic. These\nwere no appearance of secondary atelectes. The pleurisy of\nthis was exsudated, diluted with distilled water, and injected\nin one instance; they were all fatal. The serum was injected\n(also in three cases) in a state of rigidity, with the effect of\nproducing death; there was found gangrene of the lungs, but\nno secondary atlectes. The serum was injected in four other\ncases, with the effect of producing death alike; no secondary\natelectes being found, except in one instance which Mr. Codd\ninterprets by an accidented phlebitis, in the other eeehymoses\nand circumscribed induration were found. In another\nexperiment the enormous quantity of 160 grammes of serum\nwas injected. From all the experiments, Mr. Codd, not lapsing\nthe proportion, that the symptoms described under the various\nnames of purulent infection, purulent absorption, purulent\ndiathesis, suppuration phlebitis, are always produced by\nthe absorption of the pus-pleure into the blood, and by the pus-pleure\alone. He states that it exerts no direct action on the blood,\nand only becomes infectious when detained in the capillaries of the\nlungs or other organs, by exciting the irritative symptoms char\nacteristic of the affection, in consequence of the infection it\noffers to the due performance of their functions, and to the-
attempts made at its elimination. He regards the most common source of infection to be an inflamed vein or a taphonation in contact with the open mouths of veins. He does not admit the possibility of such an accident with the veins intact, unless it be from the doubtful source of inflamed lymphatics or arteries. Mr. Schillat appears that he has been able to detect pus globules in the blood by his microscope, in cases of Pyaemia. He states, however, that it may be confused. He too, by a superficial examination with a low power, the difference becomes visible, if a power from 500 to 800 diameters be employed.

Some of the discrepancies of authors in respect to the detection of pus in the blood are explained. He points out the circumstances under which the search for it has been undertaken. He states that it is not always to be found even when purposely introduced by injections; and further that he has failed in detecting the pus globule after a single injection of pus. The same remarks apply to all cases in which the secondary abscesses have only commenced forming in the lungs, the stage of softening not yet being attained; but when large and numerous collections of pus exist, he says that he never failed to find pus in the blood, at whatever part of the system this has been taken from. He even goes so far as to state that his diagnosis in several cases rested upon it — an opinion, he expresses, which was confirmed by a post mortem examination. Mr. Bect Jr. informed Mr. Schillat with a note upon the distinctions between the
pus phlobile and the white phlobile of the blood; they are as fol-
lows: the dimensions are different, that of the pus-phlobile varying
from $\frac{1}{100}$ to $\frac{1}{50}$ millimetric, that of the white phlobile from $\frac{1}{100}$ to
$\frac{1}{100}$, a third or a fifth smaller. The colour of the pus phlobile is
slightly yellowish, that of the white phlobile a dead white, without
any trace of yellow. The form of the pus phlobile is spherical, while
that of the white blood phlobile is much more flattened, being
at most biconcave, and more spherical. A marked difference is
generally seen in the nuclei as exhibited in both by acetic acid:
those of the pus phlobiles are much larger, varying from $\frac{1}{100}$ to
$\frac{1}{200}$ millimetric, and exhibit in their interior a regular, well-defin-
ed cavity, while the white phlobile furnishes scarcely other than
very small flattened nuclei of from $\frac{1}{200}$ to $\frac{1}{2000}$ millimetric,
rather resembling nuclei of fatty granules.

As a result of his very numerous experiments M. Schellot has
expressed the conviction that there are two distinct diseases, which
had, before his research, been confounded; one arising from
the pus phlobile, and giving rise to the peculiar atherosis so
characteristic of Pyaemia, and the other arising from
phlobial matters, either accidentally mixed with the pus
or occurring independently of the latter, and giving rise
to limited jaundiced spots or patches in the retina. He
quotes mentions a case of "pyaemia complicated with putrid
infection" in confirmation of this distinction. In this case the
pus proceeding from an osteitis was of an exceedingly interstitial
character.
It is to be regretted that throughout the whole of his historical sketch, the Author has not given any reference to the works he has consulted.
The symptoms of infection came on more suddenly, persisted more rapidly, and were accompanied by a more acute prostration, than is the case in simple phthisemia. In the latter death comes on gradually, and seems to bear no relation to the amount of anatomical change; but here the lungs, having gauzy brown patches on their surface, and but few traces of suppuration, still continued abundantly expectorant, and capable of receiving large quantities of air, though the respirations amounted to forty-five in a minute, and the lips and extremities were rendered coldly livid.

Mr. Lee is the last writer to whose opinions I shall refer. He thinks that in the attempts made to explain the pathology of his affection, that the solids have received an undue attention, to the neglect of the condition of the blood. From experiments he made, he is induced to believe the opinion of the circulation of the pus through with the blood to be quite hypothetical. He is of opinion that the destructive results so often witnessed after pus has entered the blood are to be attributed to the effects of pus on blood. And from my own experiments on animals, he is led to suppose that suppuration takes place more rapidly in than out of the body, so that it is the result not of a chemical, but of a vital influence.

Having thus given a brief history of phthisemia, I shall proceed to the symptoms of this affection.
The symptoms of Pyoderma.

The inflammations that result from the introduction of pus into the blood are always characterized by that state of asthenic action, local and general which is incapable of producing copious lymph, that may limit itself the most to local action and the escaped fluid. At present we are not in a position to state what symptoms are induced in the system before the occurrence of any local inflammation; nor how much of the constitutional affection is owing to the mere reception of pus into the blood, and how much to the disease of the system subsequently set up.

I have observed that the symptoms of pyoderma are developed suddenly, there having been no previous complaints of indisposition. The constitutional affection is almost invariably ushered in with chills, and vomiting usually occurs, especially if the symptoms arise from any affection of the abdominal viscera.

The appearance of the patient usually undergoes a marked change; and the prostration soon becomes so decided that there is a tendency to fainting upon slightest exertion, the pulse being commonly small and feeble. There is often a peculiar yellowish tinge of the skin; in one case that I observed this was exceedingly well marked; it is said that the conjunctiva also become similarly affected. The respiration soon becomes accelerated, even though the lungs are free from any secondary inflammation. It is worthy of remark
That there are no auscultatory signs to guide us, the diagnosis of pulmonary effusion being drawn mainly from the rapidity and embarrassment of the respiration. In a few cases where Empyema results, this condition might be discovered by auscultation and percussion, but as far as my experience goes, these are the exceptional cases. I have repeatedly seen the lungs level with numerous abscesses, and small patches of firm tissue without there having been any pleuritic affection. The pain is usually severe, especially in affection of the abdomen, probably from the peritoneum becoming affected, and it is often referred to the part which subsequent inspection shows to have been the seat of the secondary affection; whilst at other times but little pain is complained of. Selenium is by no means constant. Though few cases will be found in which it has not been present at some periods of the disease. With the constitutional symptoms there are usually local ones indicating the organ affected; but these are sometimes very greatly marked. From these symptoms it will be seen that there is no pathognomonic type of symptom; its diagnosis must be formed from the conditions under which it occurs. The following case admitted into the Clinical Ward distinctly illustrates the symptoms and progress of the disease:

Ellen Mc. Gilvany, 46. 40, the wife of a Shopkeeper, was admitted into the Infirmary, Dec. 4, 1850, complaining
of palpitation, and some pain in the epigastricus and right hypochondrium. She states that she has been ill six days. On Friday Nov. 29th she was suddenly seized with shivering, and vomiting of greenish matter, accompanied with pain in the epigastricus. She was confined to bed on account of the pain, and from the faintness experienced on attempting to rise. Vomiting has occurred every day up to the period of admission. She is six months gone with child. The face is pale, the eyes very languid, the countenance much sallow, and debilitated. The skin is cold and perspiring. The pulse is small and feeble. The tongue is dry and brown in the centre; the bowels are confined; and there is great tenderness on pressure in the epigastricus and right hypochondriac regions. After she had in some degree rallied from fatigue she was further examined. The thoracic organs were found to be unaffected, except that the pleurae dealt dullness was slightly increased. The tongue was not so dry as at the time of admission; bowels have not been moved; urine clear, of an orange-red colour, not copulable. Dr. Allen was in the ward when she was admitted. He directed, at once, and to be followed on the same morning, one by one; 

of opium to be taken immediately; and in the evening twelve leeches were applied to the back of her back, and one grain of opium was directed to be taken at bed-time and to be repeated next morn.

Dec. 2nd. Leeches did not bleed well; has had but little sleep;
Moist have been moved; pain unaltered, but much better in
the right hypochondrium. There is great heat, but the
tongue is rather more moist. Pulse 120, thin, soft and
external pulsations. Has had no vomiting since admission.
Twelve leeches were applied to the seat of pain, and she
was directed to take a pain and a half of opium every four
hours. To have the effective draught for drink; also to have
a purgative camom.

9 p.m. The miscarriage last night; there is still a great
heat of pain; there is great debility, the pulse thin, soft
and tender. The opium was directed to be continued, and a
leech to be applied for eight hours to the seat of pain.
In the evening the pulse was tender and pulse. To have
four ounces of wine.

10 p.m. A leech has been a little. She has had a pain of
opium every three hours since last evening. Pain is abated
and the breathing is easy. Pulse 112, still soft. Tongue
rather moist; had had no vomiting since admission; the
bowels have been moved. To continue the wine and opium.

11 p.m. In change since last report.

9 a.m. She appears to-day more dejected. Pulse 112,
better, and still soft. Pain in the abdomen not abated;
has had a draught to-day, but no vomiting. Did not sleep well.
Bowels have been moved once to day. Has had since last report
a pain of opium every four hours, and eight ounces of wine, and
To-day she was found a Rhinobac and appendicid papation, and a Colonel and Opium pile every eight hours. The Wine to be introduced to 7 ounces.

In the evening the headache was less, but each aspiration was succeed. Pulse very feeble. Bowels have been moved from 2 to 5 times since the Colonel and Opium pile was taken. The fever was checked towards mid-night, but she died early in the morning.

The Autopsy revealed by tumor at the stomach; the details will be found in the head of anatomical character of Pyrexia.

Mr. Arent collected twenty-three cases of frequent abortion following inoculation of the head, and the usual course of these cases. The observer seems to have been Mr. H., and in the great majority of twenty-four cases it is stated, that the patient for some time did well, having recovered his consciousness, when they had been lost, which was frequently not the case, was free from fever, and the wound suppurring kindly; that afterwards unfavourable symptoms took place, consisting of fever, delirium, nausea, and vomiting, delirium, yellow colic of the skin, and sometimes, shortly before death, pain in the right hypochondriacum, or affection of the chest. There was some difference in the period at which these symptoms appeared; but of nine cases, 6 of which was the seventh, and the latest the twenty-fourth day after the ace.
accident. The average death of the fatal termination of the same occurred was between the twenty-second and twenty-third days, the earliest being on the fourteenth, and the latest on the twenty-seventh, subsequent to the injury.

The symptoms that result from the entrance of Putrid Matter into the circulation, while they bear a considerable resemblance to those resulting from the administration of poisons with blood, appear to be characterized by certain differences. It will be seen in a subsequent part that the effects of putrid matter on the blood are very different to those resulting from the addition of poisons under the same conditions: for whilst the latter always produces coagulation, and forms a clot which is uncommonly firm, and with difficulty broken down, the former retains coagulation and forms a soft, easily broken down emulsification.

With these striking differences, we ought to have an essential attention to the symptoms which we have seen to be the common result of putrid infection. Thence such differences to exist, and Thence no one who has carefully read the experiments of Dr. Japson, can have failed to remark how often the intestinal mucous membrane become affected, after the injection of putrid matter into the blood. The affection was chiefly characterized by frequent, dark, and extremely fetid evacuations attended with marked relief, and in some instances by the entire removal of all the symptoms.
What is means by this term?
Anatomical characters of Pyrexia.

The Post-Mortem appearances observed in those who die in consequence of the introduction of frothy fluids into the blood cannot, for the most part, be distinguished from similar changes produced by other causes; yet there are some effects which are peculiar, and may be directly associated with the reception of foreign matter into the circulation.

The most characteristic circumstance attending the extension of the disease to different organs of the body, is that several parts of those organs, or even different organs, will be simultaneously affected. The disease will appear at once in various spots, which will become rapidly disorganized, while the surrounding tissues will remain unaltered, either in structure or colour. The appearances on dissection will vary according to the part affected, and the stage of development in which the disease is found; but the general characters of the organic changes produced by this may be said to be small disseminated centers of inflammation, having a great tendency to the rapid formation of pus. These conditions being indicated only, externally, by the accompanying functional disturbances. Purulence may be said to be the characteristic result of the admixture of pus with the current of living blood.

It is met with under two distinct forms, viz. of effusion, and of purulent effusion; the former condition has been found in almost every organ of the body, whilst the latter has been observed only in the thoracic and abdominal cavities.
Of all the sceneries, the lungs are most frequently the seat of these multiple points of inflammation and affect. They appear either as numerous, small, well-defined centers of suppuration, having red, papillated pulmonary tissue around them, or as black impressions having soft walls easily softened down and evidently consisting of portions of the lung in a state of gangrene; suppuration, if it be present, taking place only at the circumference of the mortified part. In the case of Mary Ann Carroll, examined in the Pathological Theatre, these conditions concurred: the lungs containing numerous small yellowish spots, seen beneath the pleura. When these spots were incised, they gave out a few drops of pure pus, which, when examined microscopically, was found to contain some very highly developed corpuscles, together with many granules and oil globules, and also many anomalous forms. Besides these little affections, there were some elevated cavities containing a dark-coloured debris of tissue, and circun

...
...attaches scattered through the lungs. In the substance of the lower
lobe of the right lung, were several small circular patches of
yellowish exudation, surrounded by rings of infected pulmonary
tissue. On a microscopic examination with a low power, very
distinct granulations could be observed in the section, but in higher
powers showed the exudation to be almost entirely composed of
fibrous corpuscles, the granulations being distinguished by puncture
through glaciers.

In some cases of Pyorrhea, minute attachers have been observed
in the heart, both beneath the lining membrane, and in the
muscular tissue. Have not seen this condition of the heart
arising from Pyorrhoea, and it certainly is not common.

Next to the lungs, the bowel becomes most frequently the seat
of secondary inflammation. Every part of the organ affected
by histidiosis, as in the lungs, proceeds to suppuration with
a rapidity truly surprising. The usual appearances presented
after death are protrusions on the surface of the organ, which
when cut into often discharge an enormous quantity of pus; and
upon emptying the attachers, the hepatic tissue

The lungs, surrounded by indurated and well-marked inflam-
ination, but on the contrary it is more soft than natural, break-
ing down readily on slight pressure with the finger. The following
was the condition of Mr. Brown in the room of Mr. Galbraith whose
case is related: The whole organ presented externally a generally
diffused deep purple colour, and a considerable number of yellowish
coloured. Fluctuating prominences, having a gradually rounded outline and occupying an extent of from one to three inches. On section, the organ exhibited numerous atelectases of nearly a globular form, and in a few instances confluent. The tissue lining these atelectases was composed of a soft debris of a yellowish gray colour, and forming an ill-defined pyogenic membrane with large flocculi projecting from the surface. This abutted immediately upon the hepatic tissue, which throughout was of a purplish colour, having a mottled appearance from the greater or lesser depth of the colour. The lobuli presented a red tint from center to circumference, and the hepatic vascular radicles were indistinctly visible around the general concretion. The large stab burs contained a little bile.

Affections of the spleen are not often met with, and when present the atelectases are usually small and well-defined. In one case wherein abscesses of the lungs, hepatic atelectases, and jaundice intervened upon necrosis of the liver, the spleen was quite free from atelectases, but was soft and turgid yellow. In the boy in whom an affection of the lungs intervened upon a gun-shot wound, the spleen presented a very mottled appearance. Under the microscope it was found to contain, in addition to blood corpuscles, nucleiated fibers, and the usual splenic cells.

The secondary affections of the kidneys are probably not to readily recognized as similar affections of the lungs and liver; for though the kidneys are often found diseased in those who die of Pycnemia,
yet it is comparatively rare that secondary abscesses are formed in them. The appearances presented are not usually to be distinguished from those produced in these organs from other causes than fulminating infection, but occasionally characteristic abscesses are to be detected in them. In one case I saw small collections of pus both in the cortical substance, and in the pyramids, their from being very disintegrated, some being fluctuate, others clotted, and one pulsate; but in other cases they appeared quite normal, whilst the meninges were, and sometimes both, were in a state of complete decomposition.

The brain and its membranes sometimes present diseased conditions in those who die from fulminating infection of the blood. In the majority of cases these conditions are perfectly unconnected with any peculiar effects of the disease; but in others, where a large or fulminating abscess has been found, it would appear that there is something more than mere coincidences. Whilst making this general statement, I would observe that one in one way by which the brains of the brain are especially liable to become affected, and through them the pulmonary and other organs. I allude to those cases of fulminating abscesses complicated with disease of the cerebellar tumours. This complication has not been sufficiently attended to; though the cerebri of the temporal lobe, and as a consequence an affection of the brain, has long received much consideration. That the cerebral tumours should occasionally become affected during the
caries desorganization of the temporal bone, is what might naturally be anticipated from their anatomical relations to the bony portion of the temporal bone; and when it is considered how invariably the dura mater becomes inflamed, either from sympatry with disease of the ear, or extension of the destructive process from the brain, it is certainly surprising that this affection has been so rarely referred to. The complication has proved fatal in a way which would scarcely be suspected: that is, by giving rise to secondary affections in the chest. The following case, abstracted from Dr. Abercromby's works, must be of this description, though Dr. Abercromby offers no explanation of the thoracic complication:

A young lady, 18 years of age, had been subject to frequent pharyngeal affections, was affected with delirium, headache, and pain in the ear, with inquietude and spasmodic paroxysms. She was afterwards attacked with inquietude and a quantity of foamy pus was evacuated by puncture, with some relief to the headache. The pulse varied from 124 to 84 in the course of the day. On the following day the patient complained of some pain in the left side of the thorax, for which she was bled with partial relief, but the pulse was very rapid, and the death quite sudden on the fourteenth day. Inspection. Right temporal bone in many places rough and dark coloured. Histology of the dura mater. Right lateral sinus much thickened, and filled with a deposition similar to that which occurs in the cavity of an aneurism.
Pleural cavity contained fully a pound of purulent fluid.

In a case recorded in the Medical Gazette by Dr. Bruce, in particular of the description of a boy of 9 years, it is detailed that there was found extensive disease of the bronchial membranes, and nearly a pint of thick, yellow-coloured pus had filled each pleural cavity. The thick layers of the lungs were congested, and studded with purulent deposits of various ages. Both pleural sacs were exerted, externally with a thin layer of yellowish lymph, evidently of very recent formation.

A limited number of such cases are to be found in the periodic literature, but probably it is a condition that would have been more frequently recognised, had its importance been understood.

The secondary affection of the serous membranes are of frequent recurrence, but it to purulent effusion into the pleura. That attention has been chiefly directed, this being the more common than effusions into the pericardium or ascidom, which are comparatively rare. In the pleuritic affection resulting from pneumonia, there is always undoubted evidence of pre-existing inflammation, but here, as elsewhere, the characteristic effusion is pus, one or both pleural sacs being frequently found one-third filled with this fluid. Sometimes the pleuritic effusion has been coincident with, and perhaps depended on, one or more minute pulmonary affections having opened into the pleural cavity. The affection of the pericardium resulting

...
from Pyrexemia, are the same characters, as belong to the Venereal complication, just considered.

The affections of the joints consequent on Pyrexemia are of frequent occurrence, and have required much attention. After amputation above a joint result occurred, it is not uncommon to find pain in the joint above. The cause of this is believed to be the propagation of the inflammation by the medullary canals, in which pus is often found. But, in many cases, we cannot admit this explanation, as joints far removed from the source of primary suppuration become the seats of such effusion. There is sufficient to show that these cases admit of an easy solution. The knee is generally the joint first affected with pain and effusion, the ankle, shoulder, wrist, hip, are also frequently affected. In a woman who died sixteen days after delivery, these were the most affected joints. My notes of the case are as follows: Under the suck of the head, the head of the left humerus is cartilaginous; the fossa is filled with pus, but there is no pus in the joint, although the synovial membrane covering the head of the bone is discoloured. The right shoulder joint is healthy, but the acromial fossa is filled with pus. The bladder was healthy; the left ovary contained a small phlegmonous tumour; the uterus and symphysis pubis of the matrix presented numerous ulcers, some as large as a shilling and perforating completely the mucous membrane.

In this case there were no indications of the absorption vitellus.
Matters except the affection of the alimentary
The condition of the reins in a part which is believed to have
been the source of the subsequent constitutional and cerebral
affections has excited much attention. It has been stated
previously that the majority of Pottish and O'Leary Pathol.
opine are of opinion that Pyorrhemia is the result of a
preceding or accompanying Phlebitis. In many instances
the existence of corpora adhering to the sides of the reins, and
the thickening of their coats, have been deemed sufficient
proof of the existence of such inflammation; but there is
reason to believe that these conditions admit of a very dif.
derent explanation. In the last part of this essay, the effect
of pus on the blood are thrown. It will be seen that pus deter-
nines the much more rapid coagulation of the blood
than any other animal fluid; and believe the true
explanation, at least in many cases, is that the changes
in the vessels are owing, not to any Phlebitis, but to the
coagulating agent produced upon the blood by pus, and the
subsequent reaction union between the coagulum and
the sides of the vessel.

In the case of a boy who from Pyorrhemia with the usual
secondary affections, after a fever that ruined of the freeman,
the reins and lymphatics were examined by Dr. Gardner, but
not the slightest deviation from the normal appearance could
be detected. In another case where death resulted from
Pythemia, after amputation of the thigh, the following was the condition of the vessels. The Vena Cava ascendens was in all respects healthy, from its bifurcation to the arrective: it contains rather fluid blood, with small partially decolorized corpuscles, and the lining membrane is smooth and polished. Immediately above its junction with the Vena Cava, the common iliac vein of the left side presents a moderately firm coagulum, which, however, is slightly granular and opaque, especially on the anterior aspect where it is partially decolorized, and of a dusky purplish grey colour. The condition of the blood extends throughout the external iliac vein, the lining membrane of which, though slightly smooth to the touch for the most part, as it has here and there fragments of colored clot adhering to it, and everywhere presents a less polished appearance than that of the Vena Cava, being at the same time rather pale in color, excepting at the points where it is stained by the adhesion of the clot. The upper part of the femoral vein contains a considerable quantity of highly granular coagulum of an opaque purplish tint, portions of which adhere to the sides of the vessel, giving it a mottled appearance. The lining membrane is also deprived of its polish, and covered everywhere with minute granulations of colorless or slightly colored lymph, which can be readily carried away by the point of the knife. The Profunda femoris vein presents in all respects an appearance similar to this portion of the femoral.
Circumflex illi and internal iliac veins are distended with colored esculenta, but none and the lining membrane of the vessel are normal. Between the junction of the suspensa and the wound, the superficial femoral vein contains but little esculenta, being distended with a quantity of nearly pure presulent matter mixed at the upper part with portions of granular esculenta. The lining membrane is mostly of a pale yellowish tinct, but evidently more opaque than at the other portions of the vein. All the coats but especially the inner are thickened so as to resemble to some extent an artery. The surface of the inner membrane, which is mostly of a pale yellowish color, is thickly sprinkled over with minute granulations, which are easily separable by the knife in the form of a soft pulpy, and mostly colourless material, which under the microscope presents numerous cell forms. By the kindness of Dr. Gardiner I had an opportunity of carefully examining this appearance. With the naked eye, an intense but abundant and hazy molecular appearance. The cells seen are mostly circular or slightly oval, ranging from about twice the diameter of the blood globule a little larger, down to the smallest size distinguishable. They have generally more or less of a flattened appearance, and are very transparent, except when surrounded by the molecules above mentioned, which are found to a considerable extent in the interior of some of them. They have a distinct smooth edge, and the larger ones present well marked circular or
oral mucosa from one half to two thirds their own diameter. Mixed with these are some pus and hyaline corpuscles of the usual form and appearance, and numerous hyaline delicate cells. The bodies of the kind to often found in pus. These are also a few much larger bodies which are perfectly circular, and very hairy in their interior, but show strangely traces of two or three nuclei resembling those of the smaller corpuscles just described. They appear indeed to be aggregations of these held together by some delicate membranous membrane. The pus in the lower part of the skin, as well as that mixed with the coagula contains normal pus cells, and a considerable number of the hyaline bodies are noticed; also hyaloid corpuscles involved with pus cells; also a large quantity of granular and molecular matter.

It has been stated that many, perhaps most pathologists, have been in the habit of conceiving the conditions first detected as evidences of Phlebitis; but the recent researches of Hecil, Finlay, and others on the Anatomy and Pathology of the blood vessels, would lead to an opposite conclusion. The fact of these authors after pointing out the general resemblance which the larger vessels as well as the inner surface of the heart have to the serous membranes also mentions certain distinctions which appertain to them. The serous membranes and vessels both possess an epithelial coat; but in the vessels there exists under the epithelium
a layer of mucous membrane distributed of vessels, which together with
the inner layer of epithelium constitutes the so-called inner coat of the vessels. This is strengthened by depositions on its
surface, and indeed to frequently in this the case that it is
difficult to decide whether these thickenings are pathological
or not; whilst, moreover, beneath the epithelial layer of serous
membranes there exists a layer of cellular tissue rich in
nerves and vessels. From this Anatomical distinction
between serous membranes and the walls of blood vessels, two
Physiological distinctions depend: first, that the vessels
are not so easily excited to inflame, even as the serous
membranes are; secondly, that vessels when inflamed, cannot
so quickly and fully pour forth their exudation upon the
free surface, as occurs in the vessels of the serous membranes.
Inflammatory exudations of the outer and middle coats of the
vessels do not readily make their way through the inner.
In none of the experiments of Virchow, after an artery was
deprived of blood between two ligatures, was there an exudation
poured forth on the inner surface of the arterial coat upon
the application of a stimulus either to the outer or inner surface.
When therefore depositsions and thickening are found in the
interior of veins which during life were filled with cold
stagnant blood (and it will be shown hereafter that the effect
of pus on blood is to cause its coagulation), such changes
in the structure of the vessels are to be referred to exudation.
I think that is translating the English of chemically unassuming solutions. May
it be a further hinting to compaction. The effects together in that case won’t be
of a very large effect. Is this right?

Will anybody translate this?

Cambridge
derived from the fluid in the vessel itself. One can suppose that the alterations in the vessel in these cases arise from an expenditure of its own vessels, since it is quite certain that the feverous substance could separate from the fluid expenditure. The latter must be carried along with the stream of fluid. Why should the febric, which proceeds from the coats of the vessel expelate before the febric contained in the fluid? Why should it expelate so long as the fluid is in motion, since the motion of the fluid is the cause which renders expulsion? We cannot suppose that there is any difference in the febric caused by the same nature or distinguished from the febric of ordinary fluid, which renders it more prone to expelate. There is no reason to suppose in the Umbilical cord and in the Vessels Arteriosus that a plastic expenditure is separated from their coats. When, on the contrary, it is expelated, it means which Nature and Adoption to prevent purgative effects expelate in the constitution of affections set up in internal organs, in the expelation of the febric around the part, and the subsequent stimulation of the vessels, it is not conceivable for that purpose febric should be expelated by the capillary vessels to a part which is in immediate contact with the febric of the fluid, especially when the observation of vessels is taken into consideration, namely, that the coats of the vessels do not possess that richness in fluid that
Has it not been generally believed, considering that heat is the essential power in itself, and that the materials for the formation of textures and being that all the phenomena connected with fluid and inelastic admit of a natural explanation without knowing recourse to phlogiston, that I content myself by knowing that fluid is capable when combined, of becoming organized. Mr. Newton, speaking of cohesion, says: "I imagine it to proceed upon the same principle as the union by the first intention: for union by the first intention is no more than the living parts when separated, whether naturally so by art, forming a reciprocal attraction of cohesion with the intermediate esculinum, which immediately admits of mutual interweave, and, as it were, one interest." And again: "When fluid has been separated, so as to adhere to both surfaces and to keep them together, it may be said that union has begun." Mr. Newton gives a plate representing a coagulum of fluid adhering to the Tunica Vaginales. The adhesion was firm, though it admitted of a separation at one end; when separated, fibres were seen running between it and the testis. The following account of a structure found in the brain of an insane person appears to me to afford an additional confirmation of the view: "Shave taken of the condition of the vessels in Pyorrhonia: that the thickening and alterations of texture so often found result not from a preceding or an..."
accompanying phlebitis, but from the concretion of the blood by
inward the subsequent union between the conjunct and the
outer of the vessels. In his case later to, Sir Papeit states
"a thin layer of pale coloured, and muddy membrane lined
the whole internal surface of the cerebral aorta, and
adhered closely to it. Its colour, the existence of patches
of blood-cloth interlaced on it, and all its other character,
not satisfactorily proved that it had been a thin clot of blood.
Numerous small vessels could be seen passing from the aorta
mater into this clot membrane. Its minute structure showed
Character I. peculiar interest. In the substance of what
appeared like a firm clotted clot of fibrine, spread thick over
with minute molecules, he addition of acetic acid brought
into view corpuscles like nuclei, very elongated, attenuated,
and, in some instances, like short sticks. Such fibre.
By the favour of Dr. Gardner Chase had an opportunity to
study the internal surface of the veins of a woman
who died with a large encephaloid tumour occupying
the medullary, and encroaching greatly upon the
left hemis which was much compressed. Found that
the left vein on sanominate was nearly obliterated, whilst
in the left pulse was enormously distended by a nearly
solid mass of coloured coagulum, by which its calibre
was almost entirely obliterated. The microscopie showed the
coagulum to consist of fibrine. Had this been occurred in
In all circumstances.
connection with Pythemia, it would probably have been referred to Pachyderma, whereas under the circumstances under which it occurred, it was impossible to refer it to this cause, and could be referred to an internal exudation of the blood and the subsequent union of the exudate to the side of the vessel.

The condition of the blood has not thrown much light upon the pathology of Pythemia. In the case I have recorded there was a peculiar purpuric appearance. Mr. Arndt has observed that the blood attracted from an arm of persons suffering from this affection, has presented a dark, and livid appearance, and that the exudation was more soft than usual. I think that he has described the condition of the blood resulting from Putrid and not Putrefactive infection, as the latter invariably renders the exudate more firm than natural, whilst the addition of putrid matter no more in its precise conditions Arndt has mentioned. It hardly necessary to refer to the mistake of Professor and Dr. Allen of Thomson, who confounded the ordinary white flat sole of the blood with the pus flat sole, and expressed the opinion that the formation of pus in the blood was the proximate cause of most fevers, from having observed pus-like corpuscles in the blood in these affections, in enormous numbers. The best proof that they were not pus flat sole is that they never occurred in secondary affections with these, characteristic of the introduction of pus into the blood.
It will be seen by reference to the experiments recorded in the present part of the essay, that the effects of pus on the blood are quite peculiar. The coagulation of the blood is quickly determined, and whilst coagulating it presents a peculiar "stumpy" or "stubby" appearance which is quite characteristic. This generally stated in works on this subject, that the effect of pus on the blood is to render the latter darker, and its castaneous tinge than natural; such is not the case. Nor do I see that these are the effects of Putrid matter, whether animal or vegetable; whilst pus actually renders the Castaneous more firm than in normal blood.

The effects of other fluids on the blood were carefully noted, but they produced no such effect as pus is alleged to do.

It should be mentioned that the castaneous tinge of blood to which pus has been added presents a remarkably granular appearance, apparently very much resembling a condition of the blood formed in the vessels of those who have died from Pulpchonia.

I shall now proceed to the concluding part, namely, the cause, and nature of Pulpchonia.
The Cause, and Nature of Pyrexia.

The difficulty of understanding the effects of diseases and the products they produce is evident. As they are introduced into the circulation, they render an irremediable state of the patient's system unattainable. While changes in the structure of solid parts are more easily observed, the effects of pus upon the blood itself have been less understood. Many anatomists have neglected this disease, and its effects upon the blood have been insufficiently explored.

It is true that the circulation of pus globules with venous blood has been maintained with much ingenuity, as being capable of explaining the formation of the vesical abscesses and other secondary affections, quite independently of any alteration in the character of the blood. This opinion has been supported principally upon the physiological grounds. That foreign matters, entering the blood and unable to be discharged by the natural evacuation of the body, are liable to be arrested at the first set of capillaries that lie in their course, and as all the venous blood passes through the capillaries of
the lungs, and a considerable part through those of the liver, it is believed, that in the capillary tissue of these organs, that the pus globules, and other material substances (Mercury for example) incapable of being discharged by the usual excretions, become entangled and excite inflammation in the tissue in which they are thus arrested.

This opinion of the mechanical arrest of the pus globules in the capillaries, is considered by many to be unanimously established by the well-known experiments of Luschin, in which he introduced metallic mercury into the veins of living animals with the result of producing small disseminated affections, each containing a small globule of mercury, in the lungs or liver according as the mercury was introduced into the Portal or Pulmonary circulation. Hope to adduce sufficient proof hereafter that this opinion can only be received in a very qualified manner.

Again, it has been generally believed that the pus which gives rise to the secondary inflammations and affections is to be attributed to the existence of an antecedent or an accompanying Phlebitis in the part of the body primarily affected. These already shown that the researches of Senlé, Vinkow and others tend to show that this opinion is founded on the supposed analogy of structure existing.
between the serous membranes, and inner surface of the
heart and bloodvessels is untenable; for whilst the acellular
tissue beneath the epithelium of the serous membranes is
very vascular, that which exists beneath the epithelium
of the veins (and also of the arteries) is destitute of vessels;
and as we proceed in the inquiry, it will become
evident that there is no necessity to have recourse to
Phlebitis to explain the phenomena connected with this
disease.

With the view of ascertaining whether pus exerted any
influence on the blood, I was induced to make the fol-
lowing experiments, which were performed with the as-
stance of Mr. Morton and Mr. Peace.

Experiment 1.

The integuments covering the side of the neck in a Sheep
having been reflected, opened the external jugular
vein, which had freely; and having previously procured
four vessels in all respects the same, three quarts of blood
were let into each vessel. The first contained two dollars
of pleuric pus, the second the same quantity of fluid mer-
ccury, the third a similar amount of water, whilst the
fourth was left empty. The contents of each vessel were
gently stirred with glass rods until coagulation commenced
which was noted by a watch. At the expiration of three
minutes, the contents of the vessel containing pus had
become coagulated, whilst the blood in the other vessels had, at this time, undergone no change. At the expiration of twenty minutes the blood was equally coagulated in all the other vessels, not the slightest difference being observed in the period of their coagulation.

Upon examining the clots, the first (containing the first patient) presented a remarkable starchy or stringy appearance; it was very thick, and so tough as to be held up entire when perforated by an instrument. Its form was very irregular, and contrasted strikingly with the others, of which assumed the circular form. The second (containing the mercury) was readily distinguished by its weight; upon breaking it up numerous globules of mercury, unchanged in appearance, were found in its interior, but the greater part was found on the under surface of the clots. It was in all respects, except its weight, precisely similar to those contained in the third and fourth vessels. The clots of the other two vessels were the same in appearance; circular in form, and of moderate consistence; the colour was uniform and presented none of the mottled appearance so evident in the clots containing purin; neither did they possess the tenacity and firmness that characterised the clots containing the purin.

The serum was normal in each vessel.
In this experiment the effects resulting from the administration of pus, with every thinking, not less in the capacity by which the coagulation was induced, than in the differences of the clot, which were certainly remarkable.

Experiment 2.

A cow having been stunned by repeated blows on the head, the integuments of the neck were quickly reflected, and the external jugular vein opened. A few ounces of blood were received into a vessel containing half an ounce of pus, which however did not appear red in parts of the body, having been allowed from a vesicular gland in the neck; the second vessel, which contained half an ounce of fluid mercury, was filled with the same quantity of blood as in the first vessel; whilst the third containing half an ounce of water, received into it also from sources of blood. The contents were gently stirred with gentle rods as in the former experiment. At the expiration the blood containing the pus began to coagulate in the peculiar lumpy manner so characteristic of it; the coagulation began in the other vessels much about the same time (perhaps not quite so quickly, but the difference was very slight), but the coagulation was much more complete, and more effaced in the blood containing the pus; at the expiration of twenty minutes none of the clots were firm, and they underwent no subsequent change.
When examining the clots, the first containing the fluid was irregular in form, presenting the same peculiar mottled appearance obtained in the former experiment, and like it also a stringy appearance which I have observed in every instance when pus has been mixed with blood. The crustamentum was firm and tenacious. Under the microscope, a large number of pus corpuscles were evident. The second (containing the mercury) presented an uniform color and consistence. Its form was eccentric, and its weight consedurate owing to the globules of mercury entangled in its interior during the constitution. It had none of the mottled appearance, nor tenacity which characterized the crustamentum containing the pus, and was not nearly so firm. The crustamentum in the other vessel, owing to an accident could not be examined.

Although the differences in the clots were as remarkable in this as in the former experiment, yet the constitution of the blood by pus did not begin until it had also commenced in the other vessels. I am disposed to explain the discrepancy by changes brought in the blood whilst under the influence of living vessels, by the injury done to the nervous system: the animal being killed by very violent and repeated blows with a hammer on the head. It has been mentioned that the pus was derived from a suspicious gland, and did not appear to be hardly
of normal consistence, but I do not think this had much
to do with the result.

Experiment 3.
The external jugular vein of a sheep having been opened,
three ounces of blood was received into a vessel containing
two drachms of fresh pus; the same amount of blood
was received into a vessel containing two drachms of
very slightly jellied pus; and into the third cup con-
taining two drachms of a watery solution of hourly
jellied liver, four ounces of blood were also let. The
fourth vessel contained two drachms of water.
In the first vessel [containing fresh pus] coagulation
in three minutes, and in seven showed no usual stumpy
appearance; the exsanguination appeared somewhat darker
than natural; at twenty minutes the clot was partly solid
and throned. In the second vessel [containing the very
slightly jellied pus] coagulation commenced under two
minutes; at eleven minutes coagulation was more advanced
than in the one containing the fresh pus; the colour was
also somewhat darker than that contained in the first
vessel; at twenty minutes the whole mass formed an
irregular solid, of a stumpy appearance. In the third
vessel [containing a very [field] watery solution of liver]
coagulation did not commence till between four and five
minutes but at the expiration of seven minutes it had
formed a soft ununiform coagulum, the colour being darker than in either of the other vessels; in twenty minutes the coagulum was still soft. In the fourth vessel containing the water, coagulation began at five minutes and was completed in twenty minutes.

Experiment 4

Another sheep having been obtained, four ounces of blood were received into a vessel containing half an ounce of very slightly foiled pus; the same amount of blood was received into another vessel containing half an ounce of very foiled aqueous solution of Epsil. The blood containing the pus began to coagulate in one minute, and was pretty firm in its, presenting its usual shining appearance; the colour was slightly darker than natural; whilst the blood containing the putrid animal solution remained quite fluid at five minutes, and it was only slightly coagulated in twelve minutes. The examination of the effects in the two last experiments showed the blood to which had been added to consist of small hard nodules irregularly placed in other parts of the castaneous. These nodules examined microscopically were found to consist of fine globules of large quantity and of blood clots; fine globules were found in other parts of the castaneous but in not nearly such just numbers. The whole of the castaneous had a peculiar stickiness.
appearance, evidently rising to flosules of pus. The colour was slightly darker than natural. The fluid to which
the putrid solution had been added, had a very dark appearance; there was a film of sulphuric acid, and its colour was very dark and no less soft, being
terribly soft. The latter was broken down by the force. Not a single
and bold flosule could be seen with the microscope,
though repeatedly looked for. Whilst the white corpuscles were seen moving about in the field of the
microscope, quite unchanged. The cirrhmation con-
tained in the vessel to which water had been added, was firm
and presented all the characters of healthy fluid.

Experiment 5.

Having prepared four vessels, in the first was placed a
dash of perfectly pure pus; in the second an equal
quantity of strongly putrid pus; in the third the like
quantity of a slightly putrid animal solution; whilst
in the fourth was placed a dash of slightly putrid
vegetable solution. The external pressure being of a
thick was now opened, and two ounces of fluid were allowed
to flow into each vessel, the contents being firmly stirred
with glass rods until coagulation commenced.

In the first (containing fresh pus) coagulation began at
the expiration of a minute: it was pretty well advanced
in five, and nearly completed in ten. The cirrhumation-
the next quote from an eighteen minutes. In the second (containing
purulent pus) exsanguination commenced and was completed
in much about the same time as in the first vessel, but
the observation at the expiration of the time was not so
precise. In the third (containing pus and animal solution),
exsanguination began at the expiration of a minute and a
half, and was pretty well advanced in ten, but at
the expiration of eighteen minutes, the exsanguination was not
nearly so far as in the two vessels containing pus. In
the fourth vessel (containing pus and equivalent solution),
exsanguination began at the end of two minutes; at the
expiration of ten was less advanced than the correspond-
ing time at solution, and even at the end of eighteen
minutes the exsanguination was imperfect.

Examination of the clots.
The one containing pus pus was decidedly firm, tenacious,
with a peculiar granular appearance, evidently from
globules of pus. The serum was well squeezed out.
Examined with the microscope, a large number of pus
corpuscles were seen; also a large quantity of the
coloured blood corpuscles. It was impossible to distin-
guish the white from the pus corpuscles; in no
instance have I been able to do so. The exsanguined mat-
ter was unaltered.
The blood to which purulent pus had been added, presented
the castorumum was not quite so firm as the one to which
fatty oil had been added. It was slightly darker than
natural, and had a distinct fatty odour. With
the microscope fine corpuscles were seen to be numerous.
The colouring matter of the red corpuscles appeared
somewhat darker than usual. The whole mass had
a distinct granular appearance.
The blood to which a diluted vegetable solution had
been added, presented a soft coagulum, of a uniform
dark colour; it had no odour. With the microscope the
colouring matter was seen generally diffused, but the cor-
puscles appeared quite unchanged.
In one fourth vessel, which contained the filtered
animal solution, the castorumum was rather firmer
than that to the corresponding vegetable solution had
been added. It was distinct of all granular appearance,
and had a dark colour. This was a slight putrefac-
tive odour. With the microscope the coloured corpuscles
were seen unaltered, whilst the white corpuscles were
also clustered; but they appeared normal.

Experiment 5.

With the view of ascertaining the effects of other substanc-
es on the blood, and thereby to guard against error as
much as possible, in drawing any inference from the effect
of fats on blood, other experiments were performed with
bile, alcohol, chloroform he had as they have no direct
feeling on the surface of the skin; hence content
himself with mentioning the following experiment:—

Having opened the external jugular vein of a sheep, three
ounces of blood were permitted to flow into a vessel contain-
ing three drachms of chloroform; the same quantity of
blood was received into a second vessel. Three drachms
of ether, into a third vessel containing three drachms
of alcohol, in same quantity of blood was received; whilst
the fourth vessel, which contained three drachms of ether,
also received three ounces of blood.

In the first vessel containing the chloroform, the first
effect was the immediate change of colour in the vessels
blood to a bright scarlet colour. Coagulation began in
less than half a minute, was firm in eight minutes, and
was completed in twenty-two minutes.

In the blood containing the ether, coagulation began under
half a minute, the colour being a dark purple. Coagula-
tion was completed, as in the other examples, in twenty-two
minutes.

The first effect observed upon mixing the alcohol and blood,
was slight coagulation, beginning also under the half
minute. The colour was intermediate, being not quite so
dark as the blood containing ether, and only presenting
a faint aftertaste to the beautiful scarlet colour of the

Blood containing Chloroform.

In the blood containing water, coagulation began in five minutes, was slightly advanced in eight, and was not

firm in fourteen, although separation of cerasatumum

and serum was completed.

Examination of the Clot, by the Microscope.

In the one containing Chloroform, the corpuscles were

unchanged; the colour was partially diffused and

brighter than natural. Cerasatumum moderately firm, and

there was a distinct separation of the serum.

The blood to which water had been added, showed

the colour of the corpuscles partially diffused, the red

corpuscles, however, being very visible, but most

shrunken and of irregular appearance. The clot was firm, but

there was separation of the serum as in the former case.

The alcoholic blood had the colouring matter partially
diffused, the red corpuscles being mostly unchanged.
The cerasatumum was very soft; there was a slight

separation of the serum.

In the cerasatumum of the blood to which water had

been added, the red corpuscles were mostly invisible;
The colouring matter was diffused; the white corpuscles

were unaltered.

In reference to the experiments now recorded, they be

allowed to observe, that they were performed with contact -
enable us, and the results are faithfully stated. The
following deductions appear warranted by him:—

1. That pus, whether fresh or putrid, when mixed with
the fresh drawn blood of a living animal possesses the
power of coagulating its coagulation; and the coagulum
thus formed is characterized by its firmness, tenacity,
and a peculiar granular appearance which is quite
characteristic.

2. That fluid mercury exercises no influence upon
blood under the same conditions.

3. That the effects resulting from the admixture of putrid
matter with blood are essentially different, and in some
degree opposed, to those which arise from the mixture of
pus and blood. The coagulum being soft, uniform,
easily broken down, and of a dark colour.

It thus appears that pus, when mixed with blood coagulates
that fluid; and it will be at once perceived how beautifully
this action is ordained by Nature to prevent prevalent
atraction. So long as this power remains in the blood
it resist oil, as it were, sealed by a firm coagulum
while the healing process is going on; but if this
conservative coagulating action does not take place
in time to plug the vessel, the barrier, which Nature
in a state of health arrests the flow of pus into the veins
is not set up, and the poisonous fluid is carried onward.
in the current of the evacuation. It is true that the contractile coat of the vein assists in part also in preventing venous infection, just as it assists in preventing traumatic sequelae; but there are some veins so placed that they cannot contract on their contents; these veins, it must be evident, are solely dependent on the conformation of the blood for their safety. Stenome the veins lie bones; and when it is considered how many cases of pyaemia originate from disease of bone, the truth of these assertions must be apparent. Mr. Burnet has found that a single drop of mercury introduced into the cancellated structure of a bone is to be subsequently found in the lungs; an experiment which enables us to understand how readily intimated matter may find their way into the blood. Then the ordinary means for the repARATION of bone are unsuccessful; a fact which is of immense importance when it is remembered that a large majority of the cases of Pyaemia are dependent on diseases of the osseous system.

The first effect new after pus has gained admission into a vein will be to cause the conurbation of its contents; and the second will be the adhesion of the conurbation thus formed to the sides of the vessel, and we may then have the whole vein obliterated. But the conurbation may be interrupted with, or broken up after it has formed; in the former case the vein will remain unaltered.
in appearance, whilst in the latter, its effects will be found
thickened; this alteration in the texture of the vessel being
the effect and not the cause of the congeulation of the fluid.
But as in post-mortem examinations, the changes produced
in the vessel are much more easily recognised than the
alterations in their contents, the former have almost exclu-
sively occupied the attention of the Pathologist; but
instead of referring the congeulation of the fluid, to the
alterations in the structure of the vessels so commonly found
in these cases, to a previous or an accompanying phlebitis,
they may, perhaps, with more propriety be attributed to
the effects which result from the entrance of pus into
the vessel, and the subsequent vascular union between
it and its contents. This view is in perfect accordance
with a fact noticed by numerous observers, that the
congeulum in veins usually extends only to the nearest
collateral branch, where it abruptly terminates. If the
congeulation of the fluid in the vein and the alterations
in its tissues be considered, the result of phlebitis, it is
almost impossible to afford a satisfactory solution of the
fact, but now that we are acquainted with the effects
of pus on fluid, the cause is very apparent. When any
portion of a vein is obstructed, the fluid is kept at rest
between the obstruction and the next collateral branch;
and, if disposed to congeulate, there is nothing to prevent
such an action. But the case is different as soon as one vein
opens into another, a first current of blood is then passing
over the orifice of the obstructed vessel, and even although
the blood at this point should have a tendency to coagulate,
it is carried on in the course of the circulation before it can adhere
to the sides of the obstructed vein.

This view is confirmed by what takes place after delivery. It
has been observed in these cases, that the inflammation
usually attacks the uterine veins alone, and for the
most part the one only on the side of the uterus to which
the placenta has been attached. The hypogastric veins
are comparatively rarely affected; and the alterations
in the uterine veins, usually terminate abruptly at its
opening into the vera cava on the right side, or into the
vena cava on the left. Sir Astley Cooper first directed the
attention of the Profession to this circumstance, expresses
his inability to account for it. But the explanation
of the difficulty is such as I have just mentioned; and
I think the sudden termination of the defeated appear-
ances, affords an additional proof that the blood and
not the vessels, is the medium by which this affection
is produced.

From the evidence of these facts, and the experiments recorded,
it becomes apparent, that the introduction of pus
into the system through an infected, or in some

instances an inflamed vein, can rarely be the first step towards
prevalent infection of the system. Some change must have
previously taken place in the blood, by which its coagulating
power is impaired, or some unusual means, of a mechan-
ical kind, must have been employed before the pus can
find its way into the course of the circulation. The con-
tradictory statements which have been made by those who
have injected pus into the veins, may thus be reconciled,
by taking into consideration, the power exercised by
the blood in the experiments which I have recorded. There
can be little doubt that, while, in some instances, a
portion of the pus has been forced into the general circula-
tion, in the great majority of instances it has been detained
in the vein into which it was first introduced. And
accordingly, some experiments were made, secondary
attacks which they observed, while in other hands these
appearances were not produced.

Having been an intern of one of the largest British
dying-in hospitals, these views irresistibly impressed
with the statement which these cases of Phthisia in
fever to some form of Pneumonic fever. I have no
doubt this resemblance is owing to the circumstance
that the latter affection often depends upon the absorp-
tion of irritative matter from that part of the uterus
when the Placenta has been attached. In the uncontracted
utensis after child-birth, the rents which open upon the placental surface, pass through the firm texture of the organ, and are incapable of contraction independently of the muscular structure which surrounds them. The cœsulae which close them at their extremities secure them against the entrance of any foreign matter; but should these cœsulae be removed before the rents are otherwise protected, their open mouths are exposed to any secretions that the uterus may happen to contain. In these cases, if a cœsula be not firmly formed, or if it be displaced by violence, it may be broken up, and portions of it mixed with the fluid blood. Subsequent cœsulae may form in the rents, and offer fresh obstructions to the admission of any foreign matter, but these may, as in the first instance, be disturbed, and carried, together with any admixture of the secretions of the part, in the course of the evacuation. Dr. Simpson remarks, "The anatomical condition of the surgical patient after delivery, and of the surgical patient after an operation, are in many respects the same. In the surgical patient, we have a wound or laceration of continuity on the external part of the body, made by the knife of the surgeon; this wound is, opening upon its free surface, the mouths of numerous arteries and veins; and it comes to be repaired either by the direct adhesion of its opposed surfaces, or
more slowly by exudation of lymph and fluid from its surface, and the ultimate formation of a new skin or new enveloping or connecting tissue. In the gynecological patient, we have a wound or violation of continuity on the whole internal surface of the wound made by the separation of the placenta, and the evaporation of the decidua or mucous membrane of the uterus; this wound has, opening upon its free surface and especially at the former site of the placenta, the mouth of numerous arteries and veins; and it comes to be covered under the usual accompanying exudation of blood, lymph, and pus (lochial discharge), from its surface, and by the ultimate formation of a new layer or coating of mucous membrane. "Here is at the present time in the Clinical Ward, under the care of Dr. Christopher, a patient who was confined at the Maternity a few days before admission. Five days before coming into hospital, the right forearm became paralysed, puffed on pressure, and on the side of the hand there is now distinct fluctuation. The corresponding lower extremity is also affected, presenting the appearance called Phlebitis Obliterans. The thigh, but not the femoral, vein is felt a little harder than natural, and it is also slightly painful. In this case it is worthy of notice that the affection of the arm preceded by a day that of the lower extremity. If any doubt remained as to the nature of the case, it has been quite removed by the
occurrence of several affections in various parts of the body. In this case the only explanation admissible, I judge distant from the uterus becoming affected (without any affection of the uterus itself) by supporting that excited emotions have obtained admission into the circulation, either by veins or lymphatics, and have given rise to inflammation in different parts of the body.

So too in Psoehemia, we can understand in no other way the characteristic circumstance attending the extension of the disease to different organs of the body, and even to different parts of the same organ. The affection appearing at once in various spots, which rapidly became disorganized. This view is confirmed by experiments where various fluids were artificially introduced into the circulation by Mr. Gascard, without producing any upon the cells of the veins (as proved by examination after death) through which they passed, and yet the general symptoms were precisely similar to those originating from genuine phlebitis.

In accordance with this statement, it will be remembered that I have mentioned one case, where death resulted from several affections of the lung consequent upon a fur that lacerated the arm, where the vessels of the injured part were perfectly healthy. And it is an equally well attested fact that the venous fluid and lymphatics are often found perfectly healthy, while the phlebitic, or renal, or...
stained more distant veins are most likely diseased. In either case, the healthy condition of the vessels near the superficial lesion negates the opinion of inflammation having originated in, or propagated along, the coats of the vessels, while all analogy appears in favor of the disease being transmitted through their contents.

Having thus shown, I trust, that Pythionemia is the result of the entrance of pus into the blood, the question next arises, how does it give rise to the symptoms and mortal appearances characteristic of the disease? I cannot agree with Mr. West that it is owing to the Extern Paris Becoming abundant after it has reached the limbs; because Mr. Pedler has shown that the serum produces no effect if free from putrefaction when injected into the vessels; and if putrid, though local diseases were induced, they were not of the nature of vesicular abscesses but of gangrene. And further I have shown that the effects resulting from the mixture of putrid matter with the fresh-drawn blood of a living animal are very different to those of pus. Neither is the opinion of André admissible: that the affection we are considering is owing to a decomposition of the serum, and the action of Ammonia on the blood rendering it darker and distolled; because it is difficult to see when the pus is fresh how the animal matter can be converted into amonia. Besides these proofs by experiment that
the action of pus on blood is not to render it discolored, but on
the contrary the coagulum turns in fifteen minutes natural; whilst
its color undergoes but little change. An examination of my
experiments will show that the effects which Andrait mentions,
am peculiar mode which take place when putrid matter
are mixed with the blood. The opinion of Reckummel and
Pyxhimius tending to spontaneous changes in the blood, which
appears to be much the same as Jailer's opinion that it is to
be attributed to a spontaneous hypertensive diathesis, is
unsubstantiated by any facts; and the changes in the blood
came about when putrid matter was mixed with blood. I have no evidence
to show that the blood becomes diseased spontaneously. On
reflecting on the progress of the disease, its symptoms and
anatomical characters, the effects of pus when injected
into the veins of animals, the changes produced by the
administration of pus with blood. I think all the phenomena
connected with Pyxhimius are best understood by consid-
ering that they result from the entrance of a poison into
the system. No other hypothesis will give a natural and
satisfactory explanation of the simultaneous implication
of different organs, and even different parts of the same
organ; and it is impossible not to be arrested by the
similitude it bears to other poisons which give rise to
serious changes in other parts of the organism.
In any attempt to obtain a true knowledge of any disease
we are greatly assisted in tracing its resemblance to other
diseases the true nature of which are unquestionable. The
simplest examples of flood-infection are those in which
a poison, of well-ascertained qualities is introduced from
without; and for the purpose of illustrating my meaning
I shall take the usual phenomena that result from
infection of wounds, and from glands:—

A person sometimes a part, most commonly the hand,; This
is followed in a short time by toxic fever, in every case of
a typhoid character; the nervous system becomes greatly
affected, and as the disease proceeds secondary affection
in the form of abscesses take place in various parts of the
body, and at a distance from the original wound, and in
some cases even on the opposite; of the body, as in the
case of Dr. Sealy where the disease commenced in the
left axilla, and passed to the right forearm; and in the case
of Mr. Cunningham also been reported in the Edinburgh Med.
Chirurg. Trans. Vol. 1) Where the disease began in the left
axilla, and passed to the right, where it terminated in gangrene.

A man was brought into the Clinical Ward, having
large pustules, surrounded with a flush of inflammation,
occupying the face, upper extremities, and other parts.
There was also some erythema of the face. With these local
symptoms, there was well-marked typhoid fever, delirium,
and extreme prostration. The patient died soon after
admission. On examination, pus-tules, surrounded by a zone of injected vessels, were found in the lungs, lumps, and other parts. A student slightly injured his hand in examining the head of a stung bee, and an ulcer ensued, with inflammation of the subcutaneous and cellular membranes of the arm, and this was followed by sym pathetic fever. After some days, an abscess formed in the opposite arm, and another at the lower part of the back. Subsequently, he became hectic, and suppuration took place in the lungs, and in one of his kidneys; and after the expiration of several months, an abscess formed successively on each knee joint. A short time after, he died. (Dr. Williams.)

A man undergoes an operation, for some days he appears to be going on well, when suddenly he is seized with long continued and recurring rigors. The ulcers are succeeded by a fever of a peculiar kind, the countenance becomes collapsed, there is great anxiety, and there is unequivocallastoration. With these symptoms there may nausea or vomiting, and there may be some complaint of pain in the chest or abdomen. The skin has now become yellow, the pulse is rapid, delirium may or may not be present, and the patient dies. In destruction, pus-tules also appear found in the serosa or a peculiar characteristic effusion in the pleura or peritoneum.
2a. All this, or only

mutual varieties of this?
Now in all these cases we have been considering, there is first a local disease, on which secondary affections supervene, and these secondary affections are attended by a fever nearly the same in all, and the whole course of the phenomena in all indicate the action of a poisonous agent on, and through, the blood.

While this we are compelled to admit that there is a pus-ferment. It is not less certain that pus does not act, as some have supposed, as a ferment, because we know that all poisons which act as ferments are distinguished by the circumstance that the quantity introduced is a matter of little consequence, a small dose frequently acting as potently as a large one, only requiring more time to develop the results. But on the contrary, pus appears to act in a manner quite opposed to the action of a ferment, for it has been conclusively shown by repeated experiment, that small quantities of pus introduced into the system are incapable of giving rise to a fatal issue.

Some experiments by Mr. Gallieus (the details of which are unfortunately not precise) appear to me to throw some light on the perseverance (whether in part or in whole) which has been deemed so characteristic of this affec- tion. He found that pus introduced into the blood, cellular tissue or into a frous cavity, generally predisposed in a remarkable
manner to the supplicative action, although other foreign bodies, as iron nails, or common sand, do not produce this effect; and it would certainly appear from these experiments that the presence of pus in the fluid determines the nature of the subsequent edema.

Now that we are acquainted with the effects of pus on fluid, which we can explain by secondary affection of Röhrenwasser or otherwise than mechanical principles. The mechanical theory is obviously open to the objection that there is nothing in the size of the pus globule to occasion its effusion in the capillaries of any part. The best proof of this statement is to be found in the difficulty, not to say the impossibility, of distinguishing the pus globule from the white globule of the fluid. I am not aware that anyone, except Dr. Sedgley, has ever contended that they could be distinguished microscopically. I have examined both for a considerable time without being able to recognize the differences. Dr. Sedgley indicates, and from the concurrence of experience of all subsequent observers, we must suppose that he has been in error. In the opinion of Galvani that pus in the fluid determines the supplicative action to be well-founded, and now that I have shown what effects pus produces upon the soft tissues, fluid of a living animal, I think there can be less difficulty in believing this. At all events,
Smith confesses that all mechanical explanations of the formation of secondary affections, are quite unsatisfactory to my mind. I am much more inclined to seek their solution in Vital, rather than in Physical, Laws.