

**Some observations on the structure of the mesenteric glands in the  
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1. *Some Observations on the Structure of the Mesenteric Glands in the Balaenoptera rostrata.* By DR JOHN REID, President of the Royal Physical Society of Edinburgh.

DR KNOX having lately purchased a young whale, he very kindly allowed me a considerable portion of the mesentery, cut close to the spine, for the purpose of repeating the experiments of Mr Abernethy upon the organs in the whale that correspond to the mesenteric glands, as related in the Philosophical Transactions of London for 1796. This animal was a female, about ten feet in length, belonging to the *Balaenoptera rostrata* of naturalists, and had been dead about a fortnight (February.)

An injection, composed of brown spirit varnish, white spirit varnish, and turpentine varnish, mixed in the usual proportions, and coloured with vermilion, was first thrown into the arteries, and the same materials coloured yellow into the veins. Both injections succeeded well, and very minute vessels were seen ramifying in all directions upon the surface of the intestines and mesenteric glands. The mesenteric glands appeared a little increased in size after the injection had been thrown in; but on handling them, the materials injected could not be felt to be collected into masses in their interior, as described by Mr Abernethy, except in one case, and this was evidently dependent upon extravasation. The lacteals were next attempted to be injected. These were more easily found than could have been expected, as the mesentery was completely void of fat, and all the small arteries and veins were filled with injection.



Several of these vessels were injected ; but in all, from the softness of the glands, or some other cause, the mercury seemed to burst into the substance of the gland, converting it into a sac, and none of it appeared in the *vasa efferentia*. On opening one of these glands, I was at first almost convinced that the mercury had passed into a cavity in the interior of the gland ; and I had almost persuaded myself of the existence of an indistinct lining membrane upon its walls ; but upon more minute examination of the others, and particularly as none of the mercury could be detected in the *vasa efferentia*, and as no such cavity could be detected in these not injected, I became satisfied that it had ruptured the vessels, and passed into the substance of the gland. On cutting into the substance of the glands in which the arteries and veins were only injected, these vessels were seen ramifying through their texture, dividing and subdividing very minutely, and nowhere presented the appearance of opening into cavities or cells. It also appeared to Dr Alison, who examined some of these glands under the microscope, that the whole of the injection was contained in the vessels. The glands themselves were of a uniform texture ; and, with the exception of being of a darker colour, and of a greater size, resembled very closely in their appearance the mesenteric glands of the human body.

Those who are acquainted with Mr Abernethy's experiments, will at once perceive that the results of the injections just described differ very materially from those obtained by that gentleman. Upon what this difference depends I cannot pretend to judge. Mr Abernethy does not mention the genus, species, or size of the whale from which he procured the mesentery ; but it is evident, from some parts of his paper, that the mesenteric glands must have been much larger than those in the present case. The largest of these bodies in this case did not exceed a pigeon's egg ; and when they appeared larger, this was found to depend upon two or more of these lying in close contact. It is not likely that these bodies can differ so very much in their structure in the different Cetacea as to account for results so dissimilar ; and the disparity in size could only produce a difference in degree, not in character. Mr Abernethy used a waxen injection, which is considerably coarser than that which we employed. It appeared to Mr Abernethy, that some of the arteries and veins opened upon the inner surface of large cavities in the interior of the glands, into which they poured their contents ; while in the present case, though the injection had run more minutely than what we could expect a waxen injection to do, none of it seemed to pass out of the vessels. It also appeared to Mr Abernethy, that a number of lacteals opened into



the interior of these cavities, and probably mixed their contents with those of the arteries and veins. Whether there were any communications between the lacteals and veins, or whether the lacteals poured any of their contents into cavities or cells, these injections do not entitle us to form anything like a satisfactory conclusion; for the extravasation of the mercury into the substance of the gland prevented all accurate observation, and besides, the whole of the minute veins being filled with injections, it would be prevented from appearing in them, admitting that such communications did exist. We saw enough, however, to render it very improbable that the lacteals in this case opened into such large cavities as those described by Mr Abernethy. Dr Knox himself injected some eighteen or twenty of the lacteals two days previous to my attempts, immediately after the abdomen had been opened, before the mesentery had been detached, before the arteries and veins had been injected, and while the parts were still very fresh. The mercury passed freely through these vessels as far as the glands; but none of it appeared either in the veins or *vasa efferentia*. The experiment of Mr Abernethy has been supposed by some to furnish a strong analogical argument in favour of the communication between the veins and lymphatic vessels in the human body, but it appears to me, that this would require to be confirmed by others before much weight can be attached to it.

2. *Injections of the Vessels of the Fœtus, to show some of the peculiarities of its Circulation.* By DR JOHN REID.

THREE fœtuses were injected in the following manner: A red coloured injection was thrown up the *vena cava* inferior, and a yellow-coloured injection down the *vena cava* superior at the same time, and as much as possible in equal quantity, and with equal force, to endeavour to imitate the currents which flow along these veins during the life of the fœtus. As it is impossible that one person can manage both, it was necessary to intrust the two syringes to different persons; and this must render the success of the injection more precarious. It was principally wished by these injections, to try to ascertain to what extent the Eustachian valve prevented the intermixture of the two currents entering the right auricle by the two *cavæ*; and, provided that the Eustachian valve really had the effect of keeping the two currents to a certain extent separate, directing the greater part of the ascending current directly into the left auricle through the *foramen ovale*, whether these two currents still continued separate in their subsequent course,—that passing along the aorta going entirely to the large vessels of the head and superior ex-



tremities, and that through the *ductus arteriosus* filling the descending aorta.

The first trial was made on a foetus of between five and six months. By some mistake the injection was not thrown down the *cava superior*, and that thrown along the *cava inferior* was in small quantity. On examining the heart, we found that the red injection had passed along the *cava inferior*; that some of it had passed into the right auricle, but the greater part had been directed through the *foramen ovale* into the left auricle by the Eustachian valve, so as to fill the whole of the left side of the heart, while not a single drop of injection had passed into the right ventricle.

This experiment, then, was not entirely useless, for it showed, in this case at least, that a fluid ascending through the inferior *cava* passed more readily into the left side of the heart than into the right. That part of the injection should have passed into the right auricle, was to have been expected, for though the Eustachian valve when perfect nearly insulates the *cava inferior* from the cavity of the right auricle, yet it cannot entirely exclude the passage of some of the fluid into the right auricle, when that cavity is not occupied by the column of blood which descends through the superior *cava*.

The second trial was upon a foetus at the full period. Upon examination we found, that, though the two currents chiefly passed in the course which we shall fully describe in the third experiment, yet some intermixture had taken place. This was not to any great extent. This intermixture might depend upon two causes. *First*, the Eustachian valve is supposed to be less perfect at the full time than at an earlier period; and, *secondly*, the injection was not so well managed as it ought to have been, from the difficulties experienced in two persons commencing and stopping exactly at the same time, and using nearly equal forces.

The third trial was upon a foetus of about seven months, judging from its size and the position of the testicles. Care was taken, by a previous course of training, to throw in the two currents as equally as possible. On tracing the red injection upwards, we found that it had passed through the *foramen ovale* and filled the left side of the heart without any intermixture with the yellow; except very slightly at the posterior part of the right auricle. Not a drop of the yellow appeared to have accompanied the red into the left side of the heart. From the left side of the heart it ascended the aorta, and filled all the large vessels going to the head and upper extremities. The injection in all these vessels had not the slightest tinge of yellow.

On tracing the yellow downwards, we found it filling the right auricle, free from intermixture, except slightly at the posterior



part of the auricle, as already mentioned. From the right auricle it filled the right ventricle, passed along the pulmonary artery, and filled the *ductus arteriosus*, and branches going to the lungs. On entering the aorta, it passed down that vessel, filling it completely without any intermixture of red; and thus all the branches of the thoracic and abdominal aorta were filled with yellow. The whole of the red had passed to the upper part of the body. In an experiment of this kind, the injection, after filling the left auricle, passes along the pulmonary veins, but, during the life of the foetus these veins must be filled by the blood returning from the pulmonary arteries. Had the injection been sufficiently minute, it would have passed from the pulmonary arteries into the pulmonary veins, and, consequently, we would have had some intermixture of yellow in the left auricle.

Though it may be doubted, whether these two currents keep themselves so distinctly separate in the living foetus as they appear to have done in this last experiment, yet, from the result of these three injections, we may be justified in concluding, that the blood returning from the placenta principally passes to the head and superior extremities, and that the lower part of the body is principally supplied by the blood returning by the *cava superior*, or, in other words, by blood which has already made the circulation of the upper part of the body.

### 3.—*Some Observations on Phlebolites.* By Dr JOHN REID.

The accompanying preparation is a portion of one of the broad ligaments of the uterus, in the veins of which are observed a number of small rounded osseous-looking bodies, which have received the name of Phlebolites. They are described by Beclard in his *Anatomie Générale* under the chapter on Veins, and by Jules Cloquet in his *Pathologie Chirurgicale*; but I am not aware of their having been noticed, except incidentally, by any English author, though they must have occasionally been seen by those much engaged in dissections. Their presence does not appear to be attended by any bad effects, and they consequently possess little practical importance; but the nature and cause of their formation may, ere long, become an object of considerable interest in physiology, as serving to strengthen or confirm some of the doctrines concerning the living fluids of the body. They cannot be considered as of rare occurrence. I have now seen them in five instances, and four of these have been within the last twelvemonths. In three of these they were found in the uterine veins; in one (a male) in the vesical veins; and in the present case, both in the vesical and uterine. They varied in size from that of a millet-seed to that of a large



pea. They varied in number from two to more than a dozen. In all the cases in which I have examined them, they seemed to be placed loose in dilatations of the veins, allowing sufficient space for the blood to pass between them and the coats of the vein. Some of these veins were of very small size in the undilated portions, and required a careful examination to be convinced that they were placed in veins; while others were of sufficient size, as to render this apparent almost at the first glance. The subjects in which I found them were all advanced beyond the middle period of life.

Beclard and Cloquet describe them as being most frequently inclosed in layers of fibrinous matter or coagulated blood; but in all, except in the present case, I have found them without any covering whatever, and in nearly all of them of a bony hardness throughout.

In the preparation before you a very large one may be observed with a clot of blood. Several smaller ones were also observed enveloped in coagulated blood. The spermatic veins in this case, in the branches of which these were deposited, were much enlarged.

According to Cloquet and Beclard, they have been also found in the hæmorrhoidal veins, in the spermatic veins of the male, in the saphenæ veins, and twice in the *vena cava inferior*. In one of the cases described and delineated by Cloquet, he states, that the smaller ones were formed of a little soft clot of blood; that those of a larger size contained in the centre a nucleus of white fibrinous matter; that the largest had in their centre an osseous-looking nucleus, upon which the white fibrinous matter was arranged in concentric layers, the internal very hard, the others becoming gradually softer as they approached the surface. He also gives a drawing of a round fibrinous mass taken from the *vena cava inferior*, containing an ossific-looking matter in the centre, from which a number of rays of the same substance passed through the fibrinous matter towards the circumference. Another specimen similar to this was seen by Cloquet in Sæmmering's museum, and was said to have been taken from the *vena cava inferior* of a child.

I am not aware that the chemical composition of these bodies has been accurately ascertained. Cloquet speaks of them as composed of phosphate of lime, but he does not state that they were analyzed. Mr Kemp had the kindness to analyze two of them taken from different subjects. He has not yet been able to obtain accurate results; but he states, that he is certain that both were principally composed of phosphate of lime, of carbonate of lime, and of animal matter, and that it appeared to him that these earthy salts and animal matter were nearly in the pro-



portions that exist in the bones. He has promised to make a more accurate analysis ; and we will then see how far they differ from, or agree with, the osseous texture in their chemical composition. It may also be stated, that the animal matter seemed composed in a great part of gelatin ; but this would require farther researches.

It becomes an interesting subject of inquiry, whether these bodies are formed by a desposition of the earthy salts contained in the blood, mixed with some of the animal matter, or whether this depends upon some vital action in the fluids, corresponding to the formation of the osseous texture. Neither Beclard nor Cloquet give any opinion upon the cause of their formation. The fact of their being only found in the depending veins, where the flow of blood is retarded, and the improbability of the formation of any osseous texture in the interior of these vessels, strongly favour the notion of their being merely depositions from the blood, as urinary calculi are from the urine ; while the nature of their formation, the gradual conversion of the fibrinous layers into osseous, the radiation of the ossific matter through the fibrinous clots, and their chemical composition (if their similarity to bone is confirmed,) must strongly incline us to ascribe their origin to something more than mere physical or chemical laws. Additional observations, by furnishing more extensive data, may enable us to come to more decisive conclusions on this interesting question.

4.—*Case of Obliteration of the Vena Cava Superior at its entrance into the Heart.* By JOHN REID, M. D. President of the Royal Physical Society of Edinburgh.

DURING the course of last month, (December 1833,) the *vena cava superior* was observed to be obliterated at its entrance into the heart, in one of the subjects in Dr Knox's Practical Dissecting-Rooms. This obliteration was about two inches in extent, and formed, in the usual situation of the vein, a rounded cord of a cartilaginous feel, firmly connected to the surrounding parts, particularly to the anterior surface of the right *bronchus*, at the division of the *trachea*, by firm cellular tissue. Around it, particularly at the lower part, were several calcareous deposits, apparently connected with the bronchial glands. On the inner surface of the auricle, the entrance of the vein was only marked by a slight depression, and the auricle at this part formed a kind of digital pouch.

From the advanced state of the dissection when this circumstance was discovered, it was difficult to trace the channels through which the blood must have passed to the *vena cava*



*ascendens*; but after a good deal of careful examination, some of these, and perhaps the greater part, were made out. The large veins at the root of the neck united in the usual way to form the *cava superior*, and this vein became suddenly impervious at the part already mentioned. On examining the *vena azygos*, it was found to be at least twice its usual size, and became suddenly impervious where it joined the obliterated *cava*. The right intercostal veins, particularly the superior, were much enlarged, and a vein of the size of a common quill passed between the *cava* immediately before its obliteration and the upper part of the *vena azygos*. The *vena azygos* was joined at the usual place, viz. about the seventh dorsal vertebra, by what is called the *semi vena azygos*, which was more than twice its usual size. The state of the superior intercostal veins of the left side could not be ascertained, as they had been nearly all destroyed: but, to judge of their size from some remnants of them, they must also have been considerably enlarged. On blowing air down the *azygos* and *semi-azygos*, they were observed to retain their large size, as low as the *diaphragm*, and to form several flexuosities. The air passed freely along the enlarged intercostals and superior lumbar veins, distending all the lumbar veins, and filling the *vena cava ascendens*. The lumbar veins were also considerably enlarged. A vein of at least the size of a writing quill, formed by a branch from each of the *azygos* veins, passed through the left side of the aortic opening, and joined the *cava inferior*, near its junction with the renal veins.

The internal mammary veins had been destroyed, but the epigastric veins were of their natural size, so that there could not be any reflux of blood in that direction.

All the systematic venous blood of the body except that of the coronary vein, being poured into the right auricle by the *vena cava inferior*, that vein was also considerably enlarged. At its entrance into the heart, it nearly admitted the passage of three fingers. The *azygos* veins generally communicate with the renal veins, but whether this communication existed, or was enlarged, could not be ascertained, as the kidneys had been removed.

The condition of the vessels, as here described, was fully examined by Dr Knox and Mr Fergusson, who assisted in the dissection.

The exact manner in which the blood passed from the large vessels at the lower part of the neck to the enlarged intercostals which entered the *azygos* veins, could not be examined, as the dissection was too far advanced, but it is probable that a considerable part of it flowed through the intercostal veins, which empty



themselves into the *venæ innominatæ*, and then passed through the anastomosing branches of these, with the intercostals which enter the *azygos* veins. Part of it might also have flowed along the internal mammary veins, passed through the anastomosing branches of these with the intercostals and superior lumbar, and thus reached the *azygos* veins. The thoracic veins in the *axilla* might also have allowed a reflux through them, which, from their anastomosis with the intercostals, would also reach the *azygos*. The sinuses and veins within the spinal canal might also have assisted in this, by their numerous anastomoses.

Though the *azygos*, intercostals, and lumbar veins were all enlarged, yet it was difficult to conceive how the whole of the blood of the *cava superior* could pass with the necessary facility into the *cava inferior*, particularly as it was a retrograde motion.

That there could be any other channel than those already mentioned through which the blood could pass between the two *cavæ*, it would be difficult to conceive.

The appearance of the parts around the impervious portion of the *cava* furnished no perfect clue to any supposed cause of its obliteration. It is, however, probable that the calcareous deposits around the vein were the remains of some enlarged bronchial gland, which, by their pressure upon the vein, produced its obliteration.

This subject was a female about 40 years of age, and died in the City Charity Work-House, under the care of Dr Smith, who has kindly furnished the following particulars of her case :

“ A. B. was admitted into the Charity Work-House in July last, labouring under symptoms of *hydrothorax*. There was general *anasarca*, great difficulty of breathing, livid countenance, inability of lying down, scantiness of urine, pulse frequent, small, and irregular.

“ She was relieved of these symptoms by the use of cream of tartar and other diuretics.

“ Finding herself better, she left the House in September free from œdema, but shortly after her symptoms relapsed, and she was again admitted in October. The same remedies were had recourse to, but without producing any relief. She died rather suddenly under an aggravation of all the symptoms on the 30th November, having had neither delirium nor coma, though she was somewhat deaf.

“ *Inspection*.—The right cavity of the *thorax* was full of serum, and the *pleura costalis* was much thickened. On the left side there were strong adhesions between the *pleura pulmonalis* and *costalis*, and the latter membrane was in many places fully three lines in thickness. The kidneys exhibited strong marks of Bright’s disease. This woman had led a very irregular life.”



I may also mention, as somewhat analogous to this case, that last winter, while dissecting the sinuses of the *dura mater*, I met with an obliteration of the superior longitudinal sinus about its middle. I ascertained that in this case also there had been no cerebral derangement present during the last illness of the patient.

In contrast with this case, where the blood of the two *cavæ* was poured into the auricle by the inferior *cava* alone, we may mention another which lately occurred in the same rooms,\* where the greater part of the blood of the two *cavæ* entered the auricle by the *cava superior*.

The two primitive iliacs in this case, instead of joining to form the *cava inferior* in the usual place, continued to ascend separately, the one on the right, and the other on the left of the *aorta*, until they were joined by the renal veins. They then united a little to the left, and behind the *aorta*, to form the *cava inferior*. This vessel passed through the aortic opening, getting to the right of the artery, and took the usual position and course of the *vena azygos*, and like it, joined the *cava superior*. In this subject the depression on the inferior surface of the liver to the right of the *lobulus Spigelii*, for the *cava inferior* was wanting, and passing through the opening in the *diaphragm* for the *cava inferior*, we had a much smaller vessel formed by the junction of the hepatic veins, which took the place of the *vena cava inferior*, and, like it, opened into the auricle.

In this last case, the irregularity in the venous distribution evidently depended upon original formation, and is interesting as such;† while the two former apparently depended upon a change produced by disease on the original formation, and possess considerable interest both in a physiological and pathological point of view.

I may mention, that the whole three subjects were females; the two first were about 40 years of age, and the last about 65.

##### 5. *Additional Observations on the Fœtal Circulation.* By JOHN REID, M. D. President of the Royal Physical Society of Edinburgh.

THE injections of the fœtal heart and vessels, detailed in the last Number of this Journal, go to confirm the opinion which Sabatier, from a careful examination of the structure of the parts

\* This subject was dissected by my friend Dr P. S. K. Newbigging.

† According to Meckel, the veins, particularly the internal ones, are seldom found to vary from their usual course, and in that respect differ considerably from the arteries.



entertained of the use of the Eustachian valve. The observations of Sabatier, although approved of and illustrated by Bichât, seem scarcely to have satisfied the generality of anatomists and physiologists, that it could possibly prevent the intermixture of the two currents, in the manner he described, so that we frequently find this opinion referred to, as the supposed use of the valve; and in two of the latest works on physiology, those of Magendie and Dr Bostock, the use here assigned to it, is by the former, strongly stated to be impossible, and by the latter, it is treated as a fanciful hypothesis. The careful examination of the foetal heart *in situ* must tend powerfully to remove the scepticism which usually exists on this subject.

In the *first* place, after the right auricle has been laid open in a proper manner, we may observe that the *foramen ovale* does not exactly pass through the *septum* of the auricles, but is rather partly placed in a notch in the posterior and inferior part of the fleshy *septum*, and partly in the upper part of the *vena cava ascendens*, as it joins the superior *cava* to form the great *sinus venosus*. When we next examine the position of the Eustachian valve, running from the left of the entrance of the *vena cava inferior*, to the left side of the *foramen ovale*, nearly forming a septum between the entrance of the vein and the right auricle, we perceive that this valve prevents the entrance of the blood of the *cava inferior* into the right auricle, and directs it through the *foramen ovale* into the left auricle. And lastly, when we consider the entrance of the two *cavae* themselves, the superior passing downwards and forwards, the inferior upwards and backwards, and add to all this the thick upper margin of the *foramen ovale*, we further perceive that the blood, passing down the *cava superior*, must fall directly into the right auricle, to the left side of the Eustachian valve, and thus fill the right ventricle. The course which the currents take in passing along the *aorta* and pulmonary artery is confirmatory of injections of these arteries in the *fœtus*, made by Kilian.

The supposition, that the superior nutrition of the head and upper extremities over the lower, may be accounted for by the greater purity of the blood sent to the upper part of the body, does not appear, when stated in this general manner, to be borne out by facts. For example, both the suprarenal capsules and kidneys are supplied by the blood, that has already made the circulation of the upper part of the body: and yet we find the absolute size of the renal capsules and the comparative size of the kidneys, greater in the *fœtus* than in the adult. From the instances here adduced, it would appear, that there is no necessity for having recourse to an arrangement of this kind, for regulating the growth of the different parts of the *fœtus*, notwithstanding that its cir-



culating fluids are less pure than after birth, and that the usual method of augmenting the quantity of blood sent to the part, when its nutrition is to be increased, which we find adopted, after the animal is enabled to maintain an independent existence, can apparently answer the same purpose during foetal life.

To this the brain, however, may be an exception; and it is probable, that the peculiar arrangement of the circulation in the *fœtus*, may have a reference to the supply of that organ. It is perhaps necessary that an organ so delicate as the brain, whose functions, at least in the adult, are so easily deranged by insufficiently aerated blood, should be supplied from a purer source than that which the two *cavæ* could furnish. For though the brain is in the foetal state perhaps entirely a prospective organ, intended for an independent existence, yet we must suppose that its organization is from the first adapted to its independent state, and if this should be the case, it is highly probable, that imperfectly aerated blood, which would be capable of deranging its functions, would be little favourable to its perfect developement. It may be that this answers a similar purpose, though by different means, to the arrangements which G. St. Hilaire has described in the heart of the crocodile, the physiological condition of which approaches somewhat to that of the human *fœtus*, by which the brain and extremities are supplied with the best aerated blood, while blood less highly aerated is circulated among the other *viscera*.

An objection has been made to the application of these injections upon the dead *fœtus*, to explain the course of the blood in the living state. It has been said that an important element of the question has been omitted, by overlooking the influence of the vital contractions which circulate the blood. If, however, it be granted, that the position of the Eustachian valve is such as is usually described, and that it presents an obstacle to the entrance of the blood, passing along the *cava inferior* into the right auricle, while it directs it toward the *foramen ovale* (which these injections prove), it is plain that it must continue to do this, whether the fluid is set in motion by vital contractions, or by a syringe; more particularly as the auricles are quiescent during their filling.

I may here mention, that I am satisfied, from repeated dissections, that the usual description of the distribution of the umbilical vein of the *fœtus* through the liver is incorrect, and that the account of it given by Kilian, Dr Knox, and probably by others, is the proper one. The umbilical vein, after passing along the horizontal fissure of the liver as far as the transverse fissure, enters the left branch of the *vena portarum*; and from this left branch of the *porta*, generally directly opposite (though this varies a little) to the entrance of the umbilical vein, arises the *ductus venosus*, which passes backwards in the posterior part of the horizontal



fissure, and enters one of the branches of the left hepatic veins before it joins the *cava ascendens*. If the umbilical vein be still described as dividing into two branches, it would be necessary to mention, that the branch which goes to the sinus of the *porta* supplies the left lobe of the liver; that it is never obliterated after birth, but afterwards becomes the left branch of the *vena portarum*; and, in fact, this is the view taken of it by Roux in his additions to the *Anatomie Descriptive* of Bichât.

Our notions on the circulation of the blood through the liver of the *fœtus* must remain the same whichever of the two descriptions we adopt.

6. *Additional Observations on Phlebolites.* By JOHN REID, M. D.

SINCE writing the few remarks on phlebolites which appeared in the last Number of this Journal, I found, during the last summer, several of these bodies in the vesical and uterine veins, which presented some unusual appearances. The largest was at least of the size of a garden-pea; the others were considerably smaller. The largest and several of the smaller consisted of two distinct portions. The smaller portion occupied one of the extremities, was smooth externally, of a bluish colour, and was nearly of the consistence of cartilage; the larger portion was of a bony hardness throughout. When dried, this smaller portion shrunk considerably, and resembled in appearance a piece of dried cartilage.

I find, upon more extensive inquiry, as I had previously expected, that many of those much engaged in dissection have observed these bodies more than once. I have found them in five out of the last sixty subjects in the dissection of which I have been concerned. My friend, Mr Fergusson, informs me that he once found them in great quantity in the mesenteric veins.

Tiedemann gives the following analysis of them by Gmelin :

Animal matter,	-	27.5
Phosphate of lime,	-	53.5
Carbonate of lime,	-	15.5
Magnesia and loss,	-	3.5

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100.0 \*

It is stated by Dr Lee that Dr Prout has also analyzed them, and has obtained similar results.† Though the different changes through which these bodies pass in their formation have now been pretty accurately ascertained, yet the nature of the causes which produce these changes is exceedingly obscure.

\* Tiedemann's Zeitschrift für Physiologie, Vierter Band Erstes Heft, 1831.

† Cyclopædia of Practical Medicine, article Veins.



Tiedemann, Otto,\* Lobstein,† Cloquet, and Dr Carsewell,‡ all agree that they are formed in the interior of the veins; that they at first consist of a coagulum of blood; in the interior of this clot the fibrin becomes pale and concrete, then assumes an osseous appearance, and this goes on little by little, and layer after layer towards the circumference. We could easily class their formation with the occasional deposition of calcareous matter among the other tissues, if Hodgson's opinion was correct, that they were first formed external to the veins, and afterwards made their way by absorption into the interior; or if, according to Andral,§ they were in general first developed in the middle coat of the veins, and then passed into their interior in the same manner as the false cartilages are formed, and pass into the cavity of the joints. Hodgson stands alone in his opinion; and we even find Mr Langstaff,|| upon whose authority he describes these bodies, inclined to believe that they are formed in the interior of the veins. The adhesions of these bodies to the inner coat of the veins by a fine membrane, as observed by Tiedemann and Cruveilhier,¶ would afford some countenance to Andral's opinion, were it not at variance with accurate observation; and we may suppose that this appearance was produced by the presence of the foreign body causing irritation and effusion of coagulable lymph.

Tiedemann,\*\* and, following him, Lobstein, suppose them to be formed by a mechanical deposition of the calcareous matter contained in the blood, intermixing itself with the albumen of the blood. It appears to me that this opinion is unable to explain the manner of their formation in many cases, and consequently, can scarcely be regarded as the probable cause of their formation in those cases which seem to agree with this supposition. Mechanical deposition of the matters contained in the blood cannot, I think, explain their formation in those†† cases, where we find an osseous-looking deposit taking place in the centre of a coagulum, around which the fibrin arranges itself in concentric laminae, increasing in density as we proceed to the centre, and where apparently those nearest the centre gradually assume this osseous appearance, which extends itself towards the circumference.

If these bodies resulted from mechanical deposition, could the earthy salts pass through the several dense laminae of fibrin,

\* Otto's Pathological Anatomy, translated by South.

† Lobstein's Anatomie Pathologique.

‡ Cyclopædia of Practical Medicine, article Veins.

§ Andral's Anatomie Pathologique, Tome ii. p. 412.

|| London Medico-Chirurgical Transactions, Vol. viii.

¶ Cruveilhier's Anatomie Pathologique, Tome ii. p. 71.

\*\* Journal Complémentaire du Diction. des Sciences Médic. Tome iii.

†† Cloquet's Pathologie Chirurgicale, and Observations of Dr Carsewell in article Veins, Cyclopædia of Practical Medicine.



and deposit themselves, apparently in certain proportions, in the innermost laminae? If the presence of the earthy salts was the result of a deposition, would they not rather be found upon the outer surface of the most external lamina, instead of penetrating through it to reach the innermost? We cannot, at least in the present state of our knowledge on the subject, refer their formation to any chemical agency. Their formation is probably akin to the occasional hardening of tubercles into bony concretions, which is a process independent of any vascular organization of the tubercles themselves. It is also illustrated by the formation of the vegetations on the valves of the heart, as observed by Laennec and Dr Alison,—also by the tubercular, purulent, or encephaloid deposits, sometimes found in the fibrinous clots within the heart and great vessels.

I can scarcely venture to hazard an opinion on this subject; but I must confess that I feel inclined to believe (however fanciful the opinion may appear to some physiologists) that the great resemblance of those bodies in their chemical analysis to the osseous texture, the manner of their formation, and their possessing in some cases physical properties similar to cartilage, can only be explained by supposing that they are the result of a process resembling the formation of the osseous tissue in the other parts of the body.

It is possible, that when our knowledge of the spontaneous motions observed in the circulating fluids of vegetables and animals becomes more extended, we may be furnished with a more satisfactory explanation of their origin.

Tiedemann and Lobstein are of opinion that these bodies are more frequently found in arthritic patients; and they believe that this may be accounted for, by supposing that the blood in those individuals may contain a greater quantity of earthy salts. The concretions, however, found in the joints of arthritic patients consist of urate of soda, a salt not discovered in the phlebolites. In all the subjects in which I found them, there was no reason to suspect any arthritic affection; but having had very few opportunities of dissecting subjects who have suffered from gout, I cannot speak of their relative frequency. They are generally described as being deposited in the dilated veins; but we so often see the dilatations corresponding to the varied sizes of these bodies, that it appears probable that they are very frequently the consequence of their presence.

Since the preceding observations were written, I have found several phlebolites in the spermatic or rather ovarian veins of the two last female subjects I have dissected. In one of these subjects, we found them in all the different stages of their formation.



and deposit themselves apparently in certain proportions, in the innermost laminae. If the presence of the nuclei cells was the result of a deposition, would they not rather be found upon the outer surface of the most external lamina, instead of penetrating through it to reach the innermost? We cannot, at least in the present state of our knowledge on the subject, solve their formation in any chemical agency. Their formation is probably akin to the occasional formation of tubercles into bony concretions, which is a process independent of any vascular organization in the tubercle themselves. It is also limited by the formation of the vegetation on the valves of the heart, as observed by Latham and Dr. Alison; also by the tubercular punctures on ectopic and deposits, sometimes found in the ligamentum ciliare in the heart and great vessels.

I can scarcely venture to hazard an opinion on this subject; but I must confess that I feel inclined to believe (however true or false the opinion may appear to some physicians) that the great resemblance of these bodies in their chemical analysis to the osseous texture, the manner of their formation, and their presence in some cases physical properties similar to cartilage, can only be explained by supposing that they are the result of a process resembling the formation of the osseous tissue in the other parts of the body.

It is possible, that when our knowledge of the spontaneous motions observed in the growing fluid of vegetables and animals becomes more extended, we may be furnished with a more satisfactory explanation of their origin.

Dr. Latham and Dr. Alison are of opinion that these bodies are more frequently found in certain patients; and they believe that this may be ascertained by supposing that the blood in those individuals may contain a greater quantity of earthy matter. The conclusion, however, found in the journal of various patients, seems of more of value, a soft, not dispersed in the blood, but in all the subjects in which I found them, there was no reason to suspect any vitiated action; but having had very few opportunities of dissecting subjects who have suffered from gout, I cannot speak of their relative frequency. They are generally described as being deposited in the distal extent; but we often see the relations corresponding to the varied state of these bodies, that it appears probable that they are very frequently the consequence of their presence.

Since the preceding observations were written, I have found several phibolites in the epistaxis or rather osseous valves of the two last female subjects I have dissected. In one of these subjects we found them in all the distal angles of their laminae.







