

On the influence of vegetations on the valves of the heart, in the production of secondary arterial disease / by Jolliffe Tufnell (surgeon to the city of Dublin Hospital).

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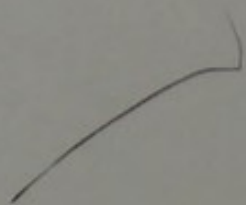
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With the Authors
Wm. L. G. and
ON

THE INFLUENCE OF VEGETATIONS

ON THE

VALVES OF THE HEART,

IN THE

PRODUCTION OF SECONDARY ARTERIAL DISEASE.

BY

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PRISON, ETC. ETC.

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ON THE INFLUENCE,

&c., &c.

ATTENTION has been recently drawn by Dr. Senhouse Kirkes, in a communication read before the Royal Medico-Chirurgical Society of London^a to some of the principal effects resulting from the detachment of fibrinous deposits from the interior of the heart, and their admixture with the circulating fluid; and also by Dr. Rühle^b in Virchow's Archiv, to the same subject.

These papers both ably illustrate the dangers attendant upon the presence of warty vegetations of the valves, and point out the sources of peril which cauliflower excrescences, once formed, must ever be, by demonstrating the serious results that may ensue from their detachment, and consequent presence in the circulating blood. They show how their arrest within an arterial canal, if of the head, may lead to direct paralysis and speedy death; or, if in the main artery of an extremity, be productive of gangrene, which, though slower in its consequences, yet ultimately becomes no less fatal to life.

A third form of this secondary influence has recently fallen under my observation, and, connected as it immediately is with the subject of arterial dilatation and aneurismal development, I propose directing attention to the case, and offering a few remarks upon it.

This case I saw, for the first time, on the 7th of January of this year. The individual in whose person it occurred was a young man, twenty-five years of age, of delicate constitution and small make. In August, 1846, after exposure to wet and fatigue in shooting, he complained, on returning home, of pain in different parts of his body, but which was more particularly marked about the ankles and knees. The symptoms were

^a Medico-Chirurgical Transactions, vol. xxxv.

^b Medical Times and Gazette, March 19th, 1853.

acute; he was unable to rise from his chair from pain in the insertions of the recti muscles, and the ankles were both swollen and tender; sore throat and general symptoms of cynanche accompanied this state; there was some degree of fever, thirst, hot skin, &c. &c.

This state was met by leeches being applied to the inflamed joints, the administration of the warm bath subsequently, followed by Dover's powder and blue pill, with alkaline cathartics.

On the 29th he was convalescent, and was allowed to leave the house, and take walking exercise in the grounds.

On the 2nd September relapse occurred, commencing with transient stiffness, and some uneasiness in the back of the Achillis tendon, followed by swelling of the left wrist. The next day there was a good deal of fever; the night was passed without sleep in consequence of pain; the pulse was 94, and throbbing; the headach considerable; skin hot, and urine depositing a lateritious sediment. Purgatives and colchicum were exhibited; and on the 6th there was a mitigation of the symptoms. It was now, for the first time, ascertained that the patient had gonorrhœal discharge from the urethra. Balsam and alkalies were, therefore, superadded to the colchicum. On the 14th he was free from all uneasiness. Upon the 20th the discharge from the urethra ceased; and on the 23rd he left the country for London.

From this date he continued in good health up to the month of September, 1852, when he contracted syphilis, and was subjected to the influence of mercury.

In November, after exposure to wet, he complained of pain in the head, shoulders, arms, and ankle-joints, with dyspepsia and gastric irritation. This attack was met by laxatives and diaphoretics, followed by sarsaparilla and hydriodate of potash, in doses of five grains, thrice a day. His recovery was tardy; but by the end of the month he had much improved, and his chest, upon careful examination, yielded no sign of cardiac disease. On the 8th of December, convalescence was interrupted by acute rheumatic symptoms, violent headach, hot, dry skin, and great throbbing of the carotid arteries, especially at night; to these succeeded periodical exudations of profuse sweat, occurring every eight hours: leeches were applied over the region of the heart, and colchicum administered internally. Up to the 16th of December there was no dyspnœa or palpitation. Uneasiness was now, for the first time, complained of in the cardiac region; this was followed by severe pain in the left hypochondrium: bellows murmur was shortly after loudly audible at the base of the heart. From this date the symptoms of cardiac disease began gradually to manifest themselves. There

was inability to lie on either the left side or the back; the heart's action became jarring and violent; pulsation was visible in the carotids; the *bruit de soufflet* was loudly heard, not only in the heart, but over the great vessels; the countenance grew pale; the feeling of debility great, and tendency to fainting frequent.

Such had been the history of this patient previously to the evening of the 7th of January, when I first saw him. There was now universal pallor of the skin, conjunctiva, gums, and tongue. There were extreme debility, palpitation, and dyspnoea, accompanied by violent pulsation of the carotid arteries, with headach from throbbing of the cerebral vessels. The pulse was 96, jarring and regurgitant, but quite regular.

Upon examination of the chest dulness on percussion was found over a large space; and to the ear a double bellows murmur was audible, loudest at the middle of the sternum, but distinct over and along the course of the carotids as far as the angles of the jaws; to the bend of the elbows in the upper, and the groin in the lower extremities. Beyond these points there was no *bruit de soufflet*, but a loud, single thump. The pulse, too, was visible throughout the same extent, at least wherever the arteries were superficial; a *bruit de diable* was also audible over the large veins of the neck. The condition of the patient was now extreme; he sat upright in his chair, speaking only in gasps, each sentence being interrupted by a short cough.

The diagnosis made was, dilatation and hypertrophy of the heart, patency of the aortic valves, with excessive anemia in consequence of deficient nutrition.

Removal of the causes of the latter condition being out of the question, the next object to obtain was an alleviation of its more distressing symptoms, by rest, pure air, nutritious diet, and chalybeates, with opium at night. To fulfil this end, the citrate of iron in two grain doses, in the form of the aqua chalybeata of Bewley, was prescribed three times a day, with half a grain of muriate of morphia in an ounce of Murray's solution of camphor at night. The diet consisted of an egg for breakfast, calves-foot jelly at noon, roast or boiled underdone brown meat at 4, with arrow-root and milk at 7, as little fluid being taken in the twenty-four hours as the patient could limit himself to. Under this treatment he continued to progress very favourably until the evening of the 10th, when, on being visited, he said he was afraid his right leg had become paralyzed, it felt so *heavy, dead, and cold*, and so full about the knee. Upon examining the extremity, its temperature first

attracted notice. It was very low, much below the other. Its colour was a dirty, livid yellow, and the foot and leg were slightly œdematous. The knee was swollen, measuring one inch more in circumference over the patella than the opposite one, the difference caused not by general œdema, or effusion into the joint, but by the presence of a large pulsating tumour in the ham.

On inspection and examination of this tumour, it was found to occupy the lower two-thirds of the popliteal space, sinking down between the heads of the gastrocnemius muscle. It was oval, of the dimensions of a hen's egg, with a lateral diastolic motion of two inches, forcing the forefinger and thumb asunder when applied laterally to it at this degree of separation. Pressure on the trunk of the artery above completely controlled pulsation, *but did not effect any diminution* in the size of the swelling. There was no pulsation to be felt in the posterior tibial artery at the ankle. Upon applying the ear to the tumour, both unaided and with the stethoscope, no *bruit de soufflet* could be heard, but a very loud single thump. A flannel bandage was now carefully applied from the toes to the middle of the thigh, and the same general measures as before continued.

On the 11th and 12th he progressed favourably. By the 13th he had so much improved under the chalybeate treatment, that he could lie flat upon his back in bed. His voice was stronger; he had lost the distressing beating in the head; and when visited in the evening said he felt quite comfortable. At 10 p.m. he retired for the night, and had been about an hour in bed, when he suddenly felt a twisting pain, of a very acute character, in the ham, being, as he described it, as if a corkscrew had been quickly turned into the joint, and then withdrawn with a jerk. This was followed by cramp in the leg, which grew worse and worse, assuming a burning character, and at last becoming so severe, as to make him cry out with pain. Having been sent for, I found him in the condition just described, calling for relief, and yet unwilling to allow the leg to be approached. After a little persuasion, however, he permitted a lawn handkerchief, sopped in laudanum, to be applied over the tumour, and gutta percha sheeting to be slightly bandaged outside. A full opiate was administered internally; and under the joint influence of the two he became tranquil, and in an hour dozed off to sleep.

The succeeding day no examination of the tumour itself could be gained, but, on exposing the front of the knee-joint for the purpose of loosening the bandage, a large artery was plainly

visible, beating on the inside of the knee, and running over the condyle of the femur, showing that collateral circulation had become established.

There was also much increased action of the heart; it was forcibly pulsating on a level with the left nipple, and for two inches to the right side of it. The dulness upon percussion extended over a space of nearly three inches to the right of the left nipple, and for the same extent above and below. The pulsation in the carotid arteries was also very visible, especially on the right side. The most careful examination failed to detect any pericardial roughness, and there was no sign of mitral valvular disease beyond a slight fremitus or purring murmur, whilst the signs referable to the diseased state of the semilunar valves of the aorta were more manifest than before.

On the 18th the citrate of iron was increased to three grains thrice a day, the same general treatment being continued. On the 22nd, nine days after the attack of pain in the popliteal space, all tenderness there had subsided, and a careful examination of the ham was now allowed. The condition of the part was peculiar: all the symptoms of the previously existing tumour had disappeared, and the girth of the limb was the same as that of the opposite side. No difference could now be perceived in the two popliteal spaces when the forefinger of each hand was drawn along the course of the arteries, at the same time, on either side. The collateral vessel, already mentioned as pulsating on the inside of the knee, was still there, beating forcibly, and feeling to the touch as large as the radial artery at the wrist. The posterior tibial could now again be felt beating behind the inner ankle at its normal site, but very feebly, as compared with that of the opposite extremity.

On the 25th of January there were symptoms indicative of failing strength. The appetite had declined, and the digestion become impaired, gaseous distention of the intestines causing much pain of pleurodynic character in the left hypochondriac region. The face and jaws, too, exhibited signs of puffiness from œdematous effusion, and the urine was scanty.

Under these circumstances the citrate of iron was omitted, and an infusion of broom, with nitric ether and acetate of potash, substituted, and dry cupping, with opiate fomentations, were applied to the painful region of the side. The urine at this time, and throughout the whole period of illness, exhibited no trace of albumen either upon the addition of nitric acid or the application of heat. On the 3rd of February, the pallor of the countenance having increased with accompanying debility, tartrate of iron was added in five-grain doses to the diuretic mixture.

On the 16th, at midnight, he was awakened out of sleep by paroxysm of pain of anginal character, the breathing being very rapid and distressing, each attempt to inspire being met by short spasmodic cough. This continued for some time, and eventually subsided under repeated doses of Hoffmann's anodyne liquor in Murray's solution of camphor. From the 16th to the 20th he gradually sank, the sensorium being clouded by day, and delirium supervening at night; wine and stimulants were fruitlessly given, and he died quietly and without pain on the morning of the 20th, the pulse, just prior to dissolution, being as steady, full, and regular, at 90, as in health: the jerk previously existing from regurgitation having subsided as the heart's power of contracting declined; and the wrist, if presented out of bed to a bystander unconscious of the real nature of the case, might have been regarded as the pulse of an individual in robust health.

The body was examined thirty hours after death. Upon raising the sternum, the pericardium floated upwards on a level with the most projecting portion of the heart, being elevated by serum effused into it to this extent, or about, in measured quantity, six ounces. The pericardium covering the heart, as well as the reflected portion of this membrane, showed no trace whatever of inflammatory action. The heart itself was about twice the natural dimensions, and obtusely rounded at its apex; the right auricle and left ventricle were considerably distended with blood. On examining the cavities consecutively, in the course of the circulation,—the right auricle was found dilated and thinned, but not otherwise diseased; the right ventricle less considerably enlarged, though somewhat so; the tricuspid valves quite sound: no trace of endocarditis having apparently ever existed in either of these cavities: the pulmonary artery and its valves were also natural. Proceeding thence to the lungs, both were congested from impeded circulation, and the air-tubes to their minute divisions exhibited conditions peculiar to congestive bronchitis. Returning to the left side of the heart, the pulmonary veins were natural; the left auricle dilated, and its structure thickened; the left ventricle greatly enlarged, and its walls hypertrophied; the mitral valve sound, with the exception of its anterior segment, where were deposited a very few specks of fibrous vegetation. At the aortic valves, as diagnosed, lay the sole seat of disease. Each semilunar division was enlarged to about twice its natural dimensions in diameter, rolled upon itself and everted, projecting upwards towards the arch of the aorta, encrusted upon every direction with masses of fibrine, gray and nodulated; some in tubercles, others in pendant bunches, forming warty

growths with narrow pedicles, or cauliflower-like vegetations, to an extreme degree. Immediately above the semilunar valves, in the sinus of the aorta, existed a large sloughy ulcer, which had destroyed the lining and middle coats of the artery. Beyond this, the aorta was slightly dilated, and bore traces of atheromatous deposit to some extent.

The popliteal artery was then carefully dissected out from its exit from the tendinous canal of the adductor muscles to below its tibial divisions. Examined by the eye, it presented a natural appearance as far as the giving off of the articular vessels; below this it spread out into an oval, flattened body, somewhat resembling the cauda equina of the spinal cord. It then became slightly narrowed before dividing into the tibial arteries, which were both pervious, but their venæ comitantes were obliterated, filled with clots of consolidated blood, of dark modena hue, lodged in separated oval nodules. To the touch, the artery itself above appeared perfectly healthy, though whitish throughout the portion described, but it felt densely solid and firm.

Upon slitting it up, and exposing its cavity throughout, no disease whatever could be found in the upper portion, but towards its lower end it had been converted into a fibrous cord of greyish-yellow colour, as solid as the walls of a long-standing gristly stricture of the urinary canal. In the intervening space was lodged a clot of fibrine, intimately connected to and with the artery below, less closely adherent in the middle, and only applied against its lining membrane above, whence it stretched upwards in a pediculated form to the nearest collateral branch. Its colour, too, greatly differed throughout this course, being gray at the inferior portion, yellow in the central, and blood-coloured at the top, its density decreasing in proportion as the fibrine verged from organic to mere clot.

Such were the local appearances in this case. Here, I think it will be allowed, is demonstrated the value of post-mortem examinations. We see symptoms, anomalous and obscure during life, made intelligible, patent, and clear; all doubt and mystery removed; and the details of a case rendered apparent, which might otherwise have (from their unusual character) become the subject of much speculation, if not of discussion and dispute.

We see symptoms so strongly simulating aneurism, that it is difficult to decide in the negative as to its existence. We have pre-existing arterial disease in a frame which had been subjected to the effects of syphilis and mercury; a pulsating tumour in the most frequent seat of the disease, whose diastole is arrested by pressure on the cardiac side; numbness and slight

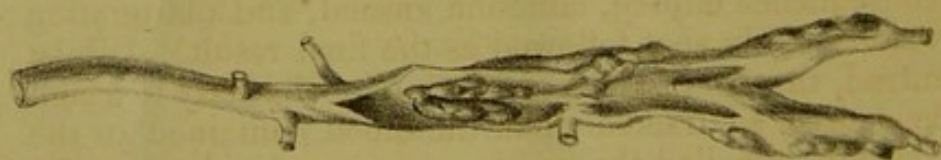
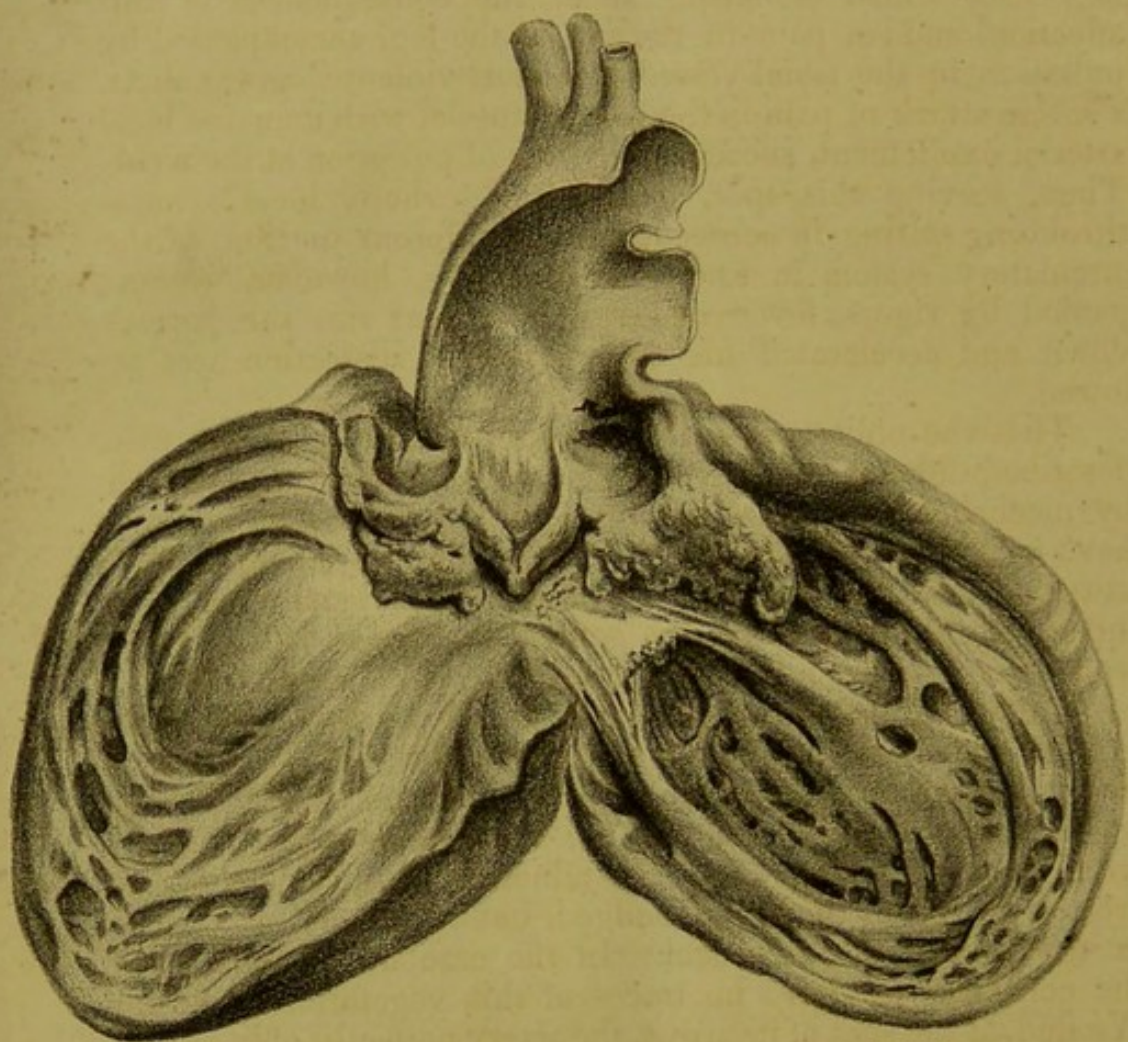
pain in the limb from distention of the passing nerves; œdema of the foot, and passive congestion from pressure on the veins and lymphatics; diminished temperature from interrupted arterial circulation, and loss of pulsation in the branches of the vessel below, yet differing from aneurism in two very important points, viz., being totally devoid of *bruit de soufflet*, upon the most careful examination by the ear; and though fluid and of recent formation, yet not decreasing in size when the flow of blood was arrested by pressure from above.

These two points led to the diagnosis that there was no true aneurismal sac communicating with the arterial tube, but that the whole vessel was dilated,—a circumstance for the occurrence of which weeks, or even months, would, under ordinary circumstances, be required, yet here developed in a few hours. Soon, however, a fresh train of symptoms, resembling aneurism, set in: as in the majority of the cases cured by compression, sudden pain was experienced in the tumour, of an almost excruciating character, lasting for the customary period, then subsiding, and being followed by well-developed collateral circulation. But now again there is a divergence from the simile. No tumour of densely hard character, resulting from the consolidated blood, is to be found in the popliteal space at the seat of disease; but instead, the feeling communicated to the fingers as if the artery were again pervious throughout, confirmatory evidence existing in the restoration of circulation in the posterior tibial artery at the ankle. All these conflicting circumstances have been cleared up by the post-mortem examination.

We find the artery pervious through some extent of the popliteal space, yet at its inferior extremity firmly and entirely closed, its canal plugged by fibrine superiorly, the walls of the artery cohering below, or like a gristly stricture consolidated by fibrous deposit.

We find no traces of a sac or aneurismal pouch; no atheromatous disease of the vessel in its course, the artery healthy at this spot, as well as both above and below. We have the artery obstructed, and rendered impervious to the blood-passage through it, and secondary consequences resulting. We trace them to the centre of the circulation—the heart, and there discover appearances that will readily resolve the phenomena in question,—loosely attached fibrinous vegetations from the sigmoid valves, hanging by pedicles into the aorta, and so delicately adherent, that a touch almost is sufficient to detach them from their site.

Here is a ready explanation of the whole; and yet, before accepting it as certain, we must take another view of the case,



and determine that the symptoms did not depend upon acute local arteritis,—such a condition as has been observed by Dr. Stokes in the following case^a:—

“A young person, with permanently patent aortic opening, had, whilst labouring under the consequences of this affection, sudden pain in the calf of the leg, accompanied by pulsation in the tibial vessels to a most violent degree; next, a severe attack of pain in the biceps muscle, with immense local arterial excitement, succeeded by loss of pulsation at the wrist. Then, leaving this spot, irritation elsewhere, local arterial throbbing setting in consecutively in different portions of the circulatory system in turn; these attacks, however, accompanied by rigors, fever, and sweating, that ran the patient down and accelerated his end. Here no dissection was allowed.”

That the obliteration of the popliteal artery in the case described did not result from local arteritis, but was caused by mechanical plugging of the vessel by a foreign body, I have not a doubt: and for this reason, viz., that had it been caused by arteritis, there would have existed symptoms of an inflammatory character in the general system, and the disease would not have been confined and limited to a single spot.

It may be urged, however, that, in the examples of plugging of the arteries by fibrinous deposits detached from the interior of the heart, which have been adduced by Dr. Kirkes in his paper, already referred to, the masses of vegetation were themselves discovered, not adherent to the coats of the arteries in which they were lodged, but merely lying loosely in the caliber of the vessel. In the case under notice, on the contrary, we have no traces of this vegetation existing. We find, at the spot of its arrest, the artery perfectly obliterated, converted into a fibrous cord. This condition, then, I believe to have been brought about in the following way:—The vegetation became impacted in the vessel so firmly as totally to exclude circulation. The artery then, behind the seat of obstruction, became distended by dilatation of all its coats; inflammatory action was set up at the point of arrest; lymph was in consequence effused, adhesion ensued, and obliteration of the vessel at this spot followed as the final result. Whilst this occurred, the artery above, retaining its elasticity to a considerable degree, contracted upon the blood contained in the dilated portion, expelled the greater portion of it through the collateral vessels, and emptied itself, so far as to prevent conso-

^a This case is unpublished, and for permission to refer to it here I am indebted to Dr. Stokes.

lidation of a sufficient amount of blood to afford to the touch the sensation of solid tumour, which is felt after rapid cure of aneurism here. A small quantity necessarily remained in the caliber of the artery, which, retained here, coagulated, and formed the clot found within this space, as exhibited in the preparation, and represented^a in the lithograph annexed.

With such complete stoppage of circulation through the limb as occurred in this case, it is, at first sight, a matter of wonder that mortification of the extremity did not ensue, such as followed in the case quoted by Legroux. Why it did not, I think may be readily explained by reference to the report. The vessels had been so long subjected to forcible distention, from a greatly enlarged and powerfully contracting heart, that they adapted themselves with more than ordinary readiness to the circumstances of the case, and speedily dilated, so as to form a collateral circulation sufficient to give free passage to the blood, and thus prevent gangrene of the leg and foot. A more difficult point of solution is the reason why the artery, upon blocking of its canal, should in this instance have dilated into a tumour, and such a condition not equally obtain when a ligature is ordinarily applied. The explanation, I think, however, may be satisfactorily afforded by referring to the peculiar condition of the individual himself in this case. With cardiac enlargement and disease of the aortic valves, anemia, and broken health, to the degree which existed here, no surgeon could think of resorting to the operation by ligature, if an aneurism did exist. We have not, nor, I think, are we likely to have, analogous cases, subjected to the ligature, and consequently are deprived of the only sources of practical deduction; but, in their absence, we may, I think, fairly draw an inference from negative conclusions.

One subject further remains for our consideration, and from its consequences it becomes the most important of the whole. I mean, the cause of the warty vegetations. Are they simple polypiform concretions resulting from coagulations of the blood, as regarded by Laennec and confirmed by Andral? Are they the result of some peculiar condition of the blood, or particular constitution of the individual, as suggested by Dr. Hope? Do they follow as the consequence of inflammation of the endocardium? Or, as laid down by Dr. Hughes, from coagulation of the blood upon the inflamed membrane? Rheumatic inflammation is now their generally assigned cause, and is, in this instance, confirmed by the history of the case. I have taken the trouble of tracing it carefully back, and find that, so far dis-

^a This preparation, and the original drawing by Mr. Connolly, are in the author's possession.

tant as the year 1846, when only eighteen years of age, this patient was the subject of fibrous rheumatic inflammation. This attack did not, however, in my opinion, affect the semilunar valves, for recovery was perfect, and succeeding health good, a corroborative proof of which is to be found in the fact of his having passed the careful medical inspection of a Life Assurance Office referee in the intervening time. The mischief, I think, we may assume to have been the result of the last acute attack upon the 8th of December, and for this reason, that the most careful stethoscopic examination, prior to this date, yielded no physical sound indicative of disease—a condition which immediately followed upon this attack, was clearly and obviously present upon the 16th, and remained constant to the time of death. Occurring then, however, I do not, however, refer it to *general* endocardial inflammation, for no trace of such affection could upon *post-mortem* examination be shown to have existed in the lining membrane of the heart, but, in inflammation only of that portion which, from its peculiar nature, became more liable than any other to be the subject of rheumatic attack, viz., the tendinous structure of the passive semilunar valves.

The fibrous structure of the latter must be regarded as affording a tissue much more likely of assault than the fine serous membrane of the endocardium; and, so regarded, inflammatory swelling of the valves once set up, exudation of lymph has only to occur, in a greater or less degree, to form the granular or warty growth, or assume the state of cauliflower excrescence. Upon the size and shape of these vegetations of the valves must necessarily, and to a great extent, depend the attendant danger. The larger and more friable the growth, the more likelihood of their being detached, and when set free their size must, of course, determine the point of arrest; the greater their magnitude, the more important is it the vessel in which they become impacted; but even in the smallest form, such as in casual inspection of post-mortem examinations might be considered as of trifling importance, their presence, as demonstrated by Dr. Hughes, may be the cause indirectly of fatal results, by retarding the blood in its progress, and thus inducing fibrinous concretions, which, equally with the vegetation itself, may be carried into the circulating fluid, be lodged in the cavity of a vessel, and produce death by paralysis if of the head, or gangrene if into an extremity of the body.

I have brought this case forward now because I consider it one of interest to both the practical surgeon and the physician; and as it is a subject of great importance, in connexion with arterial disease, I purpose at some future time, when speaking of aneurism, to refer more particularly to it.

In the first place, it is clear that the mind is not a substance, but a series of states or conditions. This is evident from the fact that the mind is always changing, and is never the same at two different times. It is also evident that the mind is not a simple, indivisible entity, but a complex, divisible one. It is composed of many different parts, each of which has its own distinct characteristics. These parts are the various faculties of the mind, such as the senses, the imagination, the reason, and the will. Each of these faculties is capable of performing different kinds of operations, and each of these operations is subject to different kinds of laws. The mind, therefore, is a complex system of interacting parts, each of which is governed by its own laws. This is the first principle of the philosophy of the mind: that the mind is a complex system of interacting parts, each of which is governed by its own laws.

The second principle of the philosophy of the mind is that the mind is not a passive, inert entity, but an active, dynamic one. The mind is always engaged in some kind of activity, and is never at rest. It is always receiving information from the senses, and is always processing this information. It is always forming ideas, and is always acting on these ideas. The mind, therefore, is a dynamic system, always in a state of flux and change. This is the second principle of the philosophy of the mind: that the mind is a dynamic system, always in a state of flux and change.

The third principle of the philosophy of the mind is that the mind is not a separate, independent entity, but a part of a larger system. The mind is not isolated from the world, but is always in contact with the world. It is always receiving information from the world, and is always acting on the world. The mind, therefore, is a part of a larger system, the world, and is always interacting with the world. This is the third principle of the philosophy of the mind: that the mind is a part of a larger system, the world, and is always interacting with the world.

These three principles are the foundation of the philosophy of the mind. They are the first three principles of a system of thought that seeks to understand the nature of the mind and its relationship to the world. They are the first three principles of a system of thought that seeks to understand the nature of the human mind and its relationship to the human world. They are the first three principles of a system of thought that seeks to understand the nature of the human mind and its relationship to the human world.



