On Infanticide.

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The term Infanticide, in its widest signification, is employed to denote the destruction of the foetus in utero, or of the child during the process of parturition, or after it has been born. To the first part of this definition, or the destruction of the foetus in utero, the term Secticide, or criminal abortion, has been applied; to the latter, Infanticide, properly so called. As, however, the former constitutes a distinct subject for investigation to the medical jurisprudent, we propose in this paper to confine ourselves solely to the consideration of the latter.

In a case of alleged child-murder, there are several considerations which naturally force themselves upon the attention of the medical practitioner; such as, 1st. Whether the child had arrived at such a period in the process of intra-uterine generation as that it could have maintained an independent existence. 2nd. Whether it had been born alive. 3rd. Whether its death has resulted from natural or unnatural causes. Having examined the child in question with a view to the determination of these several points, & having arrived at the conclusion that it had met with its death in an unlawful manner, he would then after require to direct his inquiries to the female supposed to have been its mother. & endeavors, if possible, to discover if exame

mination, 1st. Whether she had recently been delivered of a child; 2nd. Whether there appears to exist any relation between her condition & the state in which the said child had been found. He will now consider each of these points in course.
I. Whether the child had arrived at such a period in the process of intra-uterine gestation as that it could have maintained an independent existence.

The period at which a child should be reckoned viable, i.e., capable of living after being separated from its mother, has never been precisely laid down; but writers have generally adopted the seventh month as the time at which it may have a fair chance, not only of surviving its birth, but of arriving at adult life. Numerous instances, however, are on record of children born at the eighth month, or even before that, living for a considerable time. It would thus appear that the chances of a child’s living after birth, are in proportion to the period of intra-uterine gestation at which it may have arrived; so that the likelihood of a seventh month child surviving after birth, will be greater than that of a sixth month one, but not as great as one born at the eighth month; and with eighth and ninth month children. In a case of alleged infanticide, therefore, one of the first things which would demand the attention of the medical practitioner, would be the probable determination of the probable period which the child in question may have reached in intra-uterine life, since if it had not attained to the seventh month, there will be great probability of its having died from immaturity. To come to anything like a just conclusion on such a question, it is absolutely necessary that he be well acquainted with the character, both internal and external, which serve to distinguish feti of different
cut expert there can only be derived from the condition of certain of the internal organs, from the general configuration of the body. In describing these characters we shall restrict ourselves to the last four months of foetal life, viz. from the sixth to the ninth inclusive, since these will generally comprise all cases which are likely to come under the notice of the medical practitioner.

At the end of the Sixth Month, the skin of the foetus is soft, of a purple colour, which is most marked in the face, lips, ears, breasts, palms of the hands, soles of the feet. The head is large in proportion to the rest of the body, and is thinly strattured a few hairs, which are soft to the touch, of a silver hue. The eye-lids are appressed, the pupil is closed by the pupillary membrane. The surface of the trunk is smooth uniform. Membranes are formed in an unequal quantity in the commencement of the large intestine. The testicles in the male are contained in the abdomen, lying over the psoas muscles; underneath the peritoneum. Ossification is known to have begun at two different points in the second cervical vertebra. The length of the child is from eleven to twelve inches, with its central point at the lower extremity of the sternum; its weight is usually from one to two pounds.

Seventh Month. - The size of the foetus is from twelve to fourteen inches, weighs from two to four pounds, with its central point situated about midway between the lower end of the sternum and umbilicus. When the skin is drier, more fibrous in structure, and the sebaceous follicles con-
mence to secrete the vernix caseosa cutis, which serves as an inelastic protective covering to the skin. The hair on the head is comparatively long and slightly coloured. The nails, which were but feebly developed last month have now acquired considerable firmness. The eyelids have become free, the membrane papillares has disappeared. The meconium is in greater quantity in the large intestine. Valvulae concretae are seen in the small intestine. The testicles are nearer to the inguinal canals. The brain has lost its uniform appearance by the very slight development of the convolutions. The ossification of the second cervical vertebra has so far advanced that the superior of the two points, which corresponds to the odontoid process, is larger than the inferior, which answers to the body of the bone.

During the Eighth Month the skin has increased in density. It is of a whiter colour, while it is studded over with short delicate hair. The nails have acquired greater consistence & approach nearly to the extremities of the fingers. The hair on the head is longer, thicker, of a deeper hue. The limbs are reddish in colour; the different compartments of the heart are distinct; the liver is still relatively very large; the large intestine is now almost completely filled with meconium. bile of a yellowish colour & bitter taste is found in the gall-bladder. The brain has increased in size, possesses greater firmness, its interior being of a reddish colour, its external surface white; there is no appearance of convolutions.
matter. The grooves on its surface, corresponding to the future convolutions, are deeper, and more apparent, especially on the anterior and middle lobes. The testicles in the male are usually found engorged in the abdominal rings. The true bone processes of the first lumbar vertebra have commenced to ossify. The body is now round and plump, owing to the deposition of fat in the cellular tissue. Its length is from sixteen to seventeen inches, its weight from three to five pounds, its central point is placed a short way above the umbilicus.

When the foetus in utero has reached its maximum development, i.e. at the end of the Ninth Month, it measures about eighteen inches in length, weighs from six to seven pounds, and its central point is situated at, or slightly above, the umbilicus. The head is still large relatively; the bones of the cranium are in contact with one another at their margins; the anterior and posterior fontanelles are distinct. The hair on the scalp, somewhat abundant, is long and thick. The watery secretion on the skin is in greater quantity and more adherent. Fat is still plentifully deposited in the cellular tissue, so that the body manifests considerable plumpness. The nails, now fully developed, are prolonged to the ends of the fingers. In the male the testicles have passed through the inguinal canals; escaped into the scrotum. The lungs have assumed a redder colour, the liver, still very large, is much fatter. The convolutions on the surface of the brain are more marked, the grey matter can now be
distinguished slightly. The body of the first cervical vertebra, and also the first bone of the coccyx have commenced to ossify. The body of the fourth lumbar vertebra measures three lines in depth, four lines in breadth. The vertebral foramina of the six highest dorsal vertebrae begin to be formed by the union of their respective laminae.

The above seem to be all the more important characters by which children, arrived at different stages of intra-uterine life, may be recognized; and they are perhaps sufficiently constant to enable the medical practitioner to form a tolerably correct judgment upon any case. But, nevertheless, it must be borne in mind that they are subject to numerous modifications. Thus, the children of stout, healthy parents, are usually much larger, thicker, or than those of parents of a delicate, or diseased constitution. Twins, likewise, are not commonly so well developed as mature children, either in their external contour, or in their internal organization.

II. Whether the child had been born alive.

The tests which have been proposed for ascertaining whether a child had been born alive, are derived almost exclusively from the condition of the organs of respiration and circulation. These tests are all, more or less, open to objection, and judgment should never be formed from the evidence afforded by any one of them.
 singly, two, three or more ought always to be considered in connection with one another.

The foetus in utero on account of the peculiar connection which exists between it and the mother, does not require to inspire, its decomposed blood being re-oxygenated by its passage through the placental vessels. But whenever it is separated from the parent this connection is broken and a new function is called into activity, whereby what could formerly only be accomplished through the mother is now performed by the child itself. When respiration has been established we find the lungs undergoing remarkable changes. Their colour is strikingly altered, their volume and weight are increased, formerly compact they have now a spongy feel; their specific gravity is considerably diminished. The heart of the vessels proceeding from it to the lungs also experience peculiar alternations. From these and other phenomena observable in the child after birth, the medical jurist is enabled to pronounce with almost perfect certainty whether or not a child had been born alive or aspirled. Each of these tests we pursue considering: 

1st Changes in the Lungs as to Colour. The Lungs before respiration present a deep red or brownish red appearance, which not infrequently approaches to the bluish red colour of the spleen. But on the establishment of the respirator process this hue is changed to one of a light red tint, the extent of this change will be in proportion to the amount of breathing which
has taken place. If respiration has been complete the entire lung will have participated in this change, but if it has only been partial it will manifest a mottled aspect. Although usually of great value this test should not be implicitly relied on, since the lungs after death may be of a dark brownish colour from engorgement with blood, as respiration have been going on for several days. Dr. Taylor, contrary to the original statement of Berrit that it cannot be so, maintains that the light red colour as seen after respiration may be produced by artificial inflation. It is of importance to bear in mind that the lungs by exposure to the external atmosphere may be altered in colour, in cases where respiration has been performed, or artificial inflation employed, so that in the examination of the thoracic cavity, the colour of the lungs should be at once attended to.

b. Consistency. In the foetus, & before respiration, the lungs are small & dense, & feel somewhat firm like the liver. But whenever that function has been perfectly performed, or account of the entrance of air into the air vessels, their consequent distension, they increase in size, & feel loose & spongy, when compressed by the fingers, or cut into, with a knife crepitation may easily be distinguished; air bubbles may likewise be squeezed out of them. These appearances, however, may be simulated to some extent by certain morbid or artificial phenomena. Thus pleurocyst, & emphysema may cause enlargement of the lungs, crepitation may be felt, & air bubbles
may be pressed out of them but those last are larger irregular, & on a section being made into such a lung they may be seen by the naked eye to be situated in the pulmonary substance between the ramifications of the minute air-tubes. Artificial inflation will also produce the same result in the lungs as regards consistence as natural respiration. This latter objection detracts considerably from the general value of this test. We may therefore conclude that "if moral circumstances prove that the lungs were not dilated artificially, the soft consistence & regularly vascular appearance of the lungs, the discharge of air-bubbles by squeezing them under water will prove that the child had breathed."

**Volume.**—Prior to respiration the lungs are small, & occupy the posterior part of the thoracic cavity, covering when healthy only a small portion of the diaphragm & pericardium. Part of the entrance of air through the mouth, they expand, & are thus increased in volume. The amount of this expansion will of course be commensurate with the degree of perfection to which respiration has been established. Formerly, nearly half from view, the lungs (if respiration was performed) now wholly occupy the thoracic cavity & almost entirely conceal by their anterior borders the pericardium, & by their inferior concave surface, the arch of the diaphragm. From the same cause the anterior & lower margins of the left upper & right middle lobes change from a sharp to a rounded form. These phenomena however, may arise from other causes, thus, as
stated by Smellie, the volume of the lungs may be increased by thoracic disease even before the occurrence of breathing. Artificial inflation, or putrefaction may produce similar enlargement. In judging of the value of this test it must be remembered that imperfect respiration is not incompatible with a child's living after birth, the lungs in such a case generally retaining much of their fetal character. Should, however, these organs be found expanded as described above, then the only circumstance independent of disease, capable of producing such a condition are natural breathing or artificial inflation. The evidence therefore furnished by this test, if at all, must be altogether presumptive.

Daniels's Test — It is a well-known law in physics that when a solid body is placed in water it displaces a quantity of water equal to its own volume. In 1750, Daniel proposed to apply this principle for the ascertainment of the volume of the lungs, thus, if before respiration they be placed in a jar containing water, the liquid will not rise as high as it would have done had they been previously expanded by air. This test, however, is far from being satisfactory, owing to the volume of the lungs being of so variable a character; no reliance can therefore be placed on any conclusions which may be drawn from their absolute volume.

d. The difference between the weight of the lungs before and after natural respiration. — The Static Test. — Immediately on the establishment of the firm
tion of respiration certain changes in the circulatory system take place. The blood, formerly directed through the ductus arteriosus, now flows along the pulmonary arteries, enters the minute vessels of the lungs; the ductus arteriosus, being no longer of any use as a canal for that fluid, becomes suddenly contracted, unless the respiration be not imperfectly performed, is generally altogether obliterated a few days after birth. While the pulmonary arteries undergo considerable enlargement in their caliber in order that they may be fitted for the performance of their newly acquired office. In consequence of the lungs in the foetus not having any special function to perform, the quantity of blood circulating in them is very small, but whenever the sudden influence of blood attendant upon the first efforts of natural breathing has taken place, a material increase in their weight is the result. It is upon this circumstance that the static test is founded. When first proposed it was conceived that a certain average weight for the lungs before and after respiration might be found, from a comparison with which, in a case of alleged child-murder, it might be ascertained whether that process had, or had not, been established. To find these average weights so as to include all cases would be a matter of no little difficulty. Dr. Taylor states that in nine cases the average weight of the lungs before respiration amounted to 6.49 grains, and in three cases, after respiration, to 9.27 grains; while Dr. Farrel found the weight to
van, before respiration from 430 - 600 grains.

It has been well ascertained by numerous observers that the lungs do not wholly expand immediately after birth, but that as a general rule they are only dilated gradually. It is known further that the degree of their expansion regulates the amount of blood sent to them. It is therefore quite possible that a healthy, vigorous child, speedily after its separation from the mother, may by a few inspirations be able to inflate its lungs to their fullest extent, while those of another child may be only partially expanded though it may have lived several days; the lungs of the one child would of course be heavier than those of the other. Dr. Taylor gives five cases which serve to illustrate these remarks. In the first three the children lived respectively half an hour, six hours, 24 hours; notwithstanding the lungs varied but little in weight from the average before respiration, in the fourth in which the child had apparently been murdered shortly after its birth the lungs weighed 1000 grains, while in the last case where the child had certainly lived eight or nine days they weighed only 861 grains. It has moreover been found that in a large number of cases the absolute weight of the lungs of stillborn children have considerably surpassed that of the lungs of children who have breathed freely for several days. A diseased condition of these organs may likewise increase their weight.
von materially. From these considerations it will appear evident that this test can form no proper criterion by which to arrive at a correct conclusion as to whether a child had or had not been born alive.

**Plineeau's Test.** - Aware of the highly objectionable character of the above test, Plineeau, of Toulouse, proposed that the weight of the lungs before and after respiration should be considered in relation to that of the entire body. When he first published his views on this subject he laid it down that the average ratio of the weight of the uninflated lungs to the body was as 1 to 70, and for children that had breathed as 2 to 70. But the later researches of Chausier, Schmidt, and Bent have proved that Plineeau had been premature in his conclusions, since there have not been able to detect the slightest fixed relation between the weight of the lungs either before or after respiration and that of the body. The same objections which were stated against the last test apply with equal force to this, so that no reliance should be placed upon it, though both of them are worthy of trial in medicolegal investigations.

C. The Specific Gravity of the Lungs; - Hydrostatic Test; - *Decimatio Pulmonum*. - This test seems to have been known to Galen, but it does not appear to have attracted much attention in a medicolegal point of view, until several centuries after his time. When first employed it was believed to afford
conclusive evidence as to whether a child had been alive at its birth or not. Various observations, however, particularly those of Bohn, Hoffman, and Heister, soon made it apparent that it was not so valuable a test as was generally supposed, since it is open to several grave objections. From that time to the present it has been the subject of much controversy, and opinions among medical jurists are still very much divided regarding its value. The test is founded upon the fact of the lungs being specifically lighter after respiration. This arises from the air which enters them, as a consequence of the performance of that process, increasing their volume to such an extent as that their consequent buoyancy is more than sufficient to support the additional weight given them by the blood. By reason of this buoyancy, the lungs are made to float in water.

In order to perform the experiment, the lungs should be carefully removed from the chest (their large vessels having been previously secured by ligature) and then placed gently on the surface of freshly distilled or river water. Should they float, attention must be paid to the relation which they bear to the water, whether they float above, at, or below its level. They should then be tried separately, and the result carefully noted, because it sometimes happens that one lung will float, whilst
the other will sink. If there be any difference between the two in this respect it should be observed in which one it has occurred. Each lung should next be cut into twelve or fifteen pieces, and each of these pieces placed separately in the water. Supposing that they all float even after compression we may reasonably conclude that respiration has taken place, provided the other tests already given coincide with this. The two lungs, however, may have sunk, notice must therefore be taken of the rapidity of such sinking. They should then be placed in the water separately; if both sink it will be well to observe whether both do so with the same degree of rapidity. Let each of them must be cut into pieces as before, then tried separately; if all sink, then the probability will be that the child had been still-born.

As already stated this seemingly beautiful test is open to a number of objections, and these we now proceed to consider. They may be divided into two classes. The first will comprehend those which go to prove that the lungs may sink in water, yet the child have been born alive; the second those which go to prove that the lungs may float, yet the child not have been born alive.

A. Objections which serve to prove that the lungs may sink, yet the child have survived its birth.

1. It has been objected that the child may have been alive at its birth, yet the lungs sink from the complete
B. Objections which serve to prove that the lungs may float, yet the child have been born dead.

(1) Putrification. All dead animal matter on being exposed to certain external influences undergoes decomposition. The rapidity with which this takes place will depend in great measure upon the intensity of the disorganizing agents. On the occurrence of this process the bodies in question assume new characters, thus, their color, consistency, size etc. are altered, they emit disagreeable odours. The human body being organic, is capable of manifesting these changes when placed in conditions favourable for their development. The external parts of the body when brought more immediately in contact with these agents are the first to be affected by them. The internal organs, however, are not long in evincing a similar action.

Thus putrification has commenced in the lungs they are strikingly changed in character. They become soft, of a pulp consistency, their volume is increased by the development of gases, which occupy the cellular tissue, distend the aeration membrane in the form of small gaseous sacs, a peculiarly disagreeable odour is emitted. Their colour has changed to a brown or dark greenish hue. These changes will, of course, be in proportion to the degree to which putrification has advanced. Before the lungs have changed as above, the external parts will have put up to such an extent that they may be very easily separated from one another. But to the generation of gases, their
abscence of air in them. The idea is very prevalent among medical practitioners that conclusive proof of still-birth is furnished by the lungs, cut into pieces, cinkling in water; numerous cases, however, have been recorded, which incontestably shew that this notion is erroneous, and it is now universally admitted by medical jurists that a child may have lived for some time although its lungs may be in the condition, called by Dr. För. Of Leipzig, "Complete or perfect Atelectasis." In this state the lungs retain all their foetal character, as regards colour, volume, consistence, weight &c., &c. and capable of being distinguished by artificial inflation. This therefore forms a very decided objection to the hydrostatic test; the more so, since there are no means by which such cases may be distinguished from those of pure still-birth. In such cases the only proof upon which an opinion as to whether the child had been born alive could be based, would be derived from any indications of external violence, observable on its body, which may have been committed while it was in life. It is important to remember that this appearance of the lungs is for the most part observed in immature children; but it has, nevertheless, been shown that it may occur in children who manifest every appearance of maturity. It is therefore, evident that "the hydrostatic test can never prove positively that the child was still-born, but only that it had not breathed." *No satisfactory explanation has yet been offered of the causes leading to this curious state of the lungs.

(2) It has been objected that the child may have been born alive, yet its lungs cink from the respiration having been so feeble as not to have dilated more than a minute portion of their
pneumonic structure; the part thus inflated not being sufficient in large to allow of the occupancy of the entire organs. This condition of partial or incomplete "atlectasis" is regarded by many as not of uncommon occurrence in newborn children. It is by no means incompatible with life, cases being on record where children have survived their birth several months in whom this state was found after death. Should these parts of the lungs continue long undistended after birth, according to Dryg, they are apt to lose their vesicular structure, becoming hepatised. This partial expansion may be easily distinguished, when the lungs are cut into pieces, placed in water, the undistended parts sinking, while the inflated pieces float. This test indicates that the child must have respired to some extent, but does not conclude the possibility of it having been still-born.

(13) It has been urged as an objection that the lungs may sink, yet the child have breathed after birth, in consequence of their specific gravity having been increased from disease, as scirrhus, tubercle &c. Intra-uterine disease of the lungs generally acts by destroying their vesicular structure, thus preventing the possibility of the part so affected becoming expanded from the entrance of air either by respiration or insufflation. The specific gravity will necessarily be regulated by the extent of disease, so that should the entire organ be affected, respiration will be impossible, & the lung will therefore, weigh the more. If, however, the disease be limited, air may have been admitted into the healthy portion, but not in sufficient quantity to counteract its increased tonicity, to unite. This objection is of very little moment, since a diseased cond
foment in the superficial cellular tissue, & immediately beneath the base of the pleura, that the great buoyancy of the lungs, in this instance, is due. It should be mentioned that certain circumstances tend to hasten or retard putrefaction in these organs; thus removal from the thoracic cavity, exposure to heat or to the rays of the sun, being placed in stagnant water will assist in hastening it, while it may be delayed by allowing them to remain in their natural position in the thorax, by placing them in a stream of running water, by keeping them in a cold situation.

This objection is not of much importance, since there are as many ways in which the fallacy may be avoided. The air bubbles of putrefaction are highly characteristic, being large, irregular, invisible to the naked eye, situated under the investing membrane, or in the superficial vascular tissue. By gentle compression they may be squeezed out, the lungs so treated, when being placed in water sinks rapidly. If decomposition has not advanced too far, a piece cut out of the centre of the lung will float or sink according as the child may have breathed or not.

From the amount of destruction which the lungs undergo through putrefaction, the question has arisen, whether the medical witness would be justified in pronouncing an opinion as to the establishment of respiration, in a case where these organs presented signs of putrefaction. In certain cases, we think, he might be so justified, but in the majority he would not; thus, if the putrefaction be only limited, he may be able to discover signs of the performance of the respiratory process. In the
greater proportion of cases, however, these signs will be altogether lost, and in such he would only be entitled to say that the test at his command did not warrant him in pronouncing a judgment.

(3.) It has been objected that the child may be born dead, yet the lungs float from uterine or vaginal respiration. That these two circumstances may happen is now matter of fact, though for a long time the possibility of their occurrence was doubted, from clinical or physiological grounds. Numerous instances, however, of both are now on record in trustworthy observers, and from these it would appear that the evidence of the performance of respiration before, is precisely similar to what we find after birth. When we remember that the lungs do not expand uniformly at all at once, but gradually, it will not appear strange that in some of these cases they were found only partially inflated. This apparent discrepancy as regards the extent of inflation may be accounted for by the absence of those facilities for free respiration which exist after birth. Uterine or vaginal respiration can only occur under certain circumstances during the process of parturition. The former appears to be peculiar to feet and face presentations, in which for its establishment, it is essential that the os uteri be fully dilated, the mem branes ruptured, and the passages sufficiently open to admit of the free entrance of air. In the latter it may occur from a post presentation in which the head is detained in the passages, in a head presentation where the head has been expelled through the external orifice, while the rest of the body remains in the
passages, it is cases of tedious labour, from the introduction of the hand of the attendant.

In cases of in utero death, respiration can never be urged as a fallacy in the determination of the question as to whether the child has breathed or not, since it occurs only in cases which absolutely demand manual aid for their completion. The same may be said of vaginal respiration except in instances where it has taken place after the birth of the head, when, on account of its perfect similarity, except perhaps in degree, to natural breathing after the birth of the entire child, it forms an insuperable barrier to the medical witness in pronouncing an opinion; moral evidence alone in such a case must direct the juror in his decision.

(3) It has been further objected that the child may have been stillborn, yet the lungs float from artificial inflation. 

Morin seems to have been the first to point out this fallacy. For his time to the present the opinions of medical jurists have been much divided regarding its value. From numerous experiments it has been proved that the lungs are capable of being artificially inflated; the operation is, however, in no means easy of performance, unless suitable apparatus is employed. The extent to which they are distended is not always the same, since by the employment of an equal force in blowing, some lungs may be fully expanded (but this is comparatively rare), while others, which constitute a large majority, they are only partially so.

Judging from the difficulties of this operation the question has naturally arisen: does the mother in her weak, exhausted, or almost helpless condition possess after delivery, powers eno
sufficient strength to effect this? In some cases instances, we think she may leave, but as a general rule, she does not. When this fallacy is brought up in medical-legal cases it will generally be in connection with the confession of the mother herself that she had used such means for the purpose of deceiving her still-born child, or in connection with their employment by some malicious person with a view to the condemnation of the mother.

To distinguish its effects from those of natural breathing is rather difficult owing to the striking resemblance between the two as regards colour, volume, consistence & its capability for floating in water. They may, nevertheless, be recognised by the comparative quantity of blood in each, & by the comparative facility with which the air may be squeezed out of them. Regarding the first means of detection it will be obvious that the quantity of blood will not be increased by insufflation, on account of the absence of the circulatory system peculiar to respiration. Accordingly, if a cut be made into such a lung, the quantity of blood which may escape will be small, while the contrary will be the case if it be done to a lung in which natural breathing had been established. With regard to the second mode, opposite views are held by different writers on the subject; some maintaining its practicability as Wildweg, Dr Farley & other, as Mendel, Bentz, Mertz &c., holding a contrary opinion; we may, therefore, say that the question still remains sub judice. From what has been said it will appear manifest that this can be of very little val
Evidence that the child was alive at the time of its birth from Marks of Violence - These when found will usually furnish us with very good grounds for forming an opinion as to whether the child had been born alive. With a view to their detection a careful examination of the external surface of the body, of the openings leading into it, should be made previous to the inspection of the internal organs. Wounds which have been inflicted during life are characterized by the presence of traces of haemorrhage, more or less distinct, by the eversion of their edges if some time has elapsed since the wound was inflicted, by their swelling, by the surrounding cellular tissue being coloured from infiltration of blood and by the presence of coagula in the wound. On the other hand wounds which have been inflicted a few hours after death may present some of the above characters, but not in so marked a manner; if, however, the length of time, say fourteen or fifteen hours, have been allowed to elapse after death before their infliction, there will be no effusion of blood unless it be from some divided vein, no coagula in the wound, no infiltration of blood into the surrounding tissue, no eversion or swelling of their edges owing to the tissues implicated having lost their power of elasticity.

It is important to bear in mind that the phenomena observed after a wound inflicted during life may be simulated to some extent in those which follow the infliction of a...
wound after death while the body is still warm. In a medical-legal investigation in the subject of which these appearances are but slightly marked, due allowance would require to be made for such an occurrence, unless the other evidence went directly to contra-indicate its possibility.

3rd. Evidence of live birth from certain changes in the body—Various other tests for ascertaining whether a child had survived its birth or not have been suggested, but they may all be considered as of minor importance because of their liability to considerable variations. The ductus arteriosus is an important structure in the economy of the foetus owing to its contraction subsequent obliteration after the establishment of respiration. Furnish us with one of these, but these changes are not constant & require some time for their development; it would, therefore, be of little or no value in a case where death had followed immediately on the birth of the child. The foramen ovale is situated in the atrioventricular septum of the heart, through which the blood flows into the left auricle in the foetus, contracts after the performance of respiration, shortly thereafter its forerunner is indicated only by a prominent curved line. The pulmonary arteries are much increased in calibre, the ductus and valve gradually diminish. All of the above tests will of course be modified by the degree to which respiration has taken place. The ductus venosus undergoes a similar change to the ductus arteriosus, though it is effected sooner in the foramen-
than in the latter. The umbilical cord shrinks, ultimately dies, falling off usually in three or four days after birth, leaving an ulcerated surface at its point of attachment in the abdominal wall; the umbilical vessels at the same time contract and at length become altogether obliterated. These facts are open to the same objections as that of the ductus arteriosus. Should the changes above mentioned be found to have taken place in any supposed case of infanticide, then the proof will be conclusive, not only that the child had been born alive, but that it had lived for some time; if, however, these sometimes still retain their foetal character, that circumstance will be no proof that the child had been still-born; it will only indicate that sufficient time had not elapsed before its death for these changes being effected. It has been supposed that the absence of meconium from the intestines, or urine from the bladder, afforded evidence that the child had not survived its birth, but this is by no means the case, since it has been shown that both these fluids may be discharged before birth. The stomach at birth usually contains only mucus; any foreign substance, particular, if it be in the form of some kind of food, which may be found in it after death, will therefore form very conclusive evidence that the child had lived for some time after its birth. Instances of this kind are not of infrequent occurrence; as coagulated blood, variaceous artiels of food, &c., have been detected in the stomachs of child men destroyed while alive.

III. The last enquiry regarding the child is, If it has been born alive, whether its death has resulted from natural or unnatural causes.
A. Death from Natural Causes. — It is well known that a large proportion of children are either born dead, or die immediately after their birth. This is especially the case in immature children, and in twins. The mortality is much greater among males than among females, because, as is supposed, of the greater size of the head in them. The causes which produce death in general either before or during parturition are various, we shall therefore do no more than merely enumerate them.

1. A Protracted Delivery. — Various circumstances may combine to produce this result, as a deformed state of the pelvis, primiparous females, &c. In such cases the child may have died from injury to the head by compression against the bones of the pelvis, from exhaustion, &c.

2. Compression of the Cord. — This may occur in mal-presentations, as in breech or footling cases, or it may arise from prolapse of the cord. If the cause of death in such cases nothing definite is known.

3. Haemorrhage. — This may take place from primary separation of the placenta, from placenta previa, from rupture of the umbilical cord. Death, in these cases, arises from the connection between mother and child being thusly severed, from the consequent extensive bleeding.

4. Debility. — This may be occasioned by a protracted labour, by immaturity, general weakness of the child's system.

5. Congenital Malformation. — These such a condition when it occurs in an organ essential to life will of course prove fatal in a short time. Cases of this kind appear to
Disease. — This is liable to attack all the organs of the body both before and after birth, but it is not in all cases equally fatal. B: Bumsor regards apoplexy and asphyxia as rather common among still-born children. Disease of the lungs is of the utmost importance in medical. legal cases, since it materially interferes with the performance of respiration. The diseases most commonly affecting these organs are tubercle, pleurisy, lobar inflammation, &c. in proportion to the extent of the disorder will be the child's capacity of respiring. Should this, therefore, be entirely diseased, respiration will be impossible, but if only partially life may be prolonged for a considerable time.

B. Death from Unnatural Causes. — The criminal causes of death after delivery may be divided into those of omission, those of commission. The former include such as arise from neglect of tying the cord, from neglect of removing the child from under the bedclothes, or from neglect of providing it with suitable nourishment and warmth.

1. Neglect from not tying the umbilical cord. — Much discussion has taken place regarding the necessity for this proceeding; though for a long time it was considered absolutely essential to the preservation of the life of the child it is now generally admitted that it is not so. Instances, however, of death from this cause are on record, so that as a precautionary measure it is now universally adopted. When death has resulted in this manner, it is indicated by pallor of the surface, loss of colour in the viscera, absence of blood from the heart and large vessels, by the absence...
of wounds or other external lesion. Should the mother have been delivered alone or the cord have been torn across or cut with a sharp instrument and then tied, these appearances will indicate to some extent that the mother had been actuated by a desire to save the child's life. The absence of the ligature in either case but especially in the latter would form presumptive, though it could not afford conclusive evidence that death had resulted from hemorrhage or that occasioned with criminal intent.

3. Death arising from neglect to remove the child from beneath the bedclothes after birth is not of frequent occurrence. The causes which lead to it are various, as faintness, syncope, epilepsy, other forms of disease which produce great prostration of the bodily powers or prejudice as shown in the case recorded by Hunter. The jury in such a case would require to base their decision upon the nature of the other evidence, since the medical practitioner has no means of ascertaining whether the neglect was intentional or accidental.

4. Children who die from want of proper nourishment are usually found exposed in some unregarded spot. The signs of death from this cause are that the child has lived for some time, which may be proved by the condition of the foetal structures already mentioned, emaciation of the body, an empty state of the stomach and intestines. This neglect manifests itself the nature of the intention.

5. Neglect of providing suitable warmth is commonly accompanied by exposure from the continued
effects of which death ensues. Such a result is characterized by stiffness of the body, expansion of the lungs from respiration, engorgement of the large internal vessels, contraction of the cutaneous ones, lividity in the dependent parts of the body. In such a case when there has been exposure the intention must have been of criminal nature, but where this had been wanting the neglect may have arisen from ignorance or want of the proper means.

The criminal causes of death during or after delivery by commission and rape, laceration and fracture of the cervical vertebra, the introduction of pointed instruments into various parts of the body wounds, bruises, strangulation, drowning, noxious inhalation and poisoning.

E. Laceration & Fracture of the neck may be produced during delivery or after its completion. Before delivery it may occur in foot presentations by the mother pulling on the body of the child with a view to its speedy birth. After birth it may be caused by the possible twisting of the neck of the child or by pulling it backwards. They may be distinguished from one another by the uninflated condition of the lungs in the former and the presence of inflation in those of the latter. The external signs indicative of this injury are abrasions about the part & position of the neck, whilst internally they will be manifested by fracture of one or both of the first two vertebrae, rupture of the ligaments, compression of the spinal cord, sanguineous effusion into the surrounding parts.
The introduction of instruments into the body is not an uncommon mode of destroying the life of the child. Those parts which are most concealed are generally selected as the point for the insertion of the instrument, as the head where it is well covered by hair, & the external openings of the external canals of the body. Needles, scalpels, &c. sharp pointed instruments, are what are most frequently employed on account of the smallness of the wound which they make, & the consequent difficulty of its detection. Where such means have been resorted to for the production of death, the wounds should be carefully examined. The appearances occasioned by them noted, they should then be followed into the deep tissues, which they may have penetrated, & the phenomena presented along their course observed. The external puncture will show signs of ecchymosis around it, & as it is pursued deeper infiltration of blood will be found.

Wounds & bruises when inflicted with a view to death are for the most part found on the head, but they may occur in any other part of the body. The differences between wounds produced before & after the performance of respiration have already been mentioned, need not again be repeated. With regard to bruises they are characterized by considerable swelling of ecchymosis arising from effusion of blood & serum. It must be remembered that these appearances may be simulated very closely, when they occur on the head, by the tumours & attendant bladerness which are sometimes seen after a difficult labour, or lividities of the dark
coloured tumours of commencing putrefaction when on any other part of the body. It is of importance to determine if possible, whether the wounds have been sufficient necessarily to occasion death, whether they may not have proved mortal from accidental circumstances.

2. Death by strangulation results from suffocation, whether it be produced by tying a cord round the child's neck or by forcibly compressing it with the hands, or by clamping the opening into the respiratory canals. When the first method is employed there is a narrow circular blush-like mark round the neck from the application of the cord, the face is swollen stung with blood, ghastly appears in the angles of the mouth, the tongue much swollen projecting from the mouth. When the throat and chest have been firmly compressed by the hands the above changes will have taken place, but instead of the coloured ring round the neck there will be marks on the surface where the pressure of the fingers have been applied. Strangulation by the closing of the openings into the respiratory canal may be effected either by stuffling the mouth more or wind-pipe, or by smothering; in the former case there will be the ordinary signs of suffocation, but direction alone can lead to the detection of the cause, but in the latter the presence of the same signs with the absence of any other to account for death will indicate the cause.

The destruction of the child by drowning is of greater frequency in some parts of the Continent than here. All such cases involve two important questions. While in medical-legal investigations it is absolutely
to determine. These are whether the child had respirated, or whether it had been placed in the water before or after its death. We have already mentioned the means whereby the first point may be settled, and need not here repeat them. If on the other hand the child had been alive when placed in the water certain signs would manifest themselves the presence or absence of which will determine the second question. These signs are as follows, the surface of the body is pale, the pupils are greatly dilated, the tongue projects beyond the gums, a quantity of froth is found in or about the mouth. The right auricle ventricle are gorged with blood, as also the large vessels proceeding from them, while the left cavities are nearly empty. The stomach contains usually some water, search should be made in this fluid for portions of grass, straw &c., as such substances floating in the water around the child are not infrequently drawn in by it during its strenuous efforts to breathe. Should any be found it will afford almost conclusive proof that the child had been alive at the time of its submersion. The lungs are inflated & of a dark hue. The brain is congested to a greater or less extent. The blood remains in a fluid state. These phenomena are the result of death by asphyxiation & are present for the most part in all cases of suffocation, irrespective altogether of the cause from which it may have arisen.

K. The inhalation of an impure air is manifestly
every person, but particularly so is this the case with newborn children; they seem to be remarkably sensitive to its beneficent influence. If, therefore, an infant be shut up in a box, or exposed to the unwholesome air of a privy, or sewer, death may be produced from asphyxiation in a very short time. The suspicious character of the place where it may have been found, and the absence of any other cause of death will afford strong presumptive evidence of the criminality of the deed.

2. Poisoning is a very common means of putting a child to death. Whenever it is suspected, the stomach and intestines should be carefully examined, and any morbid appearances noticed. Their contents should be carefully preserved for chemical analysis.

IV. Having now completed his examination of the child, having come to the conclusion that it had been wilfully destroyed, the medical practitioner will next require to direct his attention to the woman accused of having been its mother and murderer; in her he will endeavour to find out, in an inspection of her person, whether she has been recently delivered of a child. In the first place, this will be indicated by the following appearances:—1st. The face and entire surface of the body will exhibit considerable pallor; the eyes are slightly sunken; a dark circle is seen around them; the pulse is full and undulating; fever and thirst, in much weakness. 2nd. The belly is soft and the skin of the abdomen is loose, loose, wrinkled, and numerous lines of a reddish or whitish colour are scattered over it, principally below the umbilicus; a brown line is frequently to-
...curve to extend between the pubis and ischiium. 3d. The
breasts are greatly enlarged, hard to the touch, & when pressed
a fluid of a curdy character flows from them; after two or
three days they lose their firm consistence & become soft,
then a milky fluid may be squeezed from them; the nip-
plets protrude considerably; the dark areolas around
them are well marked. 4th. The uterine can be easily
felt above the pubic & is a roundish form, & very firm;
the os is truncated, dilated & erect. The external genital
organs are swollen, tender to the touch, & greatly increase-
ed in caliber. The anterior margin of the perineum is
commonly excavated. 5th. The lochial discharge issues
from the uterus in greater or less quantity; its external
character, the time of its duration, & its peculiar odor,
sufficiently serve to distinguish it from the menstural fluid.
All these indications singly may be simulated
in other diseases, so that it will be necessary to have the
concomitance of not only of most of them. They
become less obvious in proportion to the time that has
elapsed since delivery. During the first four days
they are quite distinct, but after that they become less
clear, so much so, until between the tenth & fourteenth days they
can scarcely be recognized, & are consequently of no
mean decisive.

V. The only other point for the investigation of the medi-
cal practitioner is, whether he can establish any re-
lation between the appearances observed in the child
& those in the supposed mother. This he may endeavor
to do by observing the condition of the various structures,
of so much importance in the foetal economy which are so remarkably altered after the performance of respiration. The ductus arteriosus, ductus venosus, umbilical vessels, and the foramen ovale must all be considered in relation to this operation. The umbilical cord which elevated surface left by its separation furnishes, however, the best data from which to form an opinion. Thus, if the cord be not yet separated, he may reasonably conclude that the child had met with its death before it was five days old; if it be detached and the elevated surface not healed, that it had not attained to the ninth day.

But if the child has been so long dead that putrefaction has commenced or is considerably advanced it will be necessary for him to take into consideration the situation in which it was found, the nature of the weather, the considerations to its finding, as whether it was in a dry or moist locality, in stagnant or running water, in a spot sheltered from, or exposed to, the sun's rays, whether the weather had been dry or rainy, warm or cold, 

It must be evident, however, that these phenomena can only apply to the first few days of extra-uterine life, so that the jury will require to form their verdict principally on the other moral evidence.
h 2. Oesophagitis, ulcer, peptic, and duodenal ulcer, pancreatitis, peptic ulceration.

h 2. Poet, disease - schizophrenia, planning, encephalitis, petit mal, epilepsy, glutathione with a.