tions of both sets of ducts are precisely the same, viz., that of mere channels.

B. The menstrual fluid of the human female consists of three distinct parts: *a.* The ova; *b.* The fluid of the ovarian vesicle in which the ova are developed; *c.* A sanguineous discharge from the uterine mucous membrane. These three, combined, go to form what is known under the title of the menstrual secretion. I permit myself to speak authoritatively on this point, as I once enjoyed an opportunity of studying the physiological function of menstruation on a woman, who committed suicide when on the very brink of menstruating, such as no man, as far as I am aware, ever similarly enjoyed. The condition of things then found was carefully delineated in water-colors, by a professional artist, and still exist in all their pristine exactitude to verify every word which I am now about to say.

A healthy married woman, of twenty-three years of age, in a fit of jealousy, drowned herself in the Serpentine in 1861. At the time, the scientific committee, appointed by the Royal Medical and Chirurgical Society, was actively engaged in the investigation of the best means of resuscitating the apparently drowned. As a member of that committee, I had occasion to make the *post mortem* examination of the young married woman just mentioned; and, although the woman's organs of generation had nothing whatever to do with the question of suspended animation—as I was at the time in question lecturing to the students of University College on the subject of reproduction—after finishing the necropsy, in as far as the pathological appearances of drowning were concerned, I turned my attention towards the woman's organs of generation, when, to my surprise and delight, my eye caught sight of the congested surface of an ovarian vesicle, distended with fluid, of the size of a large hazel-nut, projecting beyond the exterior of the left ovary. Although not then fully conscious of the invaluable specimen which accident had thrown in my way, I carefully extracted the whole group of the internal organs of reproduction, and conveyed them, for subsequent scientific investigation, to the Physiological Laboratory of University College, which was at that time under my immediate superintendence. On examination, the immense value of the specimen at once became apparent.

The uterus, which was a "virgin one", was found slightly congested, and towards its internal fundus was a vascular, engorged, puffy portion of the mucous membrane, covered over by a thin adherent layer of sanguineous mucus—more blood than mucus—and from it, extended downwards to within half an inch of the os uteri, a conical-shaped layer of blood; not a single drop of which had, however, as yet reached the internal orifice of the os. The true state of matters at once dawned upon my mind; and accordingly, I at once transferred my attention to the ovaries, both of which were slightly congested. On the surface of the left ovary was seen an ova-follicle, all ready to burst. Had I doubted that the follicle was on the very verge of bursting, the sequel would soon have undeceived me. For while I was handling it, and that tenderly too, it burst beneath my fingers, and from it flowed a whitish serous liquid, which was instantly carefully collected and microscopically examined. One ovum alone was detected in it. The condition of the Fallopian tubes was next inquired into. The fimbriated extremities of both were found to be highly congested—much more so, externally, than either the external coat of the ovaries or of the uterus. But the internal coat of the tube was perfectly free from any trace of congestion whatever; and, by its pale white, shiny tendinous appearance, formed a very marked contrast to the highly congested lining mucous membrane of the uterus, the congested radius of which abruptly ended at the very orifice of the uterine ends of the Fallopian tubes. Strange to say, it was actually at the margin of the Fallopian tube orifices that the congested appearance of the mucous coat of the uterus was most marked. It may not be here out of place, incidentally to mention, that the right ovary contained a well-defined, non-impregnation, corpus luteum (commonly called false corpus luteum), as well as a beautiful, congested, unripe, ovum follicle, of the size of a large pea, embedded in its interior.

From these facts, as facts they undoubtedly are, I venture to propound the following theory as regards the normal function of human menstruation.

1. The menstrual fluid, as already said, consists of three perfectly distinct parts: ova, white serous ovarian-follicle secretion, and sanguineous mucus uterine secretion.
2. The ovaries and the uterus are the only parts which supply the menstrual secretion.
3. The Fallopian tubes do not secrete any of the ingredients special to the reproductive function.
4. The Fallopian tubes are mere passive canals for the transport of the secretion of the ovaries into the uterus.
5. No sanguineous menstrual fluid whatever enters the Fallopian tubes, in a normal state. If it gets there at all, it can only be from the uterus by an abnormal condition of regurgitation.

If this theory of normal menstruation be correct, it follows, as a natural sequence, that Mr. Tait erred in supposing the menstrual fluid that he evacuated had been pent up in a distended Fallopian tube. In case he should, however, still entertain any doubt on the subject, I shall now proceed to quote passages from his own paper, which are in direct confirmation of my views.

1. He states that the tumour "presented the red muscular appearance of the uterus".
2. A fragment of the tissue of the tumour, when subjected to microscopical examination, "proved to be composed of an abundance of unstripped muscular fibre".
3. "After the cyst was emptied", it contracted round and grasped the finger.
4. He "could find no canal leading into the uterus".
5. "About six quarts of thick dark-brown fluid, having the peculiar smell of menstrual fluid", were evacuated by means of a trocar.

These facts, taken in conjunction with the physiological description I have just given of the female organs of generation, as they appear at the menstrual period, seem to my mind to warrant the acceptance of one of the following theories regarding the source from which the grumous fluid was evacuated: namely, that the fluid was actually evacuated from a normal or from an abnormally formed uterine cavity. A. Because a grumous dark-brown fluid, posing a distinct menstrual odour, could not have readily existed at any other point of the reproductive organs above the os uteri. B. Because an occluded os uteri is not an unknown pathological condition.

Lastly, as the patient was an unmarried lady, thirty-eight years of age, and presumably a virgin; and as Mr. Tait distinctly states that it was from an organ on the left side of the body that the fluid was evacuated; it is by no means impossible that the patient was the subject of a double uterus, and that it was in the left occluded cornu of the uterus that the pent-up secretion was retained. This latter view is the one which accords most intimately with the description which Mr. Tait has given of the anatomical relations of the parts; and, had he only given as well a general history of the patient's catamenia, from the time of their first appearance up to the date of the operation, this theory could almost have been reduced to an axiomatic certainty, or the reverse.

SOME INDICATIONS FOR THE DIAGNOSIS AND TREATMENT OF AORTIC ANEURISM.*

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It has been frequently remarked, that no disease presents itself to the physician under more varied aspects, nor offers greater difficulties for diagnosis, than aneurism; it is desirable, therefore, while studying it, that we should employ every method of investigation we possess likely to throw light upon the subject. It is in this and similar obscure conditions that we naturally look to those modern instruments which are supposed to give precision to clinical observations, and ask, What can they do for us, and how can they advance our knowledge of the condition under discussion? As an instrument especially devoted to the investigation of conditions of the circulation, the sphygmograph has been called upon, in the diagnosis of aneurism, to remove all difficulties from our path, and to demonstrate with scientific accuracy the presence and position of the aneurismal sac. When the ever-varying conditions of the circulation in health and the innumerable modifications introduced by disease, are considered, surprise cannot be felt that the mere resultant of unknown and numerous forces—for as such the pulse may be regarded—does not afford sufficient data from which to calculate the character of each force concerned in its production.

The sphygmograph gives increased facilities for observations on the blood-stream; but, until the causes of its varying indications are well ascertained, the deductions drawn from them must necessarily be fallacious. Those, then, who attempted to make use of it without previously ascertaining these, blamed the instrument for their mistakes, rather than their own want of experience.

Some years ago, I attempted to give some account of the results obtainable by the sphygmograph in the diagnosis of aneurism.† The question, however, is one of so much importance, that I feel justified in returning to it and stating the results of further experience. In thus confining myself to the consideration of a single symptom, let

* Read in the Section of Medicine at the Annual Meeting of the British Medical Association in Manchester, August 1877.

† "The Physiology and Clinical Use of the Sphygmograph". *Medical Times and Gazette*, Nos. 9 and 10, 1873.

it not be thought that I regard it as more important than others; but, in this age of detail, when so much labour is spent on perfecting our knowledge of what may be regarded as minor points, one need not go far to find a precedent or excuse for that which must appear tedious and irksome, although perhaps necessary. While the most perfect physician may least depend on instrumental aids, nevertheless, to attain perfection, we cannot neglect the means of educating our senses which such aids afford us; then, if we have used them aright, we shall carry our sphygmographs in our finger-tips and our thermometers in our palms.

In a case of aneurism, the pulse may present certain characters which are recognisable by the finger; and, before applying to the sphygmograph for their explanation, it will be well to enumerate them.

1. *Delay* may occur in one or both radial arteries; it is of most value when limited to one, so that, on comparison of the two radials, the pulse can be detected in one preceding that in the other; if it exist in both, the impulse of the heart, or the first sound, will be found to occur an unduly long time before the pulse can be felt at the wrist. In either of these conditions, the pulse is said to be *delayed* in reaching the wrist by its passage through the aneurismal sac.

2. *Diminution in Volume*.—The pulse in one radial may appear much smaller than that in the other, or indeed altogether absent. This is usually wrongly ascribed to partial or complete obstruction of the vessel by clot in the aneurism, or occasionally to pressure of the sac upon the subclavian; these, however, are not the true causes of this phenomenon, as we shall see hereafter.

3. *Diminution in Force*.—That is, the pulse conveys a less sudden and forcible impulse to the finger than the normal pulse. It does not, however, necessarily mean a diminution of actual lifting power, but merely of the suddenness of the sensation imparted to the finger.

4. *Persistency*.—This character, the most important and perhaps the most difficult to recognise and estimate of any possessed by the pulse, refers to the amount of permanent distension of the vessel. Normally, the artery should not be perceptible to the finger except at the moment of pulsation; under certain conditions, however, the artery can be felt constantly distended, giving the well-known cord-like sensation to the finger; this permanent distension of the vessel gives the character of *persistency* to the pulse, and is the indication and gauge of arterial tension.

5. *Thrill* might perhaps also be considered a character imparted to the pulse by aneurism; under some rare and not very clearly defined circumstances, the pulse imparts a sensation of thrill to the finger. This probably occurs when the entrance to the aneurismal sac is very narrow, and the aneurism directly in the course of the vessel. It appears also to be occasionally produced by the rigidity of the wall of the vessel, or sometimes by a partially detached fragment of clot vibrating in the blood-stream.

If a sphygmographic tracing obtained from a case of aneurism be examined, the peculiarities of the pulse can readily be recognised. Fig. 1 shows the effect of an aneurismal sac introduced into an artificial circulation, and fig. II is a very typical specimen of the effect of an aneurism on the human radial. The tracings in fig. I were obtained from a straight elastic tube ten feet long and three-tenths of an inch diameter. The heart was represented by the ball of a Higginson's

FIGURE I.—Experimental Tracings. To show Effect of Aneurism directly in the course of the Blood-stream. From Straight Tube 10 feet long, 7-10th inch in diameter, and 3 feet from valve.

syringe, contracted by the hand; the sphygmograph was applied to the tube three feet from the valve, and the first tracing in fig. 1 was obtained. An oval elastic two-ounce bag was then introduced, six inches from the aortic valve, to represent an aneurism directly in the course of the vessel, and the second tracing was obtained. If the tracings from the vessels interfered with by the natural and artificial aneurism be compared, the effect produced in each will be seen to be very similar. Taking each point separately, they may be enumerated as follows:

1. A sloping upstroke, which gives to the finger the character of *delay*; that is, the maximum distension, which causes the sensation of pulsation in the vessel, is not attained as quickly as in the normal; the pulse is, therefore, felt later on this side than on the other.

2. *Diminished Volume of Wave*.—The upstroke is much reduced in height; this is due to the smaller quantity of blood which forms the chief pulse-wave, a large amount of the wave being spent on the distension of the sac, which may be regarded as a kind of reservoir. It receives the great volume of blood during systole, and is partially emptied during diastole, by the continued flow of the blood-stream down the vessel, which is kept more permanently distended than by the passage of one large and more sudden wave. This gives the character to the pulse of *persistency*, the vessel being kept constantly moderately distended, a condition which cannot be recognised by the sphygmograph.

3. *Impairment of Percussion*.—The percussion-wave is entirely obliterated in these tracings, owing to the whole of the shock of the contraction of the heart being expended on the distension of the sac, which acts as a buffer.

4. *Obliteration of the Secondary Waves*.—It has just been remarked that the percussion-wave is lost, so also is the dicrotic; the downstroke, therefore, may be absolutely unbroken, as in fig. II. These

FIGURE II.—Axillary Aneurism; showing Typical Effect of Aneurism on Pulse-wave. Pressure, 2 ounces.

small secondary waves are, like the primary wave, more or less lost in the distension of the sac.

5. *Vibratile waves* or *thrill* may be present. These are seen in fig. III to an exaggerated degree, produced in an artificial circulation

FIGURE III.—Typical Vibratile Movements, occurring in Schema of rather non-elastic tubing.

formed of rather rigid tubing. Some small secondary vibratile waves of this character are occasionally present in tracings from cases of aneurism; the causes said to give rise to these vibrations have already been stated.

6. A different pressure from that employed on the normal side may be required to obtain the most perfect tracings from an aneurismal pulse; it may be either increased or decreased, according to the size and persistency of the stream.

If, now, all these characters be considered, the general result to the finger is diminution, or perhaps actual disappearance, of the pulse on the affected side. This, however, does not necessarily mean any diminution of the actual amount of blood passing; it is only that its pulsatile character is diminished, and that it tends to become a continuous stream; it is, indeed, exactly the same effect as that produced on a pulse-wave by its transmission through a considerable length of elastic tubing.

It must not be thought so great a change in the pulse-wave as that seen in fig. II is always produced on the pulse by the presence of an aneurism. It only occurs when the aneurism is directly in the course of the blood-current, and on one of the large vessels, or involving their origin, but not when it is confined to the aorta itself. When the aneurism is one of the aorta, it only slightly modifies the pulse-tracing; it may not affect it at all. It is possible to obtain from a patient with a very large aneurismal sac connected with the aorta an almost perfectly normal pulse-trace at both wrists. In by far the larger number of cases, however, some signs will be discovered in one or both wrists; the most common are—a slightly sloping upstroke, a rounding of the apex of the tracing, and an obliteration or diminished sharpness of the secondary waves. The diagnosis of the seat of the aneurism will depend on the presence of these signs in both or one or other radial tracings. Fig. IV somewhat imperfectly represents the effect of an

FIGURE IV.—*Experimental Tracings. To show Effect of Aneurism not directly in the course of the Blood-stream.* From Straight Tube 10 feet long, 3-10th inch in diameter, and 3 feet from valve.

1. From Straight Tube without Aneurism.

2. Aneurism on Collateral Branch, allowing flow through it.

3. Aneurism on Collateral Branch; no flow beyond it, as if from Ligature beyond Aneurism. Distal Ligature.

4. Ligature applied between Aneurism and Main Stream: Proximal Ligature.

aneurism of the aorta upon the pulse-tracing; it was obtained from the same apparatus as before, but, instead of the aneurism being directly in the course of the blood-stream, a T-shaped piece of tubing was introduced six inches from the valve, and to the long arm of this the bag representing the aneurism was attached; the water was permitted to flow through the sac and some tubing beyond it, which thus formed a branch from the main blood-stream. A great modification is seen in the tracing now ob-

tained (fig. IV), although, be it observed, the sac was not directly in the course of the blood-stream from which the tracing was obtained. On account of the absence of other branches, the effect produced by the aneurism is greater than would be that of a sac in similar relation to the aorta. In the third tracing in this figure, the effect of distal ligature is seen; this practically reduces the aneurism to one confined to the main tube from which the traces were obtained, and imparts the aneurismal character to the pulsations much more strongly than before. The fourth tracing was obtained after a ligature had been placed between the aneurism and the main tube, cutting it off entirely from the blood-stream; the tracing immediately returns to the normal type.

Illustrations may now be given of the indications afforded by a comparison of the tracings of the two radials in cases of aneurism in different parts of the aorta. In aneurisms of the first or ascending part of the arch, both radials must be affected in a similar manner, if any effect be produced by the aneurism upon them. It is in this position, however, that the sphygmograph teaches us least, for scarcely any deviation from the normal is observable in many such cases. Fig. V was

FIGURE V.—*Aneurism of Ascending Part of Arch of Aorta, affecting the Flow through the Radials (Mr. Holmes).*

1. Right. Pressure, 3 ounces. Presents well marked signs of Aneurism; sloping Upstroke; prolonged Tidal Wave; much Diastolic.

2. Left. Pressure, 1 ounce. Also well marked signs of Aneurism. Both pulses indicate very low tension (the patient's temperature was 99.8), and also an undulation in the base-line, due to blood-tension, varying with respiration.

obtained from a patient under the care of Mr. Holmes with a large aneurism of the ascending arch; the tracings are much alike at both wrists, but in each signs of aneurism are present, the upstrokes being slightly oblique and the apices rounded.

If the right pulse present more marked signs of aneurism than the left, the disease affects the innominate and arch. If the aneurism do not involve the aorta itself, but is confined to the innominate or subclavian, the left pulse will be perfectly normal and show no indications of aneurism, while the right will be very markedly aneurismal; as a rule, though not without exceptions, the further from the aorta or the smaller the vessel affected, the greater the change in

FIGURE VI.—*Aneurism of Innominate Artery; pure; not involving Arch of Aorta or Subclavian.*

1. Right. Pressure, 4 ounces. Requires greater pressure to fully develop it.

2. Right. Pressure, 7 ounces. Fully developed and highly Aneurismal.

the pulse. Fig. VI, obtained from a patient under the care of Dr. Habershon, shows the effect of an aneurism, entirely confined to the innominate, on the pulse. In this case, the aorta was quite unaffected ;

3. Left. Pressure, 4 ounces. Fairly normal.

the left pulse is, therefore, perfectly normal, while the right is highly aneurismal. The percussion-wave, well marked in the left, is entirely absent from the right, and the dicrotic is also less distinct. These tracings, showing the freedom of the aorta from disease, were of the highest value from a diagnostic point of view, especially with regard to the treatment to be recommended. Fig. VII, obtained from a patient

FIGURE VII.—Aneurism of Right Subclavian Artery in Second Part (Mr. Gant). Typical Aneurismal Tracing.

1. Right. Pressure, 2 ounces. Typical Pulse of Aneurism.

2. Left. Pressure, 5 ounces. Tracing characteristic of Aortic Regurgitation and Hypertrophy of Left Ventricle.

under the care of Mr. Gant, suffering from an aneurism of the second part of the right axillary artery, illustrates a still more aneurismal form of pulse; while the left pulse has no sign of aneurism about it, although it indicates aortic regurgitation and hypertrophy of the heart, both of which were confirmed by physical signs. This freedom of the left pulse from aneurismal characters often proves of great value in diagnosis; such, for instance, was the case illustrated by fig. VIII, that of a

FIGURE VIII.—Aneurism of Right Common Carotid Artery, involving Innominate (?), the Arch of Aorta remaining free (?) (Dr. Edmunds).

1. Right. Pressure, 12 ounces. This pulse is much smaller than the left, and presents Aneurismal Characters—i.e., diminution in all the waves.

2. Left. Pressure, 7 ounces. Quite consistent with a fairly healthy heart and aorta.

patient under the care of Dr. Edmunds, who kindly permitted me to examine her. It was a case apparently of aneurism of the right common carotid, for which Dr. Edmunds performed distal ligation of that vessel; the tracings, however, indicate, from the aneurismal character of the right pulse, that the innominate was also involved, though probably not to any great extent; while the fairly normal left pulse was a sign of the comparative freedom of the aorta from aneurismal disease—a point of the utmost importance in the prognosis and treatment of the case. This right pulse lost nearly all its aneurismal characters after the successful ligation of the carotid and apparent temporary cure of the aneurism; seven months subsequently, however, when she was again examined, the left pulse exhibited more marked aneurismal characters than the right, indicating the extension of the disease to the aorta itself. Of this case, we shall doubtless hear more from Dr. Edmunds, who has kindly permitted me to use it so far, to illustrate this sphygmographic point of diagnosis.

In some very rare cases, both pulses may be extremely aneurismal from the presence of a very large aneurism affecting all the vessels taking origin from the transverse arch. Such a case I believe that to be which is illustrated by fig. IX. These tracings were obtained from

FIGURE IX.—Very Large Aneurism of Transverse Arch, involving both Innominate and Left Subclavian Arteries (Dr. Douglas Powell and Mr. C. Heath). Both Radial Pulses highly Aneurismal.

1. Right. Pressure, 1 ounce. Both Radial Pulses highly Aneurismal.

2. Left. Pressure, 2 ounces. There was the most feeble pulsation in the Left Radial Artery, which required more pressure to develop it.

a patient under the care of Dr. Douglas Powell and Mr. Christopher Heath. Both pulses are in the highest degree aneurismal; to the finger, the pulse appeared almost absent: it could just be discovered in the right, but in the left was only detected with the greatest difficulty. It would naturally give an idea that the vessels were obstructed by clot; but, from the excellent tracings obtainable with the sphygmograph, it is most probable that there was no deficiency of blood passing down them: it had only lost in a great measure its highly pulsatile character owing to the presence of the large sac. The pulse had first diminished on the left side; and, as the aneurismal tumour was also first observable below the left clavicle, doubtless the aneurism commenced on the left side of the transverse arch, and gradually extended towards the right until it finally involved the innominate. Probably, at some future time, more light will be thrown on this case, and the present account may have to be modified; the very exceptional character of the tracings, however, induce me to introduce them.

[To be continued.]

CASES ILLUSTRATING THE FAMILY HISTORY OF SYPHILIS: WITH REMARKS.

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IN order to determine the question of the certainty or probability of syphilis being communicated, in the event of marriage, to the mother and children, we require two series of cases, one of which, by affording certain data of a positive, the other by giving those of a negative character, will help us to arrive at the desired result. If we have a sufficient number of instances of family syphilis—that is to say, cases where the father has been infected previous to marriage, and the wife and children have exhibited symptoms of the disease more or less clearly marked—we may be able to decide, in any other particular case, the probability of such an occurrence. And, if we have a sufficient number of instances of the husband having suffered, but without any symptoms showing themselves in the