

Clinical lecture on phlebitis and thrombosis / by B. Wills Richardson.

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Expts
CLINICAL LECTURE

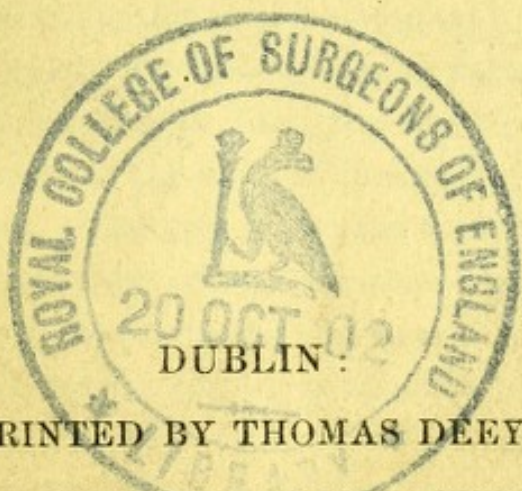
ON

PHLEBITIS AND THROMBOSIS.

BY

B. WILLS RICHARDSON, F.R.C.S.I.,

SURGEON TO THE ADELAIDE HOSPITAL.

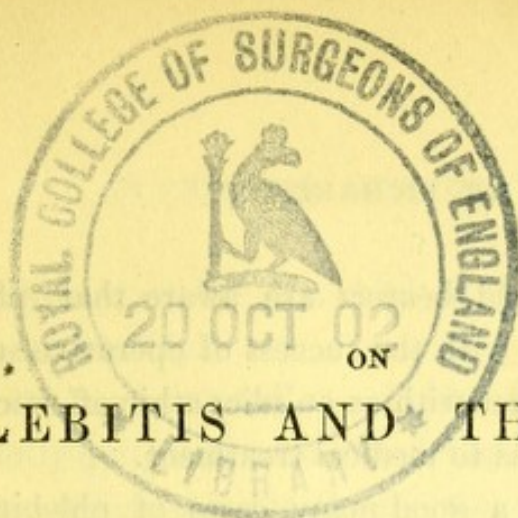


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PHLEBITIS AND THROMBOSIS.

GENTLEMEN,—In my lecture on acute rheumatism* I drew your attention to a case then in one of our wards, in which case were observed many of the phenomena so frequently complicating that disease. I also took advantage of the occasion to describe to you the treatment of rheumatism by the eliminative method, as it is called.

The girl who was the subject of that attack had, as some of you may remember, a very intense pericarditis, from which she recovered most rapidly, although neither mercury, specifically, nor bleeding, were had recourse to. To-day it is my intention to say a few words upon another disease, for the treatment of which mercury is, with some practitioners, a very favourite remedy.

We recently admitted into the hospital a very interesting example of crural phlebitis following parturition, and the patient was discharged from the ward without having taken one grain of the mineral during the whole course of her treatment. The case is also the more valuable, as the local symptoms were of such a nature, that there could be no doubt as to the disease we had to deal with.

I will also read for you the particulars of another case of nearly the same kind which was in the hospital in 1860, and which I treated on a similar plan and with similar results.

* Dublin Medical Press, vol. iii., page 209.

My more advanced hearers are aware that phlebitis frequently interferes with the success of operative surgery, and that it is also met with as an idiopathic affection, and proves very rebellious to medical treatment.

I have witnessed a good many cases of phlebitis, and have observed apparently dangerous results from the attempt to induce the specific influence of mercury. Indeed, the last case of the kind I saw treated mercurially, was so rapidly fatal, that I determined the first case of the same disease which should fall into my own hands, should be treated without the drug. Of course it would be unfair to attribute to the mercury alone the unfortunate result of the case to which I have alluded; at the same time, I have a strong suspicion that it hastened the fatal issue.

I wish you to understand that my observations, this morning, refer to individuals in whom there were local symptoms leading to the inference, if not certainty, that some portion of the venous system was engaged. I think it better to do so than to speculate upon cases without such local symptoms, the diagnosis of which must necessarily be so enveloped in doubt and uncertainty, as to lead to very unsafe deductions regarding their treatment.

I will now, Gentlemen, read the cases to you, and then I shall say a few words upon the pathology of this affection, which is engaging the attention of the most experienced and skilled pathologists of the present day.

PHLEBITIS—THROMBOSIS OF THE FEMORAL, POPLITEAL,
AND EXTERNAL ILIAC VEINS: RECOVERY.

Case 1.—Maria Cox, æt. 27, was admitted into the Adelaide Hospital on the 7th of last August (1862), having

been delivered of her first child on the 4th of the preceding month of July.

She was much exposed to cold after she was discharged—apparently quite well—from the lying-in hospital where she had been delivered. On the fourteenth day after parturition she was seized with a rigor, and a severe pain in the left ham, followed immediately by swelling of the left leg. On that day she fainted several times.

Some pills and a liniment for the leg were prescribed by the gentleman who first saw her after the seizure.

The constitutional symptoms on her admission into the Adelaide Hospital were mild in character. The pulse ranged from 80 to 90. The temperature of the skin was but slightly raised. The tongue somewhat furred and moist. Her countenance, however, was sallow and expressive of anxiety.

The left leg was swollen and œdematous, having the superficial veins enlarged and very visible. On examining the limb carefully I found that she could not bear the pressure of the finger in the popliteal space without experiencing great agony.

She was ordered to take twenty drops of muriated tincture of iron three times daily; wine, four ounces; full diet, and the leg to be stiped and raised above the level of the body.

The limb remained in the same state until the night of August 10th, when another rigor seized her, followed, in the morning, by great pain and tenderness in the left groin, along the course of the femoral vein, which, from its feel, was apparently plugged with a firm coagulum.

This pain likewise was followed by swelling and œdema of the thigh, and enlargement of the superficial veins; but

there was no constitutional reaction of any moment, her pulse being from 80 to 90, and full. Six leeches were applied over the femoral vein in the groin. The other treatment was continued, and as the bowels were confined, probably by the iron, she was given some compound rhubarb pill and extract of hyoseyamus.

12th: Tenderness in ham and groin very distressing; swelling of limb about the same as at last report. Three leeches were applied to ham, and three over the femoral vein. Continue the tincture.

13th: Tenderness in popliteal space lessened, but very severe in the groin. Swelling same. Six leeches to groin. Continue the tincture.

14th: Tenderness of groin and ham, although lessened, is still felt acutely. Four leeches to groin. Increased her wine to oz. vi. Limb to be stuped.

18th: Was attacked with severe pain in the hypogastrium last night, which subsided after the application of a turpentine stupe and the administration of a purgative. She was ordered an ounce of the following mixture three times daily:—

R Sulph. quinæ, gr. xxiv.

— ferri, gr. viii.

Acid. sulph. dil. ʒss.

Aquæ ad ʒviii. Misce.

And to rub the limb with a little of the following liniment, night and morning:—

R Liniment. anodyn. ʒii.

Ext. belladon. ʒii. Misce.

20th: Swelling of limb diminishing.

September 16th: She was attacked this morning with severe pain and tenderness in the right ham. No increase

in the constitutional symptoms. Limb to be kept raised and stuped.

17th: Is now also very tender in the right groin along femoral vein, and the superficial veins of this limb are much enlarged. She complains very much of pain behind the right great trochanter.

18th: Had a severe rigor last night; pulse 100; skin hot; bowels confined; tongue furred but moist; countenance very anxious; tenderness in right groin and ham much increased; the limb is swollen and œdematous, and two inches, larger at calf of leg, than the opposite one.

19th: Tenderness about same in degree, but it is more extensive, existing to-day in the right external iliac vein; swelling of limb greater than yesterday; pulse 96; skin hot; countenance anxious; bowels confined. Four leeches to ham, and four to groin.

R. Pil. colocynth. c. gr. x.

Ext. hyoscyam. gr. iv. Pil. ii. Nocte.

And one ounce of the following mixture, three times daily, instead of the quinine mixture:—

R. Infus. cinchon. ℥viiss.

Tinct. ejusdem, ℥iv.

Ft. mist. Stupe and keep leg raised.

20th: Enlargement of veins; œdema of right limb; pain and tenderness all lessened.

29th: Swelling of limbs has almost all subsided.

October 27th: Some slight increase in the swelling of the right leg. Has been taking the bark mixture and occasional purgatives.

November 5th: Right leg only half an inch larger than the left. Eight grains of chlorate of potash were added to each ounce of her bark mixture.

December 4th : Has been up for some days.

26th : All swelling and local symptoms having subsided, she was discharged.

PHLEBITIS — THROMBOSIS OF THE FEMORAL, ILIAC, POPLITEAL, INTERNAL SAPHENA, AND SUPERFICIAL EPIGASTRIC VEINS : RECOVERY.

Case 2.—Henry Tulmy, æt. 34, plumber, was admitted into hospital on the 18th of June, 1860, suffering a most acute and violent pain, with great tenderness, deep in the left popliteal space. There was no swelling of the limb, but there was considerable fever. Some blood was removed from over the tender part, and he was given a turpentine emulsion, with an occasional dose of compound calomel pill. In a few days the pain and other symptoms subsided. So far the case was obscure.

He was seized, on the 27th of June, with a severe stitch in the left side of chest, where there was discovered an absence of respiratory murmur, and higher up an indistinct friction sound. He had a dry cough, but some slightly bloody sputa were seen on a few occasions. These symptoms were accompanied by fever.

He was cupped and subsequently blistered, and had a few doses of pil. hyd. and opium, followed by considerable relief.

On the 2nd of July, he was suddenly attacked with most severe pain in the right groin, and excessive tenderness along the course of the right external iliac and femoral veins, which was immediately succeeded by swelling of the whole right lower extremity, with varicose enlargement of

the superficial veins of the thigh and lower part of right side of abdomen. I imagined I could feel the femoral and external iliac veins plugged by coagula.

Most severe pain was caused by any attempt to flex the thigh on the abdomen. Eight leeches were applied over the femoral and iliac veins, and he was ordered an ounce of the following mixture three times daily :—

℞ Infus. cinchon. ℥viiss.
Tinct. ejusdem, ℥iv.
Chlorat. potass. ℥iss. Misce.

Full diet.

July 4th : Tenderness lessened ; limb more enlarged ; pulse full, compressible, and frequent. Six leeches over femoral vein. Continue mixture. Wine, six ounces.

9th : Swelling of limb further increased ; complains of excessive tenderness behind right great trochanter—a symptom which I may here mention was frequently observed by Dr. Mayne in his cases. The tenderness in the course of the veins lessened. Wine, eight ounces. Continue mixture.

11th : Limb more œdematous ; all tenderness diminished ; superficial veins over great trochanter and right natis enlarged. Repet. mist.

17th : Had a rigor last night, and this morning he has deep tenderness in the left popliteal space, and swelling of the left leg and thigh. Repet.

23rd : Swelling of both limbs subsiding. Chop daily. Repet.

September 7th : So much improved that he was discharged this morning.

In a day or two afterwards he was readmitted with symptoms which threw considerable confirmatory light

upon the case; for, on the 11th of September, his right internal saphena and superficial epigastric veins were not only enlarged but also tender, and filled with firm coagula. The skin over these vessels was so red that their course was quite visible.

These states of the vessels subsided after the application of some leeches along their course. He was then discharged, and recently you had an opportunity of seeing him, for he was admitted to be treated for irritable ulcers of the legs. In other respects he had no appearance of ailment.

I take the opportunity which the consideration of these cases presents, of drawing your attention to a disease which is supposed to depend frequently upon inflammation of veins—*i.e.*, hepatic abscess.

This abscess is not only one of the unfavourable results of traumatic lesions of the portal tributaries, but also occasionally coincides with idiopathic disease implicating the same vessels, and likewise follows injuries of remote organs. There are other causes, however, which I will not at present allude to.

So insidious and vague have been its symptoms in many cases, that it has been frequently not suspected during life. A most interesting case of this kind has been mentioned by Sir Ranald Martin—a most important one also; for, if the man had survived the accident a few days, it would, most probably, have been mistaken for an hepatic abscess following the injury of the head, and which I shall allude to when I am speaking of the pathology of these cases.

The case described by Sir Ranald, was that of a trooper of Her Majesty's 11th Dragoons, who fell from his horse on parade at Cawnpore, and was killed on the spot by

fracture of the skull and laceration of the brain. On post-mortem examination, an abscess was found in the liver, although the man had never expressed any feeling of indisposition, and for months had not been an hour absent from duty.

The case which was in our hospital, coincided with a disease, which hepatic abscess far more frequently complicates in tropical, than in temperate climates. And this case confirms, in some particulars at least, the observation of those who assert that the symptoms of hepatic abscess are not always so decided as systematic writers would lead us to suppose.

DYSENTERY—ULCERATION OF LARGE INTESTINE—ABSCESS
OF THE LIVER.

Case 3.—John French, æt. 45, Commander of one of the City of Dublin Steam Company's vessels, was admitted into hospital on the 3rd December, 1859.

Previously to his present appointment he held a command on the Brazilian and Spanish coasts; but he stated that he was in perfect health until the eight weeks prior to his reception into hospital, notwithstanding that he indulged in free living for the nine preceding months.

In October he was attacked, in Liverpool, with dysentery, for which he was not treated until it had lasted a few days, when he was seized with violent epigastric pain and tenderness. He then was leeches, blistered, and had some internal remedies. The pain having somewhat abated, he was recommended to try his native air for the persistent purging; and he came over here during a most inclement

season. His symptoms became so exasperated, that he was brought to hospital, I may say, in a dying state.

On his admission, he was greatly prostrated; he was considerably emaciated, and his countenance wore an anxious, haggard expression; but he was not jaundiced. The pulse was 120, and exceedingly weak. The skin was dry, hot, and pungent. He was constantly passing extremely foetid, mucoid, bloody, occasionally bilious looking stools; and the rectum was so irritable that even opium could not be retained in any form.

The epigastrium above and to the right of the umbilicus was very tender, in which part we felt some induration, and here there was dulness on percussion. There was no defined tumour apparent. There was no positive evidence of the liver having passed below the ribs. He had no rigors; no sickness; no shoulder pain; nor did I perceive any abdominal muscular rigidity, excepting in the situation of the epigastric induration.

The tongue was white, flabby, and furred. Although I mentioned to the class at the time, the probability that there might be an abscess, yet I had not sufficient data before me to justify a more positive opinion on this point.

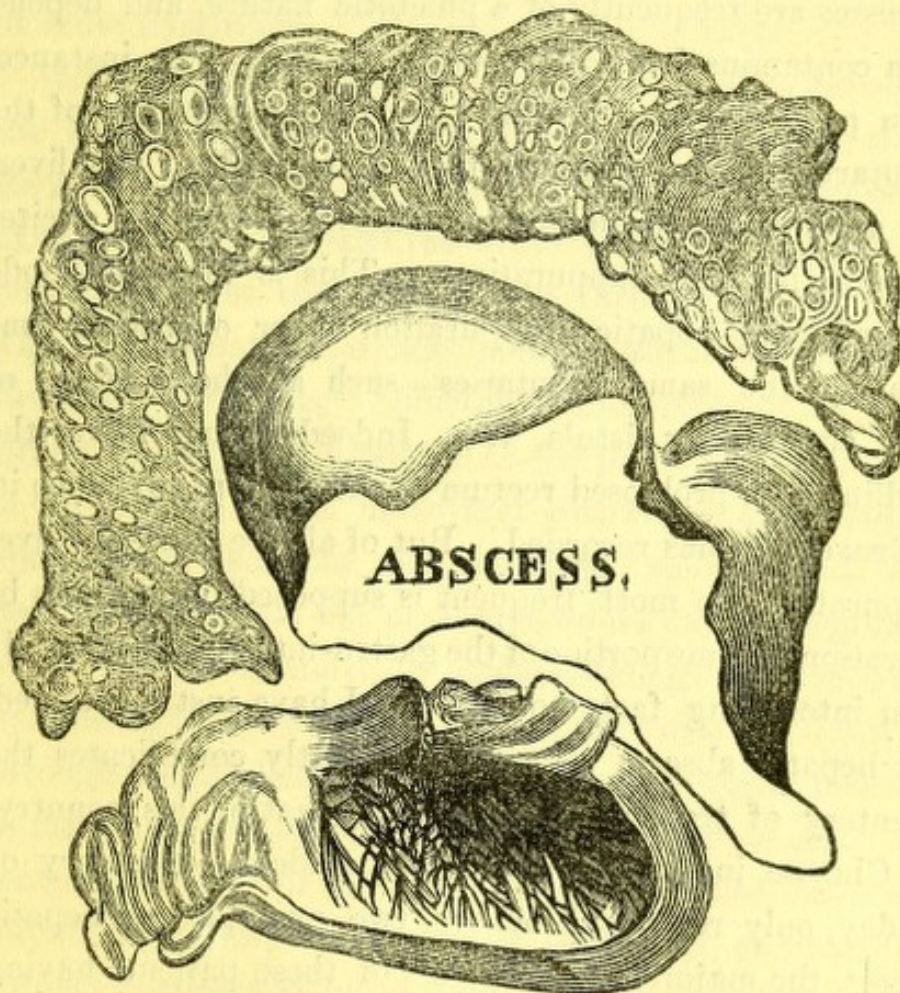
We, in vain endeavoured to support the ebbing powers of life, and to check the exhausting purging. Astringents, sedatives, wine, and various kinds of nourishment were unavailing, and he died seven days after his admission.

The post-mortem was made the evening of his decease.

On opening the anterior abdominal wall it was found adherent in the situation of the epigastric induration, to an abscess which gave way with the slightest force, discharging a quantity of horribly foetid, light slate-coloured matter. This matter was found to have come from an enormous

hepatic abscess, as represented in this drawing, which is reduced from a larger one by Conolly. The walls of the abscess were composed of broken-down, shaggy, brownish, hepatic tissue, and gave off a most disgusting odour. The liver structure immediately adjoining the abscess and at the under surface of the organ was of a dark slate colour. The remainder of the gland had the normal tint and was not enlarged.

FIG. 1.



The obliterated umbilical vein passed as an isolated cord through the abscess.

The whole of the large intestine was literally beset with ulcers of various shapes and sizes. Some were round, others oval, and many were covered with grumous blood.

The stomach was very much injected, which is shown in the illustration by dark shading. The organ being represented cut open, and a portion of the anterior wall removed. This is the more remarkable, considering that the patient did not vomit while he was under our observation.

I have introduced this case into my lecture to-day, because some very sound observers believe, that hepatic abscesses are frequently of a phlebitic nature, and depend upon contamination of the blood by pus. For instance, when pus, according to this view, is formed in any of the tributaries of the porta, it may be carried to the liver, and arrested in the lobular capillaries, where it excites inflammation and suppuration. This is also the mode of explaining hepatic suppuration after operations implicating the same tributaries—such as the removal of piles, cutting for fistula, &c. Indeed, it may follow the handling of a prolapsed rectum in the attempt to reduce it, as Cruveilhier has recorded. But of all the causes of liver suppuration the most frequent is supposed by many to be ulceration of some portion of the gastro-intestinal system. It is an interesting fact, however, as I have just mentioned, that hepatic abscess far more frequently complicates the dysentery of tropical climates than that of this country. Dr. Cheyne, in his account of the epidemic dysentery of his day, only records, I believe, two examples of hepatic abscess, the majority of the livers of these patients having been sound. Dr. Mayne's experience of our late epidemic was also somewhat similar, for he informs me he saw but one specimen in his numerous dissections. I was myself

attached to the South Dublin Workhouse Hospital during the same epidemic, and examined some dozens of cases in which the large intestine was extensively ulcerated, but I did not meet with one case of abscess, although in many I found the liver extremely softened.

Dr. Budd thinks that suppuration of the liver, in addition to having a phlebitic origin, may be also caused by fœtid gaseous and liquid contents of the large intestine being absorbed and conveyed to the liver. And he thinks abscesses are more frequent with the sloughing form of ulceration in acute dysentery.

With regard to the supposed arrest of the pus cells in the capillaries, the question may be asked, why should they be arrested at all? If I do not mistake, there is a close similarity between the white blood cell and pus corpuscle, and yet the former pass through the capillaries. This is, I consider, the weak point in the theory regarding the arrest of the pus. Something more would be necessary, either a paralyzing influence of the pus cell on the vessels, or an agglutination of several corpuscles, so as form a mass larger than the calibre of the capillary, and which consequently could not pass, and would excite suppurative action. The difficulty in understanding why the simple pus cell should be arrested, and yet the white blood cell pass through the capillaries, is so great, that it is highly probable, in many cases at least, some other condition must be present to account for the phlebitic phenomena. This leads me to say a few words on the pathology of phlebitis, a subject particularly interesting at the present time, in consequence of the researches of Virchow, and which have had for their result, some most valuable observations regarding it.

You will find a clear and concise description of phlebitis in Cruveilhier's "*Traité d'Anatomie Pathologique Générale*," to which I am indebted for the account of the views relative to its pathology, which were so generally received, until the thrombosis theory threw a new light upon the matter. It is but justice to Hunter to say here, however, that he was, I believe, the first pathologist who distinctly described inflammation of veins.

Before the researches of pathologists into the causes of death in wounds and surgical operations, death was attributed to a complication of the wound with fevers of different kinds. These fevers were afterwards discovered to be due to visceral phlegmasiæ, either in a diffuse form, or, under the form of multiple abscesses in the viscera, most frequently in the liver and in the lung.

The visceral phlegmasiæ generally manifest themselves in the latent form, and have a remarkable tendency to suppuration. They were attributed to the absorbing properties of wounds, and to the susceptibility of the wounded to all external influences.

Pathological anatomy, according to Cruveilhier, has established that the multiple abscesses had their origin in suppurative phlebitis existing in the vicinity of the wound, and the following, Cruveilhier states, are the series of facts which, he believed, have proved this view.

Pathological anatomy having demonstrated the presence of multiple abscesses in the viscera, and in the bodies of individuals dead after wounds and operations, they were attributed to purulent absorption.

Multiple abscesses of the liver coinciding very frequently with wounds of the head, they were attributed to a disturbance of the hepatic circulation : to a sympathy between the

brain and liver; and to a shock experienced by the liver at the same time as the brain. In other cases, these multiple abscesses occupying the lungs, were attributed to the softening of preëxisting tubercles, which softening had been determined by the operation.

"But what," this eminent writer asks, "is the intermedium between a solution of continuity and visceral abscesses?" Another series of facts, he thinks, showed that it was due to the presence of pus in the veins.

In every solution of continuity inflammation attacks the veins and the divided tissues which have undergone the solution. If this inflammation does not pass beyond the limits of adhesion, it will not determine any accident; but if the adhesive inflammation of the veins becomes suppurative, two things may happen: either the pus remains isolated, confined by blood clots which separate it from the general circulation, and things pass locally, without general accidents. There is then a simple venous purulent focus which either opens or does not open externally, and which, in this last case, is cured by the absorption of the most liquid part of the pus; or else the pus, bounded by the blood clots, surmounts the powerless barrier which these oppose to it, mix with the blood, and with the blood is carried into all the passages of the circulation. Now the pus, according to this explanation, is arrested in some portion of the capillary system, where it acts, not as pus, but in the manner of a foreign body, and each drop of pus becomes the material cause of an inflammation, of a capillary phlebitis, a circumscribed inflammation, necessarily suppurative, because there is a foreign body to be eliminated, and which runs through its stages with excessive rapidity.

The presence of pus, therefore, in the veins, is considered

by the followers of the above views, to be the fact of pathological anatomy that filled up the void which separates the suppurating wound from visceral abscesses.

As these visceral abscesses sometimes succeed a very trifling accident or operation, it follows, according to Cruveilhier, that the pus found in the veins and in the viscera was produced in the same place where it is encountered in the veins as in the viscera. He believes that direct proofs establish this last proposition. Thus :

It is wrong, as some assert, that multiple visceral abscesses, the consequence of wounds and surgical operations, do not present any trace of inflammation around them. Without doubt, thinks Cruveilhier, things appear to pass thus when the abscess is completely formed ; but numerous occasions having presented themselves to him for studying these abscesses in all their stages, it was evident that before the pus was collected into a focus, it was infiltrated in the substance of the organ, and that a red induration had preceded the formation of the pus ; and as every degree of this circumscribed inflammation is sometimes encountered in the same subject, it is easy to conclude that all the purulent collections are not contemporaneous ; that they are formed in succession in proportion as the pus of the suppurating vein has been deposited in the capillary system.

He also is of opinion that not less direct proofs establish that the pus found in the veins, is pus formed in these vessels themselves, the result of inflammation. For if, at an advanced period of the disease, we find the veins with a large canal and filled with phlegmonous pus : in less advanced periods, and sometimes in the same subject, we find all the periods of phlebitis : 1st, veins filled with blood clots non-canalculated and adherent ; 2nd, matter like deep coloured

wine lees occupying the centre of the concretion, which is consequently canaliculated; 3rd, clear wine lees matter; 4th, laudable pus filling the capacity of the vein and complete disappearance of the blood clots. At all these periods, although the internal surface of the vein does not present any trace of inflammation, he states that we find in the injection of the capillary vessels of the external surface of the vein and of the surrounding areolar tissue, in the infiltration, the density and the fragility of this areolar tissue and of the external tunic of the vein, unequivocal traces of a prior inflammation.

Maréchal supposed that the pus found in veins after wounds was absorbed unaltered (*en nature*) by the open orifices of the divided veins, and carried as such (*en nature*) into the viscera. But, Cruveilhier thinks, he had no difficulty in proving that Maréchal was wrong, and that the obliteration by clots, almost immediately followed the production of the wound; that consequently the divided veins were some time occluded when the pus was produced at the surface of the wound. He thought that pus was mixed with the blood, carried to the viscera, where it acted as a foreign body and excited purulent inflammation and abscess.

I must here incidentally remark, that these ideas are by no means very new: for, similar notions existed in the time of Morgagni, and are mentioned by him in his letter upon "Wounds and Blows of the Head." Indeed, you cannot peruse that letter without being struck with the fact, that many of the present views on phlebitis were in great measure anticipated by that able pathologist. Listen, for instance, to what he says on the subject of these visceral abscesses:—"It seems," he writes, "according to those observations wherewith, in my opinion, the observation of Molinelli may

be joined, that the pus carried from other parts into the viscera, is not always deposited in the form of pus, but frequently at least, that many of its particles, being mixed with the blood, and entirely disjoined from each other, stick in some narrow passages, perhaps of the lymphatic glands, and by obstructing or irritating them, as happens in the production of venereal buboes, and by retaining the humours therein, distend them, and give origin to the generation of a much more copious pus than what is carried thither; which generation is shown by those rigors and horrors. *And by this means we may also conceive how it is, that much more pus is frequently found in the viscera, and cavities of the bodies, than a small wound could have produced.*"*

With regard to the purulent appearance of the centre of clots, Cruveilhier advanced the view, that the pus was secreted by the wall of the vein *and filtered by capillarity to the centre of the concretion*. By-and-by I shall show you that there are good grounds for the supposition that this purulent-looking portion of the clot is not pus at all, but altered fibrine.

Cruveilhier, in the course of his investigations, performed many experiments with quicksilver, but at first without success. He finally succeeded in causing visceral abscesses by inserting some of the mercury into the medullary cavity of a dog's femur. The mercury was carried, minutely divided, into the pulmonary capillaries, where it was arrested, and determined the formation of a multitude of inflammatory foci, each of which had a globule of the metal for its centre. They passed successively into the state of red induration, into the state of infiltrated pus, into the state of laudable pus collected into a focus, and even into the state

* De Sedibus et Causis Morborum. Book iv., Epist. li, p. 70.

of concrete pus. He thought then he had established that there was an identity between these results and the results of suppurative phlebitis. And therefore concluded that the pus globules in suppurative phlebitis, acted in the same manner as the globules of mercury, not so much as pus, but as a foreign body irritating by its presence, the capillary system of the tissue in which it is deposited. And that *the visceral abscesses are the result of a capillary phlebitis of the viscera, a secondary phlebitis, succeeding a primitive phlebitis, which may have for its seat the capillary venous system as well as the veins of middle and of large calibre.*

These quicksilver injections, I should here mention, were not a new idea : for Saunders used mercury for the same purpose many years before, having injected it into the crural vein of a dog. After the animal died, he also found circumscribed abscesses in the lungs, having a globule of mercury in the centre of each.

In addition to the experiment on the femur, Cruveilhier likewise introduced the mercury into the mesenteric veins of a dog, when similar abscesses were found in the liver.

Teissier substituted for the doctrine of suppurative phlebitis, that of the *purulent diathesis*. He considered that the presence of pus in the veins, as well as that in the viscera, was to be attributed to this purulent diathesis, rather than the consequence of suppurative phlebitis. The purulent diathesis, Cruveilhier observes, was a particular and inexplicable disposition to form pus almost without inflammation. Teissier founded his opinion on the fact, that phlebitis has not been always discovered in cases of visceral abscesses after wounds and surgical operations, and also that the pus is confined by blood clots. To this, Cruveilhier replies by citing a case which was presented to

the Anatomical Society. The lungs and the liver were beset with multiple abscesses in an individual who died after an amputation of the leg. All the veins of the amputated member were minutely dissected without discovering the least trace of suppurative phlebitis. He then told them to break the tibia and fibula, when they found pus in the medullary cavity, in the spongy tissue, and in the compact tissue of these bones. It is evident, then, that he would consider no cadaveric examination perfect in multiple abscess unless the vessels of the bone had been carefully examined.

Teissier's objection of the delimitation of the pus by clots, Cruveilhier answered as follows:—He admits, that in the early period of suppurative phlebitis, this sort of isolation, encysting, is such that the pus cannot surmount its limit, and that none of the accidents of intoxication of the blood by the pus can be manifested. But he sustained, that the presence of blood clots to the limits of the purulence is only temporary; that the plugs formed by these clots diminish by degrees in height, become reduced to a thin lamina in the form of a *couvercle*, which itself ends by disappearing, and that then the mixture of the blood and pus in the circulation is as free as possible. He thought also if a clot of thin consistence should remain, a sort of capillary filtration of the pus might be effected through this clot as through a porous substance, permeable and not living.

No theory, says he, than that of suppurative phlebitis, and consequently intoxication of the blood by the pus, can account for the succession of facts in phlebitis.

Within the last few years the question has been reopened, by Virchow particularly, and I think if you study the subject, you will come to the conclusion that it is by no means

so decidedly settled as Cruveilhier supposed. At the same time, I fear that many—in the antagonism to his views—are running into an opposite extreme; ignoring to too great an extent, the existence of a primitive phlebitis. In order that this subject may be intelligible to you, it is necessary you should be acquainted with some of the recent opinions regarding it.

One of the most able objectors to Cruveilhier's theory is Virchow, who argues that, as colourless or white blood-cells are very like pus-corpuscles, resembling them so strongly that they cannot be distinguished the one from the other; that, therefore, there can be little doubt the white blood-cell may be mistaken for the pus corpuscle, particularly by those who are wedded to the pyæmic theory.

Many of you have heard of the absorption of pus; but I must here tell you there are strong reasons for the opinion that pus, as pus, is never reabsorbed. The "physiological reabsorption of pus" takes place, as the most careful investigators believe, by two processes. In one, the fluid part of the pus disappears, even the pus cells themselves lose part of their fluid, shrivel, become conglomerated together, and form the *pus concret* of the French. This, according to Virchow, is the history of many tuberculizations. The second form of reabsorption, as that eminent pathologist remarks, is a far more favourable process. The pus undergoes a fatty metamorphosis, forming an emulsive fluid composed of fat, water, and salts, in which state it is taken up by the vessels. Here, too, you perceive it is considered the pus is not reabsorbed as pus, but as a milky fluid, a *pathological milk* as it has been called by him. According to these views, only the fluid constituents of the pus, or the metamorphosed solid ones, are reabsorbed, pus,

as pus, being incapable of being absorbed. Of course, pure unchanged pus may get into the vessels, from their communicating directly with abscesses or through wounds, but this is very different from the reabsorption of pus.

There is much interest attached to the explanation of the part the lymphatics play when pus finds its way into, or is formed in them. Virchow considers that the lymphatic is incapable of evacuating its contents into the vessels, so as to produce a genuine pyæmia. According to him, all the lymphatics capable of taking up pus in this manner are peripheral ones. And when they enter a lymphatic gland, their anatomical disposition is so altered, breaking up into finer vessels and then entering spaces, which are so occupied by cellular elements, that it is more than probable a pus cell cannot pass a gland. Indeed, Cruveilhier himself states that he has never seen pus pass more than two series of ganglions. The probabilities being that one, for the anatomical reasons above given, is sufficient to arrest it. Although lymphatic glands, then, form a barrier to the passage of the pus-cells which enter them, they may become, as you are aware, the seat of simple or specific inflammations, and next in their turn become, in the latter case, fresh sources of contamination.

Virchow believes that every lymphatic glandular irritation has the effect of increasing the white blood-cells—a most important point in connexion with the subject before us. Suppose, then, as he argues, the opinion be entertained that pus has been absorbed, and that pus is the cause of the disturbances which have declared themselves, nothing is easier than to demonstrate the presence of cells in the blood resembling pus-corpuscles, but which are in reality white blood-cells. Let us further suppose

that we start with the impression that pus has entered the blood. We examine the fluid, and find large numbers of cells with all the characters of pus-corpuscles, and are tempted to conclude, erroneously, however, that we have a genuine pyæmia, or poisoning of the blood by pus. In reality an increase of the white blood-cells only.

Puerperal fever is thought by many, to depend upon the presence of pus-cells in the blood. But, when you recollect that the white blood-corpuscles are greatly increased in this state of the system, you cannot fail to see how easy it would be to fall into the error of supposing they were pus-cells, and that they were the cause of the pyæmic symptoms. Virchow, for the above reasons, and others which you will find in his work, concludes that, "no one has hitherto succeeded in demonstrating by arguments capable of supporting even gentle criticism, the existence of a morphological pyæmia." But he also makes the observation, that "perhaps we shall at some future time succeed, in the course of such a process (pyæmia), in discovering pus-corpuscles with well-defined characters in the blood."

I now will lay before you, as concisely as I can, consistently with the importance of the subject, the very interesting concluding arguments of Virchow in opposition to the views of Cruveilhier.

Virchow considers that Cruveilhier's theory is beyond all medical comprehension!

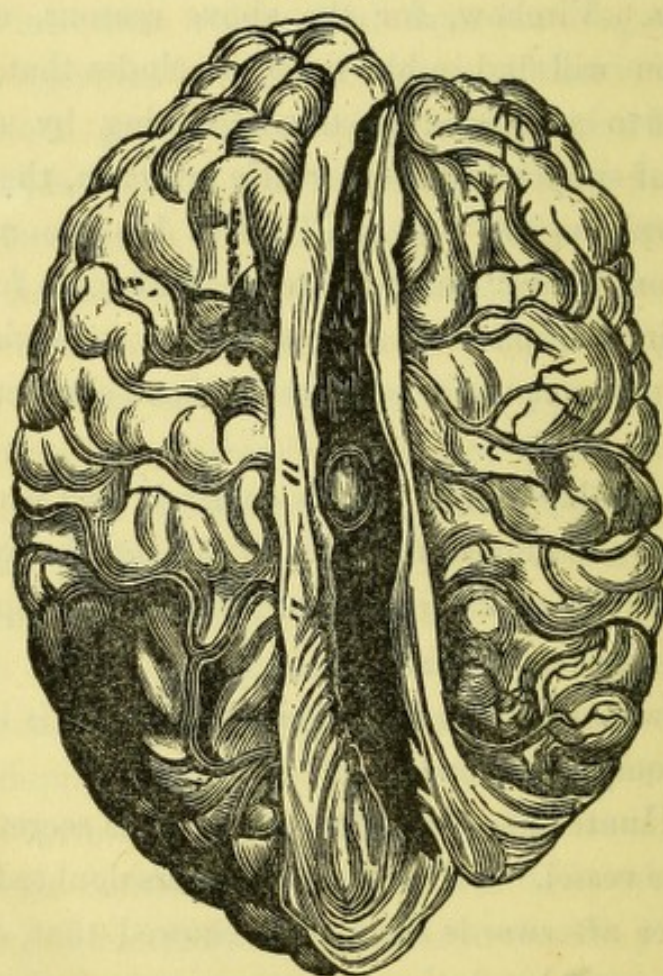
John Hunter imagined that the pus was secreted by the wall of the vessel. Subsequent observers doubted this, and Cruveilhier afterwards thought he showed that, at a stage which he considered the commencement of the so-called phlebitis, a clot of blood is always present. "He con-

cluded from the impossibility of explaining why inflammation of the veins began with coagulation of the blood—that inflammation in every case whatever consisted in a coagulation of the blood. He raised coagulation, then, into a general law, and referred every inflammation to a phlebitis on a small scale.”

Cruveilhier believed that the so-called pus never lies against the wall of the vein ; but is contained in the clot.

The appearance of pus in a clot, is represented in this reduced drawing of thrombosis of the superior longitu-

FIG. 2.*



* In this case the right cerebral hemisphere was atrophied.

dinal sinus from a larger one in the collection of Dr. Mayne, who, some years ago, showed the preparation from which it was taken, at one of the meetings of the Dublin Pathological Society.

You perceive that the sinus was occupied by a clot, and that in its centre there was a pale, apparently purulent, fluid.

Now, Cruveilhier would have considered the paler substance in the middle of the clot pus. This so-called pus first appearing in the centre of the previously existing clots, he considered that it was first secreted by the wall of the vessel, and not remaining there, was filtered by capillary attraction to the centre of the clot.

According to Virchow and other observers, before there is a trace of inflammation, we may find a clot; and, on the other hand, inflammation may exist when the current of blood within the vessels of the affected part is perfectly free and unobstructed. He, therefore, supposes that inflammation as such has no necessary connexion with coagula; and proposes to discard the terms phlebitis and arteritis, and to substitute that of thrombosis or coagulation of the blood *at a certain fixed point*. He does not, however, deny the possibility of a real phlebitis, for he admits that it really does exist; but is an inflammation affecting the walls and not the contents of a vessel.

Virchow regards the purulent-looking fluid in the centre of the clot as a chemical transformation of its fibrine, a mere mass pervaded by granules, having the external appearance of pus, but not real pus. It is, says he, a *puriform*, but not a *purulent substance*. I think it unfortunate that he retained the term puriform. For, if it is not pus, this term should be discarded altogether.

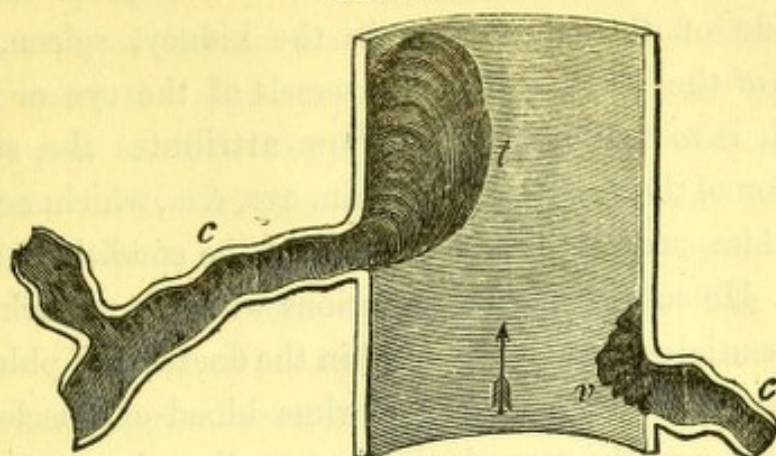
In some cases, however, he admits that the cells found in these clots bear the strongest similarity to pus-corpuscles, and that considerable doubts may exist as to whether real pus is not present. Here, again, he starts the objection that colourless blood and pus-corpuscles are so similar, it is impossible to draw a real distinction between them.

As a rule, he thinks the red blood-cells perish in the centre of the clot, where the softening occurs and where the fluid, so like pus, is formed.

As I have just mentioned, Virchow does not deny that there is such a thing as phlebitis, still he thinks that in such a case, the alteration in the coat of the vessel is almost always a secondary one and occurs at a late period. He believes that the pus-in-blood theory is not necessary to account for the symptoms of many of the so-called pyæmia cases. For, he considers that they may be evoked by the softening of thrombi; and chiefly by the detachment of fragments from the projecting end of the softened thrombus, which are carried, by the blood, to some portion of the capillary system, where they are arrested and cause plugging or embolism of these vessels.

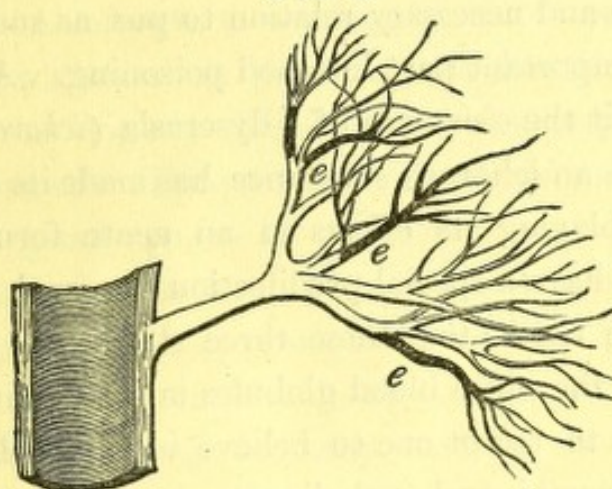
In the drawing Fig 3. which I have copied from Virchow, is a representation of the mechanism of the process: *cc* are two venous branches plugged with thrombi, which projected into a trunk at *t* and *v*, where they were constantly exposed to the attrition of the current. This is the source of real danger in such cases. For, at *v*, particles were detached by the passing stream, which were carried to vessels they could not get through, where they were consequently wedged: and produced secondary obstructions and metastatic deposits.

FIG. 3.*



In Fig 4. from the same author, you can see how detached pieces of clot *e e e* were impacted in the capillaries of the spleen.

FIG. 4.



Virchow thinks that if a considerable number of cases be compared statistically, it will be found that every time metastatic deposits occur, thrombosis is also present in certain vessels. The fragments, says he, may cause *very minute and sometimes miliary inflammations of the parenchyma*. A most important observation, in contradistinction to Cruveilhier's mode of explaining them.

* Figs. 3 and 4 engraved by Oldham.

Embolism, you may recollect, also occurs at the left side of the circulation, in the kidney, spleen, substance of the heart, and in the vessels of the eye or brain, &c. It is to this process Virchow attributes the sudden occlusion of the vessels of the brain, eye, &c., which, according to him, are totally independent of the condition of their walls. He sums up his observations with the remark, that two essential errors have existed in the doctrine of phlebitis, one being the mistaking colourless blood-corpuscles for pus-cells; and the second, the confounding the products of softened fibrine for pus, an appearance so frequently seen in the centre of clots. He considers this state of the clot, one of the most important sources of metastatic deposits. He, however, thinks that there are certain *fluids* bearing no immediate and necessary relation to pus as such, which play a very important part in blood poisoning. And that we must admit the existence of a dyscrasia (*ichorous infection*) in which an ichorous substance has made its way into the body, displaying its effects in an acute form in the organs which have a special predilection for such matters.

He likewise thinks that these three states may co-exist. For instance, the white blood globules may be so increased in number as to tempt one to believe in a morphological pyæmia. Thrombi and emboli may occur. And lastly, ichorous or putrid fluids may be absorbed (*ichorrhæmia* or *septhæmia*). These three states may then complicate each other. But you are not to think that they necessarily occur together. He finally considers that pyæmia must be regarded as a collective name for several processes dissimilar in their nature.

Sometimes very alarming constitutional disturbance sets in very soon after the ligature of a vein, and before

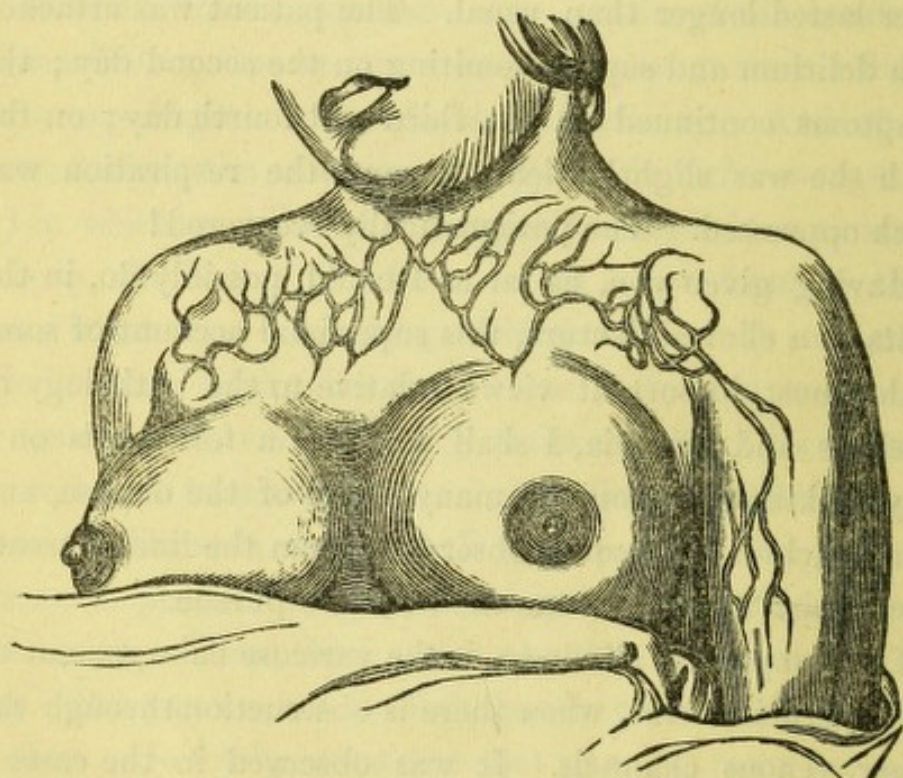
the period required for the formation of pus, as in Mr. Freer's case, of Birmingham, recorded by Mr. Hodgson. In that case, the saphena major vein was tied for varices, and in *four hours* afterwards the patient was seized with pain in the chest, hurried and laborious breathing, and vomiting of blood, which symptoms were immediately relieved by removing the ligature. The same patient was operated on again six weeks afterwards, when fever, vomiting, and retention of urine were the immediate results, although the ligature was removed immediately after its application. The operation was repeated after an interval of nine weeks, the ligatures being cut away immediately after their application; but on this occasion the fever lasted longer than usual. The patient was attacked with delirium and severe vomiting on the second day; the symptoms continued on the third and fourth day; on the sixth she was slightly delirious, and the respiration was much oppressed. The patient finally recovered!

Having given you, as far as I could possibly do, in the limits of a clinical lecture, this superficial account of some of the most important views relative to the pathology of phlebitis and pyæmia, I shall now say a few words on a very striking symptom in many cases of the disease, and then conclude with some observations on the line of treatment which appears to me the safest to pursue.

The symptom I allude to, is the varicose enlargement of the superficial veins, when there is obstruction through the larger venous channels. It was observed in the cases I read for you in the beginning of the lecture. And we have, in our hospital collection of drawings, some very admirable representations of this state of the superficial vessels. For instance, here is a reduced copy of the draw-

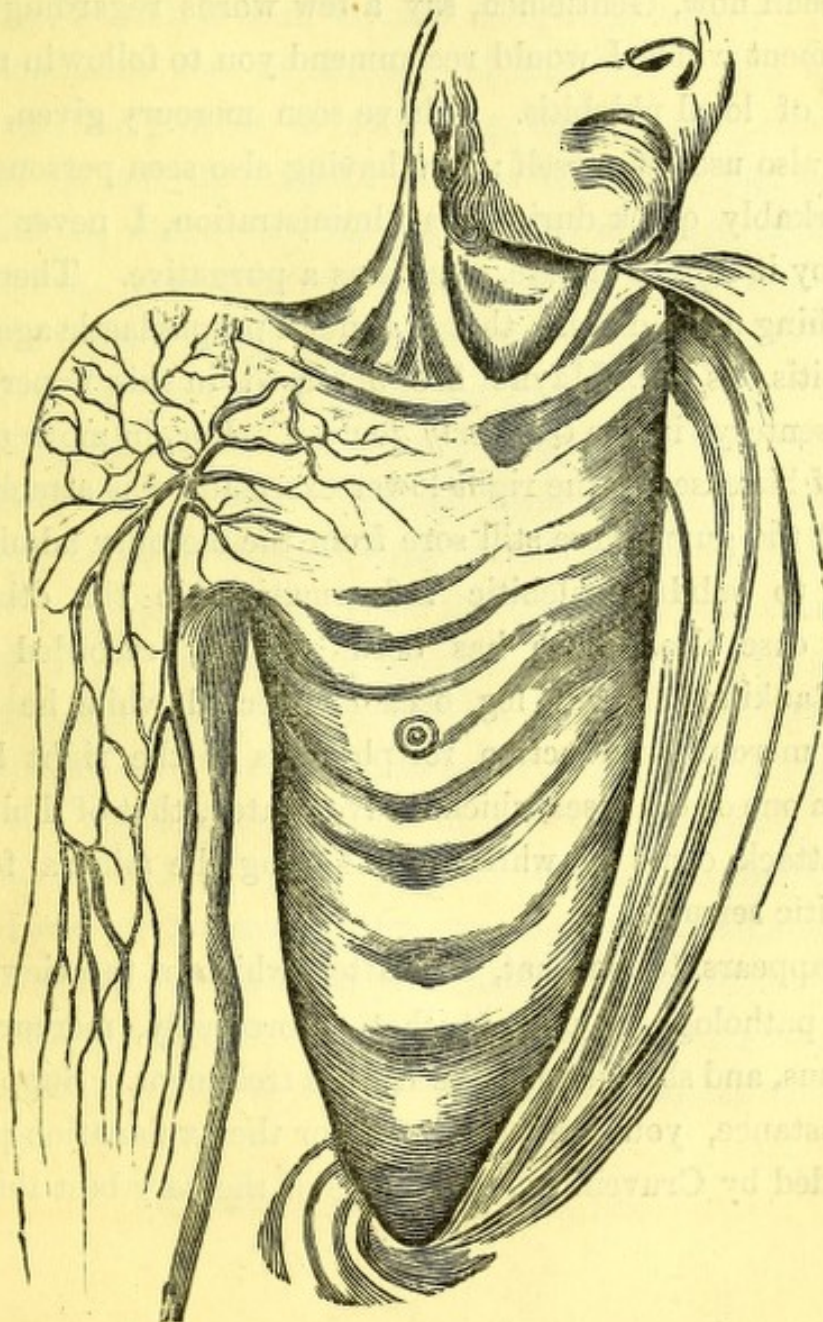
ing of a case of phlebitis, recorded by Dr. McClintock in the *Dublin Quarterly Journal* for August, 1856. In this case the increase in size of the superficial veins of the lower part of the neck and upper part of thorax and left arm was very remarkable. The woman had disease of the kidney, and died of phlebitis following parturition. After death it was found that the upper part of each axillary vein, both subclavians, both deep jugulars, the whole of the right and the upper portion of the left *venæ innominatæ*, were filled by adherent coagula. The calibre of the vessels appeared enlarged, and their walls were much thickened.

Fig. 5.



My colleague, Dr. Mayne, had also some interesting cases in which the varicose state of the vessels was well marked. He exhibited at the Dublin Pathological Society,

in November, 1851, a drawing of a case of phlebitis, in which the right vena innominata was completely impervious. The patient had been seized with sudden pain and swelling in the right upper extremity, followed by œdematous tumefaction of the entire limb. The superficial veins about the shoulder, axilla, and arm, were largely dilated, so as to attract at once the attention of the observer. They are represented in this reduced copy of a drawing of the patient by Conolly.



You are not to suppose that phlebitis is necessarily the cause of this appearance of the superficial circulation ; for it may arise from any obstruction to the return of the blood to the heart. All I wish to impress upon you is, that when a person, particularly an individual labouring under an exhausting disease, is suddenly seized with a rigor, followed by swelling and œdema of either the neck or limbs, with enlargement of the superficial veins, it is very possible the case has been a phlebitic one.

I shall now, Gentlemen, say a few words regarding the treatment which I would recommend you to follow in most cases of local phlebitis. I have seen mercury given, and have also used it myself ; but having also seen persons die remarkably quick during its administration, I never now employ it in this disease, except as a purgative. There is one thing quite certain, that it is not a prophylactic against phlebitis, as Dr. Mayne has observed in his paper on "Dysentery" in the *Quarterly Journal*. For, in more than one of his cases, "the right lower extremity was attacked, whilst the gums were still sore from the mercury administered to subdue phlebitic inflammation in the other." In a case also, which has been recently recorded by Dr. Ranking, the left leg became affected while he was using mercurial inunction for phlebitis of the right leg ; and in one of the cases which I have related, that of Tulmy, the attack came on while he was using the mineral for a pleuritic seizure.

It appears to me that, no matter which of the views as to its pathology you adopt, that theoretically, mercury is perilous, and should not be used in its treatment. Suppose, for instance, you are advocates for the explanation propounded by Cruveilhier, surely one of the very best things

which can happen is, that the local disease should, if possible, be maintained in the adhesive stage, notwithstanding that the true adhesive cases may be rapidly fatal, as Travers has mentioned. What may mercury do in such a case? Is it not very possible that in your endeavours to check the disease with it, you may fail, and by diminishing the consistency of the clot, favour purulent infection or the contamination of the blood by pus.

On the other hand, if you take Virchow's views of the disease, I think it is an equally dangerous remedy; for, if it diminishes the consistency of the fibrine, the latter, during the process of softening, may disintegrate and break up, and its particles may be carried to the nearest capillaries, where they may cause the much-to-be-feared embolism, which I have already spoken to you about.

It is from a dread of these accidents that I have relinquished the mercurial treatment of phlebitis; indeed, I avoid spancemics as much as possible, for I find that the patients recover better without them. In some of these cases, patients will apparently derive considerable relief from local bleedings, provided there is no contraindication. Many of the persons thus affected, however, are so debilitated that they will not bear the loss of any of the vital fluid.

There is one caution I must not omit to give you regarding the digital examination of the affected veins. It is the necessity of being most gentle in your manipulation; for if you use too much force, you may break the clot and cause the dispersion of its particles to vessels where embolism may be the result. This point has been alluded to by Meissner,* and it is most important you should not forget it.

* Schmidt's Jahrb., vol. 109, page 89.

I do not intend to occupy your time with a list of the various internal remedies which may be used in the treatment of phlebitis, as I am principally desirous to draw your attention only to the medicines I have found most useful in certain cases of the disease, and which, in my hands, appeared of very great service. These chiefly were, the preparations of iron and of bark, assisted by stimulants and nourishment suitable to each individual case.

In conclusion, I have to apologise for having delayed you so long this morning, which, however, was unavoidable, in consequence of the importance of the subject of the lecture, the pathology of which is, at present, exciting so much attention.
