A probationary essay on infanticide : submitted, ... to the examination of the Royal College of Surgeons of Edinburgh, ... / by James Simson ... July, 1825.

[P]

SIMSON

ESSAY

ON

INFANTICIDE.

A

PROBATIONARY ESSAY

ON

INFANTICIDE;

SUBMITTED,

BY THE AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,

TO THE EXAMINATION OF

The Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR BODY,

IN

CONFORMITY TO THEIR REGULATIONS RESPECTING THE ADMISSION OF ORDINARY FELLOWS.

BY JAMES SIMSON, M. D.

SURGEON;

MEMBER OF THE MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH;
AND EXTRAORDINARY MEMBER OF THE ROYAL
MEDICAL SOCIETY OF EDINBURGH.

Egone ut meorum liberûm ac prolis meæ fundam cruorem? Quod scelus miseri luent? Scelus est Jason genitor—et majus scelus Medea mater.

SENEC. MED.

Admitted 22nd JULY, 1825.

Edinburgh:

PRINTED BY JAMES GALL, LAW-PRINTER,
22 NIDDRY STREET.

1825.

TO

DUGALD STEWART, Esq. F. R. S. S. L. & E.

&c. &c. &c.

THIS ESSAY

IS RESPECTFULLY INSCRIBED,

IN TESTIMONY OF

THE HIGH ESTEEM AND GRATITUDE

OF

THE AUTHOR.

ESSAY

ON

INFANTICIDE.

In the whole range of forensic medicine, there is not a more melancholy example of the contradictory opinions of medical men, and of the uncertainty of the physiological enquiries upon which medical evidence depends, than is exhibited in trials for child murder. By their jarring evidence, professional men have enveloped this subject in great obscurity, and rendered prevalent the notion, that all the medical evidence which can be adduced to prove the guilt, or innocence, of the mother, is, at best, but vague and indeterminate.

That the subject is one of delicacy and difficulty we readily admit, since it presents so very extensive a field for enquiry, as to require, not only the utmost knowledge of the physiology and pathology of the human body, but also the narrowest

scrutiny and attention to every minute fact attending each particular case, in order to enable a medical man to judge with accuracy and certainty. But while we admit this, we cannot agree with what too many are disposed to believe, that the subject of this essay is involved in vague conjecture and absolute uncertainty; for we are most completely convinced, that the facts on which a correct judgment may be formed, rest upon uncontroverted data; and that, in a very great majority of cases of infanticide, a well informed professional man may come to an accurate and decided opinion.

I have retained the title of Infanticide for this essay, as a word sufficiently understood by medical men, though I conceive that Prolicide would have been preferable, as it includes Fœticide and Infanticide, both of which I intend to consider: For though the law * makes a difference between

---

* The law of Scotland excludes the procuring of abortion, whether quick or not, from the idea of murder; because, "though quick, it is still only *pars* "*viscerum matris*, and not a separate being; and we cannot say with certain-"ty, whether or not it would have become a quick birth." There is, however, a discretionary power vested in the court; for, in a case lately tried at Aberdeen, the parties were convicted and transported for fourteen years.

For the crime of infanticide, death is decreed by the law. Formerly, by the Act of 1690, any woman who concealed her being with child, and if the child was dead, or amissing, might be considered guilty, and might be put to death. This was considered, latterly, too severe; and by an Act of 49 of Geo. III. another is substituted, which says, "That if a woman shall conceal her

these crimes, in the degree of punishment allotted to the guilty mother, murder is undoubtedly committed in both cases; for the fœtus in the womb is a living being, and would have come to maturity, had the course of nature not been interrupted.

I propose to consider the subject of Infanticide generally, in reference to those cases which may occur in courts of law, and the result of which must, in a great measure, depend upon medical evidence; and I believe I shall be enabled to do so by considering the Six following questions.

I. Has the child come to maturity?

II. Was the child born alive?

III. If born alive, what was the cause of death?

IV. Has the woman accused been recently delivered?

V. Is the child produced, that of the prisoner?

VI. How is a medical man to proceed in a supposed case of Infanticide?

To answer the first question proposed, *Has the child come to maturity?* it will be necessary to enter into a detail of the changes which the fœtus undergoes in the womb.

---

being with child, during the whole period of her pregnancy, and shall not call for help, or assistance, at birth; and, if the child shall be found dead, or be amissing, the mother being lawfully convicted thereof, shall be imprisoned for a term not exceeding two years."

If the germ be examined from the end of the *first week, to the fifteenth day* of impregnation, it appears as a small gelatinous semi-opaque body, of a greyish colour, placed in the middle of a vesicle full of a transparent fluid, quickly liquifying when exposed to the air, and presenting no distinct formation even with the aid of a microscope.

At *the twenty-fifth day*, it is an oblong soft mass, about the size of an ant, slightly bent on itself, and weakly attached, by very delicate umbilical vessels, to the inner surface of the ovum. That part which corresponds to the head, is quite transparent, and contains a fluid. The body at this time measures from three to four lines in length.

At the *fifth week*, two minute spots, corresponding to the eyes, and a small slit at the mouth appear; and four prominences, from which the extremities originate, are visible. The head is bulky, and inclines forward. The whole length of the fœtus is about six lines.

At the *seventh week*, we can easily recognize the first lineaments of the different organs. The head is no longer transparent; and a white membrane, evidently the dura mater, adheres to the inner surface of the scull.* The os frontis pre-

* Tiedemann, Anatomie du Cerveau, &c. traduite de l'Lallemand, par Jourdan, page 18. Paris, 1823.

sents two points of ossification, and the os ilium one. The length of the body is now eight or ten lines.

At *two months*, the head is larger than the rest of the body, and the skin is transparent, and offers no trace of fibres. Ossification is begun in several places of the head, trunk, and extremities; the chorion is downy internally, and receives the small umbilical vessels. The extremities are very short, with the ends flattened, from whence we see the fingers and toes marked and separated. The whole length is two inches, and the weight two ounces.

At *three months*, the mouth and nose are marked, and the eyelids sealed together over the eyes. The head is still larger, and weighs more than the rest of the body, and the brain is gelatinous. The different bones are now pretty distinct; the lungs are white and small; the left auricle and ventricle of the heart are larger than those of the right; the liver fills both of the epigastric regions; and the sexual organs may be distinguished. The length is two inches and a half, and the weight from two to three ounces.

At *four months*, all the parts develope themselves rapidly; the great relative proportions of the liquor amnii disappear; the fœtus nearly fills the whole uterus; and the head has now descended to its orifice. The hair and nails, in some

cases, now begin to appear. The length is about five or six inches, and the weight four ounces.

At *five months*, the motions of the fœtus begin to be perceived; the brain is soft, white, and pulpy, without any convolutions; when cut into, no greyish matter appears, and we can separate the pia mater from it easily. The heart is very evident, though the auricles and ventricles are not easily distinguished; the lungs are small, and composed of two lobes; the spleen is little developed; the external ear is complete; the testicles of the male are situated a little below the kidneys, near the lumber vertebræ; the ovaria of females are small, soft, and placed in the abdominal region. Sœmmerring * says, that during the first, second, and third months, the upper extremities are larger than the lower; but that about the fourth they are equal, and towards the fifth they become less. The length is now eight or nine inches, and the weight nine or ten ounces.

Six months. Children when born at this time, sometimes live for a few hours. The head is now smaller in proportion to the rest of the body; the brain has more consistence, but gives way when touched; the pia mater lies loosely over it, and the fontanelles are much expanded. The hair is very

* Sœmmerring, Icones Embryonum Humanorum, page 3, folio. Francof. 1789.

thin, short, and of a silvery appearance; the pupils are closed by a membrane, and the eyelids glued together. There is some appearance of fat underneath the skin, which is soft, pliant, and of a purplish colour, particularly at the palms of the hands, soles of the feet, face, lips, ears, thighs, and scrotum. The nails are awanting, or consist of merely a layer of epidermis. In males the scrotum is small, and of a bright red colour; in females, the vulva projects, and the labia are separated, by the protuberance of the clitoris. The stomach contains a little mucus, and the meconium only fills the cæcum, and a small part of the colon. The lungs are small, white, and firm; the liver very large, situated opposite the umbilicus, and the bladder contains a little colourless fluid. The middle of the body will answer to the abdominal extremity of the sternum. It weighs from twelve to eighteen ounces, and measures from ten to twelve inches.

At *seven months*, both the external and internal organs are much farther advanced; the skin is not so red as formerly, but stronger, more fibrous, and covered with a sebaceous matter, adhering unequally at different parts of the body; the nails are firmer, and the hair thicker and stronger. The membrana pupillaris has disappeared, and the eyelids are no longer united. The brain has more consistence, is a little unequal on its external surface, and adheres more closely to the pia mater; the medullary matter is redder internally, and the tænia semicircularis, infundibulum, and choroid plexus,

are now formed. The lungs have acquired a more rosy hue, and the auricles and ventricles of the heart are quite distinct. The liver is more removed from the umbilicus, the bile of a yellowish appearance, and of a slightly bitter taste; the meconium is in great quantity, occupying the cæcum, and almost all the great intestines. The middle of the body is nearer the sternum than the navel. The length is about fourteen inches, and the weight from two to three pounds.

At *eight months*, the skin is firmer, more fibrous, and covered with short very fine hair of a darker colour, having the sebaceous covering more extended. The brain has more consistence, particularly the tuber annulare and medulla oblongata; the convolutions are more marked, and the substance of the brain is injected with blood vessels. The mammæ are often prominent, and a liquid may be pressed out of them. In males, the testicles are engaged in the abdominal ring, and in females, the vagina is covered with mucus. The middle of the body at this period, is nearer to the navel than to the sternum. The length is about sixteen inches, and the weight from three to four pounds.

At the *ninth month*, all the parts have acquired more maturity and consistence; the skin is whiter and firmer; the nails have become more solid, and the hair is stronger and thicker; ossification is far advanced in different parts of the body; and the bones of the scull, though moveable, touch

one another at their edges, making the fontanelles less. The external surface of the brain has deeper and more numerous indentations, and the cineritious portions begin to be distinguished by their colour; the cerebrum preserves its previous softness, whilst the cerebellum, tuber annulare, and medulla oblongata have acquired very considerable firmness. The dimensions of the head are five inches and a quarter from the occiput to the chin; four inches and a quarter from the occiput to the forehead; three and a half inches from one side of the parietal bone to the other, and the same from the summit to the base of the head. The face is small, the thorax short, round, and raised, and the abdomen is large and projecting at the umbilicus. The lungs are redder and more voluminous; the canalis arteriosus is larger, and its coats thicker; the foramen ovale is pretty considerable, and the eustachian valve is shorter and less extended than in the previous months. The meconium fills nearly the whole of the intestines; the bile is bitter to the taste, and the bladder contains a little urine. The middle of the body is at the navel, or a little below it; the length is from eighteen to twenty inches, and the weight from six to seven pounds. In a word, the pulmonary, sanguiferous, and nervous system, are in a proper state to commence and continue the functions of external life, proper to a child after birth.

The weight and size of a fœtus at the full time, are subject to much variety; not only in different females, but in the

same female at different gestations; for we know that the fœtus is influenced by the age, constitution, mode of life, passions, and diseases of the mother, and also by the energy and dispositions of the father. Drs Hunter, * M'Aulay, * Clark, † and others, have given the result of their observations on this subject; and from them we may say, that although we find infants at birth to vary in weight from three to thirteen pounds, ‡ and in length from fifteen to twenty-five inches; the medium is from five to eight pounds in weight, and from seventeen to twenty-three inches in length. Male children in general weigh a little more than females.

In answering the question, *Has the child come to maturity?* we must be familiar with the changes which the fœtus undergoes in the womb, particularly from the sixth month to the period of delivery. We should compare the equilibrium between the superior and inferior extremities, and between the navel and middle of the body. We are also to examine the structure of the body, the state of the brain, skin, pupil of the eye, progress of ossification, &c. to ascertain whether the organization is complete, and whether it exhibits the characteristics of maturity or immaturity, and is fit to execute all the functions of life, and that no organ essential to the exist-

---

* Hunter's Anatomy of the Human Gravid Uterus, page 68.

† Philosophical Transactions, vol. 76, page 349.

‡ Baudalocque, l'Ars des Accouchement, page 220.

ence of the being is awanting. Infants at the full time, though small, have the organs much developed, the chest large, the belly longer in proportion than in abortions, and even to the eye exhibit a degree of maturity which we cannot fail to recognize.

To what has already been said, I may add some observations of Beclard, who imagines, that where the soft parts afford us doubtful inferences as to the age, the skeleton proceeds upon more regular laws, and may furnish important evidence. Dr Hutchison * has quoted these results, and we shall find them to be, that two months after conception, the skeleton is about four inches three lines in length, while the spine is only two; at three months, the former is six inches, and the latter two inches, and two-thirds of an inch. At four months and a half, it is nine inches, and the spine four; at six months, twelve inches, and the spine five; at seven and a half months, it is fifteen inches, and the spine six and one-third; at nine months, it is from sixteen to twenty inches in length, or at a medium eighteen, and the spine is in the proportion of seven and three fourths of an inch.

Each vertebra is generally formed by three points of ossification; an anterior one, which forms the body, and two lateral ones, which form the apophysis. Each vertebra is

* Hutchison on Infanticide, page 12, 1821.

besides completed by several other points. At the sixth, two points of ossification are found in the second cervical vertebra,—one situated above the other; and at the seventh month, the superior, which answers to the processus dentatus, is larger than the inferior. At the eighth month, the transverse process has begun to ossify in the first lumber vertebra; and at birth, ossification has begun in the first vertebra of the neck, and first bone of the coccyx. The body of the fourth lumber vertebra, which is the largest, is three lines in depth, and six in breadth; and the lateral portions of the six superior dorsal vertebræ begin to unite together, to form a ring posteriorly to the bodies of those bones.

If, by our researches, we find, that the child was capable of maintaining life, (or *viable*, as the French writers term it,) we are to consider it under the second question proposed. But if we are assured that it is an abortion, we may be called upon to say, *whether it was voluntary or involuntary.* Abortion may occur at any time during pregnancy, though it happens most commonly about the end of the second month. If the fœtus is born before the end of the fifth month, it is seldom alive; and if before the end of the seventh month, though born alive, it seldom survives, although a few exceptions are to be found to the contrary; and the Parliament of Paris recognised the Mareschal Richelieu to be born at five months. In abortions caused by taking medicine, we can learn nothing by examining the fœtus, as it presents the same appearances

in almost every case, whether voluntary or involuntary; unless in some cases where mechanical means have been employed, and appearances of punctures, or wounds, may sometimes be discovered on the head or limbs.

To answer this last question, we must depend on other evidence than that of the examination of the fœtus; and to assist us in determining this point, we should know, that amongst the lower class of society, certain medicines are held in high estimation for producing abortion; viz. repeated blood-letting, emetics, cathartics, cantharides, mercury, savine powder, oil of juniper, &c. Let us, therefore, endeavour to find out if any of these have been taken by the accused; if they were indicated, or necessary; if given in great quantity, or often repeated; and if the woman was capable of supporting the treatment. In short, we should know all that has preceded the event, and whether or not it was voluntary on the part of the woman. For though we believe that none of the above medicines have any specific effect in producing abortion, unless a pre-disposition exists on the part of the woman, still, if any of them be taken in such quantities as to produce a powerful effect upon the constitution, abortion may occur. Such are the general means taken by women to procure abortion;—but there are local means also, as blows on the loins and abdomen, with the introduction of mechanical instruments into the vagina, to dilate the uterus, and rupture the membranes; but this is not easily accom-

plished, and few women are so depraved as to submit to it. It would be well if women were aware, that in every case of criminal abortion, the life of the mother is in as great danger as that of the child.

Has the woman accused had an abortion? is another question which we may be called upon to answer. If miscarriage has taken place at a very early period of conception, little or no change will be observable in the mother; but the nearer it approaches to the period of maturity, the more will it resemble parturition. If the abortion has recently occurred, we shall find a bloody ichorous offensive discharge from the vagina, mixed with clots of blood and mucus,—the labia soft, red, and enlarged,—the os uteri open, and the vagina relaxed and dilated; and sometimes pieces of wood, &c. may be found where mechanical means have been employed. The breasts will be swollen, and an areola, large and dark, about the nipple, will be visible. There will be present also rigours, tremors, faintings, pains of the loins, &c. If abortion occurs near the full time, the protuberance of the abdomen will disappear, and the muscles will be relaxed and rugose. This examination should take place within a few days after abortion. Some writers limit the time to six days; but this must depend in a great measure upon the size of the child, and the temperament of the woman. In our investigations, we are not to be satisfied with one or two symptoms of abortion as satisfactory proof, but must take them all in conjunc-

tion, to satisfy ourselves; for almost any one of them may be present, without impregnation having taken place. If the woman be dead, more accurate information may be obtained by anatomical investigation. In all our medico-legal researches on this subject, we should keep in remembrance those causes which may produce involuntary abortion, lest we attribute to criminal violence, what happens from accidental circumstances.

The fœtus may die, and remain in the womb from one to twenty-five days, or even more; and, according to the time it has remained, will be the appearances which it will shew on expulsion. If it has remained some considerable time in the womb after death, we shall find the body flaccid, the integuments soft, and of a yellowish, livid brown, or purplish appearance; the flesh of a soft consistence; the skin is removed by the slightest friction, and sugillations will appear in different parts of the body, particularly at the scalp. There is often effusion of bloody serum into the different cavities of the chest and abdomen, and the interior of the blood-vessels have a deep red colour. The umbilical cord will be soft, livid, flaccid, and easily torn, with chops about the navel. The countenance has lost its round appearance; the head is deformed by its own weight; the sutures are much relaxed and disunited; the brain is soft and decomposed, and the thorax is flattened. Sometimes, by remaining in the

womb, the body of the fœtus is converted into a state resembling adipocere.

II. *Was the child born alive?*

This is the most important question that can be put to a professional man in a case of Infanticide; as upon the answer to it will often depend the fate of the person accused. Various methods have been proposed for solving this question; but the two we are principally to depend upon are, hydrostatic experiments, and anatomical researches.

Whilst the child is shut up in the body of the mother, the lungs receive no more blood than is sufficient for their nourishment, and are dormant as to their usual functions; but the moment the communication between the infant and mother ceases, respiration becomes absolutely necessary for the continuance of the life of the infant. A new series of changes takes place;—the ductus arteriosus and venosus contract,—the foramen-ovale is diminished,—and that blood which was sent from the pulmonary artery to the aorta, is now sent to the lungs, whereby their absolute weight is increased, while the air that enters them during respiration, renders them specifically lighter.

These are not the only changes which respiration effects upon the lungs; others take place, which are the result of

the operation of this new function. Before respiration, the thorax is flattened; the diaphragm is very convex towards the chest; the foramen-ovale and ductus arteriosus are open and filled with blood; the lungs do not weigh above twelve or fifteen drachms,—are small, of a dark brown colour, firm in their consistence, somewhat resembling the spleen. They do not cover the pericardium, but recede towards the upper and back parts. There is no effusion of blood seen, nor crepitus heard when cut; and they sink when put into water. After respiration, the chest is arched, the diaphragm is depressed, the foramen-ovale and ductus arteriosus, are contracted, and contain no blood; the lungs almost cover the pericardium, filling up the lateral parts of the cavities of the chest; they are of a light pink-red colour, elastic to the touch, a crepitus is heard, and blood issues from them when cut. They weigh from twenty to twenty-four drachms, and swim when put into water.

Having said this much upon the physiology of the lungs, we shall now state the different methods that have been proposed to answer our second question. Daniel,* aware that by respiration the thorax is dilated, and the sternum elevated, proposes to measure, with a line, the circumference of the chest, to compare it with the height of the dorsal portion

* Daniel, Commentatio de Nuper Natorum Umbelico et Pulmonibus. Hale, 1780.

of the vertebræ, and to observe the distance from the sternum to the spinal canal. But the thorax is too differently formed in different fœtus to give us any positive rule; and these operations are too minute and complicated in their results to be depended on where the life of an individual is involved. He proposes another test, much more complicated in its details, and equally objectionable with the first. It consists in endeavouring to ascertain the reality of respiration by the increase of weight which a certain quantity of water acquires, in which we very strongly compress the lungs, so that the water may acquire the liquid which the lungs lose.

Plouquet * proposes to arrive more exactly at the same results, by comparing the convexity of the diaphragm. He proposes to measure, from a certain point of the thorax, to a part corresponding to the aponeurotic centre of the diaphragm: But here the same objections occur as to Daniel's first test. By far the best experiment of this kind is that which generally goes by the name of Plouquet's test; which seems to be founded upon correct principles, and appears, at first sight, quite sufficient to fulfil the object desired. Plouquet remarks, that, in respiration, not only is air admitted into the lungs, diminishing their specific gravity, but that,

---

* Plouquet, Commentarius Medicus, in Processus Criminales super Homicidio, Infanticidio, 1787.

at the same time, they receive a much greater quantity of blood, by which their absolute weight is much increased. By weighing the body of a new born child, which had exhibited signs of life a few hours prior to delivery, but which had not respired, and was born dead, he found it to weigh 53,040 grains. The lungs were closely compacted, and not at all distended by air; they weighed 792 grains; the weight of the body here was, to that of the lungs, as 67 to 1 nearly. In another fœtus, the proportional weight was 70 to 1; and in a child that had breathed after birth, the relative weight was 35 to 1;—and from these facts he lays it down as a rule, that in children who have not breathed, the proportion which the lungs bear to the body, will be as 1 to 70, while in children who have lived, it will be as 1 to 35, or 2 to 70.

To these statements it has been objected,

1*st*, *That the relative proportions between the lungs and body, are not in all cases the same as those stated by Plouquet.* Certainly the tables of Schmitt * and Chaussier † seem to prove this assertion; though we would observe, that in these tables we find lungs that were improper had been submitted to examination, and all their calculations are not quite correct.

---

* Dictionare des Sciences Medicales, vol. 10, page 94.

† Lecieux, Medicine Legale sur l'Infanticide, p. 44.

2*d*, It has also been objected, that *disease, or congestion, may render the lungs of a fœtus, that never respired, equal to those of one who has.* Plouquet denies the possibility of any such congestion taking place in lungs that have never breathed, owing to the foramen-ovale, and ductus arteriosus, offering so easy a passage to the current of blood, that no determination can take place to the pulmonary vessels. And as to the objection of disease, anatomical investigation will detect this.

3*d*, It has been objected, that *putrefaction destroys the relative weight of the body and lungs.* We will shew hereafter, that the lungs resist putrefaction longer than any other of the soft parts of the body; and when putrefaction has gone so far as to destroy the relative weight, we can learn nothing by any medico-legal investigation. "On the whole, it appears to us highly probable, that although Plouquet's test is liable to various fallacies, which render it inapplicable in certain cases, yet these cases may in general be recognised, especially when the subject shall have been more minutely studied; and that those not recognisable are so few in number, that they should not interdict the employment of this test, in conjunction with others. It should also be particularly noticed, that some of the sources of error, such as malformation of the lungs, must always operate on the side of the prisoner; they may tend to make us believe that a child who has breathed was still-born, but never that a child still-born has breathed. Now it is no

very serious objection to a particular system of proof, that it will not always detect guilt, provided it can never impute it." *

Such are the ways by which Daniel and Plouquet have proposed to answer this question; but by far the best proofs are drawn from the hydrostatic test, which we shall first state, and afterwards consider the objections that have been brought against its accuracy.

We remove the lungs in connection with the heart, first tying the great vessels near their origin; and cutting the trachea near the bronchi, place them then in such a situation as will allow any liquid they may contain to run out. Sponge away any blood or impurities that may be upon them; have them now accurately weighed, and observe carefully their colour, consistence, and if there are any appearances of disease, taking care to handle them as little as possible. Having prepared a vessel of about a foot wide, and a foot and a half deep, nearly full of water, of the temperature of the surrounding atmosphere, and containing no saline matter, as this will increase its density, we introduce the lungs gently. Observe if they float or sink; and if the latter, whether rapidly or slowly, and if any one part remains more on the surface of the water than another, and to which lung it be-

* Edinburgh Medical and Surgical Journal, vol. 19, page 466.

longs. The heart is now to be separated from the lungs, previously applying a ligature to the pulmonary vessels. We weigh them again, and re-introduce them into water. Observe if they sink to the same depth as before, or if one of the lungs swims more freely than the other, and which it is; and when placed under water, if they rise rapidly or slowly. Separate the lungs, and mark the difference in their floating. Cut each lobe into small pieces, and observe if one part swims more easily than another, and to which lung it belongs. Press them strongly, and then replace them in the water, and see if they float, and to what part of the lungs, those pieces that swim belong. Observe if there is any elastic feeling, or crepitus, when pressed; and if any blood is poured out when cut. If all the parts of the lungs swim, we may be assured that respiration has been fully and freely established; but if only part of them float, the life of the infant has been less perfect; and if all sink, then respiration has not taken place at all.

Objections have been brought against the hydrostatic test, which, if true, would be of a very serious nature, as they would lead us to condemn an innocent woman, by supposing that the child had respired, while it was born dead; and that the floating of the lungs depended upon some other cause quite unconnected with the life of the child. These objections we shall now consider.

1*st*, *That putrefaction causes the lungs of a fœtus that was born dead, to float in water.* The most accurate experiments upon this subject are those by Mayer,* which I feel convinced are correct, from some experiments of my own made in 1819, agreeing with them. If we introduce lungs into water about the temperature of 50, we shall observe about the third day, the water a little red, and bubbles of gas arising. This will continue to increase till the sixth day, when vesicles of air will appear on the surface, between the lobules of the lungs; the smell will be disagreeable, and the extrication of gas great. The lungs float about the eighth or tenth day, and continue doing so till the twenty-fifth or thirtieth day, when they sink, little or nothing remaining but part of the investing membrane.

We are to determine the difference between lungs that float from respiration, and those from putrefaction,—1*st*, By the uniform appearance on the surface of the lungs, and by their natural colour in the former; while, in the latter, air bubbles run along the fissures between the component lobuli; and, if we blow air into them gently, it will not distend them, but run underneath the membrane, which is not the case in the former.—2*d*, We know that putrefaction begins at the

---

* Mayer, Dissertatio sistens præcipua Experimenta de Effectibus Putridenis in Pulmones Infantum, ante et post partum, &c. &c. in collect. opusculor. selector. a Schlegel, vol. 1, page 251. Lepsic, 1789.

external surface. If we take, therefore, a portion of the internal part of the lungs, and put it into water, if it floated before, as the result of putrefaction, it will now sink; if, on the contrary, respiration had taken place, it will float as easily as before.—*3d*, If we press strongly a part of the lungs that float from respiration, and put it into water, it will still continue to swim; while lungs that float from putrefaction, when subjected to the same process, will sink.—*4th*, We have no crepitus, or effusion of blood, when the lungs of a fœtus are cut, which is not the case in lungs that have respired.—*5th*, By the examination of the other viscera of the body. Numerous observations shew us, that when the other parts of the body are far gone by putrefaction, little or no change has taken place in the lungs. Camper * says, that from different observations he made at Amsterdam, he has seen in those dead before birth, the head almost consumed, and the body in such a state, that the least touch would detach the flesh from the bones, and yet the lungs had not begun to swim. Orfila † says, that the lungs of still-born children putrefy with the greatest difficulty; and barely present slight traces of decomposition, when the skin, muscles, and several of the viscera, have passed into a state of a liquid stinking mass: And Capuron, ‡ and Wrisberg ‖ as-

---

* Diction. des Sciences Medical, vol. 10, page 77.

† Orfila, Lecons de Med. Legale, page 269, 1823.

‡ Capuron, La Medicine Legale, page 409.

‖ Mahon, Medicine Legale, vol. 2, page 441.

sert, that if the lungs remain in water after putrefaction has commenced, experience shews, that the same phenomena will take place in the thymus gland, intestines, bladder, and in all the other parts where the cellular membrane is like to that of the lungs. We must therefore submit these organs also, with the lungs, to the hydrostatic test; and the parity or disparity of the results which they indicate in water, shew if the lungs have the property of swimming from putrefaction; for if the other parts of the body are free from decomposition, the floating of the lungs cannot depend on this cause.

By careful attention to the foregoing tests, we believe that there will be little difficulty in deciding whether the lungs float from putrefaction, or from respiration: And it would be well for professional men to attend to the slow decomposition of the lungs; for by the reports of many, we find, that they have often stated, that nothing could be learned from the examination of the body, as putrefaction was far advanced, though the state of the lungs was never examined.

2d, *The child may breathe in the womb, and die before birth.* It is unnecessary here to enter into a discussion about children crying in the womb; if it ever happens, it must be when the mouth of the child is opposite to the mouth of the uterus, and the membranes must be ruptured. Filleau* states

* Nouveau Journal de Medicine, Chirurg. &c. vol. 3. page 90.

cases, where, if this occurrence ever took place, it was likely to happen, as the children remained with the mouth opposite the os uteri for several hours, and no such circumstance was observed. We know also how exceedingly rare face presentations are; and those where the mouth of the child is opposite to the mouth of the uterus, are still more so. And where such a presentation exists in a young woman at her first child, and which is full grown, we believe it cannot be completed without professional aid, and hence is not likely to become a subject of medico-legal investigation.

3d, *The child may breathe after its head is born, and die before birth.* This has been strongly asserted, but not as yet proved; for though we admit that a child may breathe when placed in such circumstances, yet it is exceedingly doubtful if it ever dies from this cause. And Marc * has tried to prove such an occurrence impossible; for he argues, that the pressure that prevents delivery, must prevent breathing; and if the force is insufficient to prevent respiration, it is insufficient to prevent the expulsion of the child. And how is it possible, that the feeble muscles of respiration of the child can overcome the resistance of such a power as prevents expulsion? And in confirmation of this reasoning, we are not aware of a single case where the child was not born alive, when it cried after its head had escaped beyond the vagina

* Dic. Des. Scien. Medical, vol. 10. page 73.

of the mother. Perhaps the only way in which this occurrence can take place is, where the shoulders of the child are so large as to prevent delivery, or where there is some preternatural enlargement; but in both cases, examination after death will explain the cause.

4th, The lungs of a still-born child may be artificially inflated. The possibility of inflating the lungs of a fœtus has been denied by Roederer,* and others, though its practicability is now admitted; it is, however, accomplished with great difficulty, and not likely to be attempted by a mother in the weak state she is in after delivery. Since the lungs of a fœtus may be artificially inflated, how are we to detect this source of error? 1*st*, Marc † says, that inflation fills the lungs very imperfectly; and that the left lung, from the length and narrowness of its bronchi, is not dilated. But this proof is quite inconclusive, as the same appearances are often observed in lungs that have respired naturally. 2*d*, Metzer ‡ considers the flatness of chest as a proof of artificial respiration; but this is too delicate a test, where the life of a fellow creature is concerned. The following tests are more to be depended upon than the two former. 3*d*, We should compare the relative weight of the body to the lungs, by Plouquet's

---

* Schlegel, vol. 5. page 112.

† Manual de Autopsie Cadaverique, page 138.

‡ Metzer, Systema Medicinæ Forensis, page 187. 1794.

test, and observe the quantity of blood found in the latter. Before respiration little blood enters them; but when respiration is established, the blood passes into their vessels, and distends them. We shall, therefore, find them filled with blood in all cases where they float from natural respiration, unless where death has been occasioned by hemorrhage. 4*th*, Where inflation has taken place there is no crepitus. 5*th*, Both Beclard * and Fodore † contend, that lungs, artificially inflated, when cut into small pieces and pressed, sink in water, which cannot take place in lungs that float from natural respiration. 6*th*, The lungs in natural respiration are of a rosy colour; in artificial, they are of a dark appearance.

5*th*, *The lungs of a still-born child may float from a particular kind of emphysema.* Professor Chaussier ‡ has observed this circumstance in many children whom he has been obliged to extract by the feet, who had never respired, being dead before delivery, and in whom no signs of putrefaction existed,—all the organs being in a sound state. The Professor thinks, that the lungs had experienced a kind of contusion in delivery, and that effusion of blood had taken place into the cellular tissue, from which some bubbles of air had escaped, making some parts of the lungs specifically lighter.

---

* London Medical Repository, vol. ii. p. 161.

† Fodore, Med. Leg. vol. iv. p. 463.

‡ Lecieux, Considerations sur l'Infanticide, p. 55.

This appearance can be easily recognised, as there is a brownish appearance. The air, or fluid, is contained in the cellular texture, and can be easily expelled by pressure, which cannot be done if respiration has taken place.

Besides these objections to the hydrostatic test, which we have just considered, there are other sources of error, the effects of which are in favour of the prisoner, and these we shall now consider.

1*st*, *A child may be born in so weak a state, that it has not the power to dilate the air vessels, and therefore the lungs, though cut into small pieces, and put into water, will sink, and lead us to believe that the child was born dead.* When this takes place, the children are so excessively weak, that in almost every case they would die, notwithstanding every care was administered to them. They shew evidently the characteristics of immaturity; and Fodore * says, he never met with these cases, but in children who were not come to the full time, and whose appearance demonstrated the weakness in which they were born. And the very worst error the hydrostatic test would lead us into, in such a case, is, to say that the child was still-born, when, in every probability, it could not have survived, even with the greatest care. And

* Fodore, Medicine Legale, vol. 4, p. 488.

if, in a case of this kind, we cannot always detect guilt, we shall at least never impute it improperly.

2*d*, *A child may be born with the air passages stuffed; or with mal-conformation of the thorax or abdomen; or the membranes may cover the mouth of the child; or the fœtus may be suddenly expelled into water.* In all these cases, the lungs will sink in water, and yet the child was born alive. All these obstacles to respiration may be ascertained by anatomical examination; and then it will be the duty of the professional witness to declare, whether or not Infanticide could have been prevented. In all such cases, in the examination of the fœtus, we should never forget to distinguish the stuffing by mucus, or liquor amnii, from that which results from the introduction of foreign liquids, especially when the child is found in common sewers, or other like places. Scheel * comes to the following conclusions on this subject.—1*st*, Where the liquid in the trachea is limpid, and does not contain bubbles of air, or is not converted into froth, we may conclude with certainty, that the infant has never respired.—2*d*, If, on the contrary, the liquid contains froth, we have a right to conclude, that the infant has respired, or that air has been inflated.—3*d*, When the liquid contains much mu-

---

* Scheel, Dis. Inaug. Physiol. de liquore amnii asperæ arteriæ Fœtuum Human, 1790.

cus or meconium, or when it is very thick or tenaceous, the fœtus although it had been born living, although it had tried to respire, and had even respired, will die, because respiration will not be perfect. Schmitt * agrees with these propositions; but says, that air bubbles in the passages do not always shew that the child has breathed, as it may be generated from exhalation from the lungs.

3d, *A child may respire, and the lungs dilate so slowly, as to sink when put into water.* Dr Hunter † says, that if a child makes but one gasp, and instantly dies, the lungs will swim as readily as if the child had breathed longer, and had been then strangulated. That this dilatation of the lungs may occur from a single respiration may be possible, but certainly it is not the usual way; for we know that, in general, the lungs dilate much more gradually, and that its advancement depends upon the vigour of the child. Dr Hutchison ‡ gives the authority of a Neapolitan physician, who opened ten or twelve infants a-day, who died within twenty-four hours after birth, and says, that usually he found only a small part of the lungs dilated with air; this part was frequently not larger than a walnut in its green shell, and but rarely larger than a hen's egg, and was com-

---

* Dic. des Scien. Med. vol. 10, page 87.

† Medical Observations and Inquiries, vol. 6, page 287.

‡ Hutchison on Infanticide, page 57.

monly situated in the right lung. The dilatation in these cases is certainly much slower than what generally takes place. But, even admitting that they dilate as slowly as is here presented, we have an obvious way of detecting this error; for if we cut the lungs into small pieces, taking care to exclude from examination any piece of lung containing a large blood-vessel, or part of the bronchi, some part will swim, and shew us that the child has respired.

4th, Tubercles, scirrhous, or congestion, may make the lungs of children, who have respired, sink. This source of error is founded upon the diseased state of the lungs observed so often in adults; for we know that diseases of the lungs of infants are so very rare, as scarcely to form any exception. When they do occur, we can easily give them that degree of importance they demand; and as such diseases will invariably be confined to one part, let it be separated from the lung that has respired, and the former will sink, while the latter will swim. If the lungs sink from congestion, we have only to compress the parts, and then put them into water, when they will float. Fodore* says, that he has often made experiments upon scirrhous lungs, and so congested with blood as to give them the appearance of liver, and which sank when put into water; but that, when they were cut into pieces, and put into water, some part always floated. So

---

* Fodore, Med. Leg. vol. 4, page 487.

we see, that we have it always in our power to detect this error.

Such are the objections and errors that have been urged against the hydrostatic test; and they appear to us to be of such a nature as to be overcome in almost every case by a professional witness, possessing sufficient information on this extensive subject. And here we may say, that if the causes of death are of such a nature as not to be discovered by anatomical investigation, we may be assured that the hydrostatic test will expose nothing whereby we can compromise innocence; and if the rules of art refuse to give us grounds of certainty, let us give way to clemency, and yield to the side of mercy, lest we should sacrifice an innocent person.

Besides these proofs which we derive from the lungs, of the child's having lived, there are others which we shall now consider. The heart may furnish important evidence on this point; we should therefore examine into the state of the ductus arteriosus and foramen-ovale, and also if there is any congestion. The stomach, before birth, contains only a little mucus; if we find, therefore, any remains of food, it is a positive proof that the child has lived; or, if the stomach is quite empty, we may suspect that the child has lived for some time. The intestines in the fœtus are filled with meconium; and some practitioners maintain, that this is always the case with children at birth; and, therefore, if the intes-

tines are empty, the child must have lived. Dr Denman,* however, mentions a case, where the meconium passed some hours before birth, and therefore we are not to rely implicitly upon this proof. In examining the liver, we must attend to the state of the ductus venosus, whether it is shut, or quite open, and filled with blood; and, if there is any effused, observe from whence it proceeds. Before birth, the liver is very large, which depends upon the great quantity of blood which passes through it in the fœtal state, and which is much diminished after birth. Dr Beck† makes a conjecture, that if the liver was weighed, and compared with the weight of the body, it might assist us in ascertaining whether or not the child had breathed. The bladder at birth, contains a little urine; if it is empty, we may suspect that the child has lived long enough to pass it. These proofs are to be taken as accessaries to assist us in our investiga tions.

III. *What was the cause of the child's death?*

Infanticide has been divided into omission and commission; and under these divisions we shall consider it.

---

* Denman's Introduction to the Practice of Midwifery, page 279. Lond. 1824.

† Beck's Elements of Medical Jurisprudence. Edin. 1825. Page 176.

1*st*, *Omitting to give the child the necessary heat.* When an infant is born, a certain degree of warmth is necessary for maintaining life; and unless this is supplied, death will undoubtedly take place. If we find a child stiff, almost naked, exposed in a cold place, the body pale, and contracted upon itself, with the great internal vessels gorged with blood, whilst the cutaneous ones are empty, we have good ground to suppose, that exposure to cold has been the cause of death.

2*d*, *Omitting to take the child from a state of supination.* The child, in general, is born with its face in such a position, that unless speedily removed, death must take place, by its mouth and nostrils being placed in the discharges which come from the mother, or against the bed-clothes, which prevent the access of air. A case occurred to Dr Hunter, * in which the child died under the clothes, from the woman awaiting his arrival, and where there could be no suspicion of criminality. Unless in some such case as the one mentioned, we cannot but attribute gross negligence to the woman, and in these cases, circumstantial evidence must decide.

3*d*, *Omitting to tie the umbilical cord.* The propriety of tying the umbilical cord was never called in question, till

---

* Medical Observations and Inquiries, vol. 6, page 289.

the beginning of last century, when Fantoni,* Schulze,† Schael,‡ and others, maintained, that the neglect of a ligature upon the cord is not attended with danger to the infants. They reason, 1*st*, That because a ligature is unnecessary in animals, it is also in man; and, 2*d*, That the umbilical vessels have a sufficient contractile power to prevent hemorrhagy to any great extent. To the first of these reasons, we may answer, that it is proved, that the cord of animals is different in structure from the human one, being full of rugæ, and the vessels are smaller. Professor Brendel§ says, That when the animal is born, the vessels are closed by a kind of cellular texture. The cord, too, in brutes, is never cut, but torn, which favours contraction. To the second reason, we have to state acknowledged facts, which are in direct opposition to it; and these are, that death has again and again happened, in consequence of the cord not having been tied. The conclusions to be drawn from the discussions on this subject seem to be, that in cases where the circulation is not very strong, and where the respiration is freely established, there is no danger in leaving the cord without a ligature; whilst, in other cases, where the pulsation in the cord is strong, the respiration not freely established, and the

---

* Fanton, J. Anatom Human Corp, p. 261.

† Schulze, An. Umbelici Delegatio in Nuper Natis, Absolute Necessarie sit. Hale 1733.

‡ Schael, Ludov. de Funiculi Umbelicus Delegatione, &c. Gotting. 1755.

§ Medicina Legalis sive Forensis, page 189.

cord cut near the body of the infant, death undoubtedly will take place in many cases. When, therefore, we find a child, having the cord cut near the navel, tied by no ligature, the body of a blueish pale colour resembling wax, and when this state of anemiæ is manifest by opening the body, and finding the sanguiferous system empty, we may conclude, that the child died from hemorrhagy, if the lungs shew, that respiration has taken place. It is necessary to remember, that a child may be allowed to bleed to death, and the cord be afterwards tied; and, therefore, we are not to rest satisfied, that the child did not die from hemorrhagy, because we find a ligature around the cord, but must examine the body to ascertain the fact. Death also may take place from hemorrhagy, in consequence of the placenta being attached to the neck of the uterus, or from rupture of the cord during parturition; but, in these cases, the lungs are not buoyant, and, in the latter case, the edges of the cord are irregular.

4*th*, *Omitting to give the child nourishment.* This is not a likely way for the mother to kill her child; but when it does occur, we will find the stomach quite empty, and the body of the child very small and contracted.

Infanticide by commission, means the premeditated death of an infant by means of some violence. And every cause which may produce death in an adult, is capable of doing the same in a child.

Contusions. It is of great importance to distinguish between contusions received before death, and those appearances which occur after, without the child having suffered any violence. When the injuries are received before death, they consist of a dark coloured swelling on the surface of the body, which arises from the rupture of the blood vessels, with effusion and accumulation of blood into the cellular texture. Those appearances which present themselves after death, have a blueish, purplish colour, attended with no swelling, and no effusion from rupture of the bloody vessels, and if we remove a layer of skin, the difference is at once evident. In some cases when putrefaction has advanced a considerable way, there is a soft undulating tumor, and a liquid of a blueish colour oozes out of the vessels; but the state of decomposition, and the fœtid smell, will at once shew their nature. When contusions appear on the head, they must be examined with great care, to ascertain whether they are the effects of long and difficult labour, or proceed from criminal violence. Those which proceed from labour are generally superficial and circumscribed, and consist of a serous infiltration into the cellular texture; they are not in general of a very deep colour, though this depends much on the severity of the case. They in general have their seat on the vertex, or occiput, or one of the parietals. When forceps are employed, they may produce marks on the lateral parts of the head; and the possibility of their having been used should not be forgotten. Those contusions which proceed from violence, have

their seat in other parts of the head than those pressed by the prominence of the sacrum, edge of the pubis, or neck of the uterus of the mother; they are in general more extended, and have greater extravasation than contusions from natural labour; and not unfrequently they are accompanied with fracture of the bones of the cranium, from much more violence being used than is necessary for the murder of the child. When the presentation of the child is different from that of the head, we should be aware that contusions may appear on that part which presents.

Professor Chaussier * gives us the results of some experiments which he made at the l'Hospice de la Maternite, to shew the effects of violence upon the head of a child. He laid upon a table the head of an infant, a short time dead after birth, and struck it strongly in different places, with a round short baton. In every case the head remained deformed, flattened; and not only did he find fractures, more or less extensive in the bones of the cranium, but the pieces of the fracture were separated in many places, having lost their adherence to the membranes, and to the pericranium; the sutures were relaxed and torn in many places, even to the base of the cranium; the brain had lost its form and its consistence, and often on the surface of this organ, was found an effusion of fluid blood,

* Lecieux sur l'Infanticide, page 67.

formed by the rupture of the venous sinuses, or of some other blood vessel.

Wounds made during life are attended with ecchymosis, and have red and bloody surfaces. If the infant has lived a short time after their infliction, the edges will be swollen, and surrounded with inflammation; and if death has not taken place for some days, they will be covered with purulent matter. When the wounds are made after death, they are unattended with ecchymosis, have their edges of a pale colour, which are not retracted, and no clots of blood adhere to their surfaces.

Punctures. The eyes, ears, fontanelles, sutures, nape of the neck, region of the heart, and all those parts situated over vital organs, should be examined with great care, as murder has been committed by the introduction of small sharp bodies into these parts. Guy Patin mentions the case of a midwife in Paris, who by the introduction of a sharp needle, had destroyed many children, whilst they were still in the uterus, and whilst the head was presenting at the os externum. * And Belloc narrates the case of a child that was found amongst some stones, on the anterior fontanell of which they perceived a very small wound, of no more than half a line

* Mahon, Medicine Legale, vol. 4, page 409.

in diameter. He proceeded to examine this, and found it to extend to the cranium, which they opened with great care. They found that the membranes and the brain itself had been penetrated by this instrument to the depth of two inches, and that in this place the substance of the brain was torn in every direction, and that about a tea-spoonful of blood was extravasated between the membranes and the left lateral ventricle. * In cases of punctures, a small spot of ecchymosis will shew itself, where we must introduce a probe, and dissect upon it most carefully; taking care not to confound the appearances we make by dissection, with those that really exist. In all these cases, we are to judge, after examination, whether or not the injuries are sufficient to produce death.

Appearance of ligature round the neck. If there is any appearance of ecchymosis round the neck, it demands particular attention; and we should endeavour to ascertain, whether this proceeds from the umbilical cord, mouth of the uterus, vagina, or ligature. Plouquet considers the abrasion of the skin round the neck, as a proof that death has not occurred either by the twisting of the umbilical cord, mouth of the uterus, &c. but from some external violence. It appears, however, that under certain circumstances, such as the hand of the child being placed on its own neck during delivery, that the epidermis may be ruffled, and yet the death may

* Belloc, Cours de Medicine Legale, page 93.

take place without any external violence. To point out the difference between the appearances which happen from natural causes, and those from violence, we may observe, that the cord, and the rigid contraction of the mouth of the uterus, produce an equal ecchymosis; whilst that from ligature is broad, unequal, deeper at one place than another, and makes a complete circle. If a cord, with a noose, or two ends of a hankerchief be employed, the ecchymosis will be greater where the knot is, or where the two ends of the hankerchief meet, than in any other place. The skin will be excoriated, and appearances of fingers, nails, &c. in all probability will be present. The livid parts should be examined to ascertain if the blood vessels underneath are ruptured, and if the trachea or larynx be flattened, or if the cartilaginous rings are injured, as these cannot be present without violence having been employed. The appearances which characterize strangulation are lividity of the face, the tongue projects, there is froth about the mouth; the vessels of the head are turgid, and the lungs swim. This latter circumstance can never take place where the child is strangulated by the umbilical cord or mouth of the uterus. It is quite possible for strangulation to take place, and yet we may observe no appearance of ligature round the neck.

Suffocation. The child may be murdered by being buried alive; by submersion in water; by substances being introduced into the mouth; or by turning back the tongue on the

epiglottis. Dissection will ascertain the cause of death in the two latter cases, and the frænum cannot be lacerated, but from premeditated violence, unless there be some preternaturnal deformity. The appearances which shew themselves in cases of suffocation, are generally external redness, or lividness of the face, with tumefaction; the eyes are red and prominent, the tongue projects, and there is oozing of frothy mucus from the mouth. The lungs are of a dark colour, congested; and sometimes there is rupture of some of the blood vessels into the air cells. The right side of the heart is distended with blood, while the left is empty, from the blood being prevented from returning by the lungs. The jugular veins are often distended, and sometimes also the vessels of the brain. The blood is fluid; but this takes place in other violent diseases.

Drowning. In cases of death from this cause, there is often a paleness over the body, though the countenance is sometimes livid; the eyes are half open, and often project; there is a frothy appearance about the mouth and nostrils, and occasionally a little may be found in the lungs, trachea, or bronchi; the diaphragm is pressed into the abdomen, and with these are found the other symptoms of congestion. In some cases we find pieces of straw, weeds, &c. in the mouth, which is presumptive proof that the child has been murdered, when the lungs float.

Alberti * considers the lividity of the lungs a proof that the child has been suffocated by the fumes of sulphate of alum. Hale, † from some experiments made on animals, shews, that in those who die from sulphurous gas, the heart is small, and of a pale red colour. Chaussier ‡ says, that in suffocation from sulphurated-hydrogen gas, the nasal and bronchial tubes are lined with a brownish viscid mucus, the blood is black and thick, the lungs, liver, and spleen, are of a dark colour, the muscles are easily torn, and the body passes quickly into putrefaction.

Fracture, or luxation of the vertebræ. When fracture takes place, there is a great mobility of the neck; and, on dissection, we find the spinal cord either torn or bruised by the pressure of some parts of the vertebræ. When the ligaments are torn, luxation may also take place, which dissection will discover. If these injuries were produced during the life of the child, there will be effusion of blood into the cellular texture; and if they were inflicted after birth, the lungs will float.

Poisons. Infanticide may be produced in this way, and we are to detect the poisons used, in the manner recommended in books of forensic medicine.

---

* Fodere, Med. Leg. vol. 4, page 495.

† Diction. Des Science Medical, vol. 24, page 422.

‡ Journal General d'Medicine, Oct. 1802.

Premature tying of the umbilical cord. If the cord is tied before respiration has commenced, death may take place; but we scarcely think, that those who intend to commit murder will resort to this method.

Such are the criminal methods by which a child may be murdered; but there are innocent causes by which the child may die, and where no blame is attachable to the mother.

1*st*, *A woman may be delivered alone;* and, either from hemorrhagy, syncope, or convulsions, be incapable of giving the necessary assistance to the child, and therefore allow it to lie underneath the clothes, with its face amongst the discharges of the mother, so that its death often takes place. Such an occurrence is rare, and can only be admitted by examination into the circumstantial evidence. In general, those whose accouchements have been attended with very violent symptoms, as those mentioned above, shew afterwards great weakness, faintings, vertigo, œdema; and we should make inquiries into the probable quantity of blood supposed to be lost, and also into the temperament of the mother, so as to form a conjecture as to the probability of such an occurrence.

2*d*, *A child may be expelled so suddenly by the contraction of the womb, as to be killed by the fall, &c.* Some women are so formed, as to be delivered almost before they are aware of labour having begun. We are to judge of the pro-

bability of such an occurrence, by examining if the parts of the woman are large and much relaxed, and what is the size of the child; and if it is probable that it could pass so easily as is represented; if it is the woman's first child; and if the cord was cut or torn. Professor Chaussier * has given the results of some experiments he made on infants which he allowed to fall from a certain height. He raised fifteen infants by the feet, so that the head might be about eighteen inches from the ground, and then allowed them to fall perpendicularly upon the pavement. Dissection discovered, upon twelve of these infants, longitudinal or angular fractures upon one, and sometimes upon both, parietal bones. Other fifteen infants were allowed to fall from about the height of three feet, and dissection shewed fractures on the parietals, extending, in some cases, to the os frontis. In other cases, where the infants were allowed to fall from a greater height, the membranous commissures of the vault of the cranium were relaxed, and even broken in several places;—often the form of of the brain was altered; and, in some cases, an effusion of blood was found under the membranes. But this only took place in infants where the bones were soft and flexible, and where he met with no fracture.

In cases where such doctrines are advanced for the woman, we must investigate all the circumstances that have preceded,

---

* Lecieux, Medicine Legale, p. 64.

accompanied, or followed the accouchement;—whether the woman lost or preserved her senses, and called for assistance;—if she was alone when taken ill;—if it was before the full time;—if she was young, or the mother of other children;—and if she was aware of her situation.

3d, *A child may die of intro-susception.* Anatomical examination will at once discover this cause.

IV. *Has the woman accused been recently delivered?*

The signs which shew recent accouchement, are great weakness, the countenance is pale, the eyes are heavy, and surrounded with a blueish circle, the belly is soft, and the abdominal muscles relaxed, and full of folds and ridges, intersected with whitish lines, extending from the groins and pubis to the navel. There is a dark line between the pubis and umbilicus; and if we draw our finger over this region, we shall perceive the parts very thin. The mammæ are swelled, discharging a serous or milky fluid, and have a dark areola round the nipples: and often the women are affected with the milk fever, terminating in acid sweats. There is contusion, redness, and swelling of the external parts of generation, frequently attended with rupture of the perinæum, or consecutive suppuration. The neck of the uterus is tumified and irregular, and the uterus itself is much increased in size, which may be easily felt through the muscles of the

abdomen, but still better if we introduce one finger into the vagina, whilst the palm of the other hand rests on the hypogastric region. There is a discharge of a bloody sanies, or puriform fluid, possessing a very peculiar smell, known to accoucheurs by the name of lochiæ; at first red, but gradually becoming paler, and ceasing in a few days.

These are the signs which indicate delivery; and when they are all present, we can entertain no doubt that it has taken place. Some of them however may be present without impregnation having occurred; and therefore it is the duty of a professional man to examine them in connection; and also to endeavour to ascertain what circumstances have preceded their appearance.

The symptoms disappear, in robust and active women, much more rapidly than in those who are delicate and sedentary. Most of the writers on forensic medicine have fixed ten days as the time within which the examination should take place. Some of the symptoms disappear in a few days, while others are never entirely removed, as the folds of the abdominal muscles, cicatrices of the perinæum, and deformity of the neck of the uterus; which Capuron* says, is in general divided, the anterior half being larger and thicker than the posterior.

---

* Capuron, l'Med. Legal. relative a l'art des Accouch. p. 125.

We cannot here enter into the consideration of the different complaints which leave symptoms, resembling those of parturition, as this Essay has extended to a much greater length than was proposed; but we may add, that if we have an opportunity after death of examining the woman, we shall find the uterus enlarged, from nine to twelve inches long, much thickened, and containing a bloody fluid. The blood vessels and lymphatics are much enlarged; there is a rough surface where the placenta was attached, of a dark colour, resembling gangrene. The ligamenta rotunda are relaxed, and ligamenta lata almost effaced. A corpus luteum, or scar, will be found in the ovaria; the cervis uteri will be relaxed, and the vagina enlarged. About eight days after delivery, the womb is about the size of two fists, and it does not return to its natural size for at least a month.

V. *Is the child produced that of the prisoner?*

To discover this accurately we should ascertain, if possible, the time when the woman was delivered;—what was the nature of the confinement;—and then compare the appearances of the child, with the circumstances of the accouchement. We should take into consideration the state of the child as to putrefaction, and whether there are any circumstances that have retarded or advanced decomposition; and observe, if the probable time of its birth, corresponds with that of the delivery of the woman. If the skin is fresh, red, and covered with

sebacious matter, the umbilical cord soft, spongy, firmly adhering to the navel, and no appearance of ulceration commenced; if the stomach contains mucus, the intestines meconium, the bladder a little urine, and the lungs only partly dilated, then may we suppose that the child died soon after birth. If the umbilical cord is dry and withered, with a red areola around it, or separated from the body, and cicatrized; if the skin is rough, and the epidermis separates in scales, and the sebacious matter is removed, the stomach containing food, and the lungs fully inflated, then the child has lived; and the time will be best discovered by examining the state of the umbilical cord. It is nearly detached by the fourth day after birth, is generally separated from the navel by the fifth, and the ulcerated surface is healed about the eighth or ninth day.

The length of time the child has been dead is to be approximated by the extent to which decomposition has advanced. And here we are to be regulated by the firmness and freshness of the body; the fulness and spherical state of the cornea; the state of the skin, as to colour and consistence; and the other signs of decomposition, will enable us to ascertain, with tolerable precision, the time of the infant's death, provided we are aware of the circumstances in which it has been placed, to retard or advance decomposition. In our investigations on this subject, we should ascertain if it is the woman's first child: For in almost all cases where it is the

first, and where the presentation is natural, there will be found on the occiput of the child a tumour, consisting of serous effusion; while, if the woman has had many children, there will be no appearance of injury. Besides these means, we shall often be much assisted by moral evidence.

VI. *How is a medical man to proceed, in a supposed case of infanticide?*

When a professional man is called upon to examine the body of a child, suspected of having been murdered, the first thing he should endeavour to ascertain is, whether or not the infant is absolutely dead. If this is doubtful, he should have it removed immediately to a proper place, and have the usual methods of resuscitation tried. If death has undoubtedly taken place, he should observe carefully the situation and attitude of the body, whether the place is public or private, exposed to heat or cold, and if there is any circumstance present to advance or retard decomposition. He should also note whether the place where the body lies is rough or uneven: For appearances are sometimes produced by the unequal surface on which it lies, which may lead us to suspect, that violence has been committed, unless we are on our guard. The state of the body, as to clothing, filth, blood, &c. should next deserve attention; and whether or not the last proceeds from the body of the child. If it is found

in water, whether it is a running stream, or stagnant pool. The sex, age, and size must be recorded, and how far putrefaction has advanced, and if any unnatural appearances present themselves upon the body of the child, and also the state of rigidity of the limbs. These circnmstances being attended to, he should have the child removed to a proper place for farther examination, taking care never to lose sight of it, for fear of imposition. In removing the clothes, let him observe if they are cut, torn, or pierced in any place; and if there is any part of the body soft, discoloured, or covered with blood, and if the sebacious covering is removed. He should have the body washed and weighed most accurately, and then the general appearance of the body examined; he should search for wounds, or punctures, in all the canals, passages, fontenelles, or opposite any of the important viscera; and if the least appearance of ecchymosis is found, it must be carefully marked, and examined more minutely afterwards. He should next investigate the state of the limbs, as to their form and position; and if there is any appearance of fracture, or dislocation; and in what state the umbilical cord is, as to its length and appearance; if attached to the placenta, and if the latter is quite sound. He should, in the end, examine the state of the neck, if there is any appearance of ligature or depression; and if the skin is ruffled; and what state the thorax and abdomen is in, as to form, elevation, resistance, flacidity, &c.

In considering this question farther, we should now proceed to detail the manner in which we should dissect the different cavities of the child; but this would extend our essay far beyond the limits we intended; and, therefore, we must refer, for information on this subject, to the works of Capuron, Beck, Hutchinson, &c. and, in particular, to an essay by Renard.*

---

* Considerations Medico Legales sur l'Overture des Cadaveres. Paris, 1819.