

An essay on the signs of murder in new born children / translated from the French, of Dr. P.A.O. Mahon, ... by Christopher Johnson, surgeon, Lancaster: ... with a preface and notes by the translator.

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ESSAY
ON THE SIGNS OF
MURDER
IN NEW-BORN CHILDREN.
TRANSLATED FROM THE
FRENCH
OF DR. J. E. A. MARION.

AN
ESSAY
ON THE SIGNS OF
MURDER
IN NEW BORN CHILDREN.

ESSAY

ON THE SIGN OF

MURDER

IN NEW-BORN CHILDREN

ILLUSTRATED FROM THE

FRENCH

OF DR. P. A. M. M. M.

PROFESSOR OF FORENSIC MEDICINE

AT

IN THE MEDICAL SCHOOL OF PARIS, &c.

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IN NEW-BORN CHILDREN

1812

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FRENCH,
OF DR. P. A. O. MAHON,
PROFESSOR OF FORENSIC MEDICINE,
IN THE MEDICAL SCHOOL AT PARIS, &c. &c.

BY
CHRISTOPHER JOHNSON,
SURGEON, LANCASTER:

MEMBER OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH, &c.

WITH A PREFACE AND NOTES BY THE TRANSLATOR.

“ I think these things ought to be touched upon by us, rather that they
“ may not be entirely unknown by Physicians and Judges, than that they
“ should come to the knowledge of the common people.” (*Morgagni.*)

Lancaster :

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1813.

AN
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IN NEW BORN CHILDREN
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CLARK AND BATTY, LANCASTER; WILCOXSON, BRISTOL.

1813.

R53376

TO

James Casseles
24th July 1813
JAMES CASSELS, M. D.

THE FOLLOWING PAGES ARE INSCRIBED,

AS A TESTIMONY OF RESPECT,

FOR HIS HUMANITY, SCIENCE AND INTEGRITY,

BY HIS OBLIGED FRIEND,

CHRISTOPHER JOHNSON.

Lancaster, July 23, 1813.

Dr James Home

of Edinburgh

JAMES CASSELL, M. D.

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AS A TESTIMONY OF RESPECT

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London, July 23, 1814

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THE TRANSLATOR'S PREFACE.

—000—

FORENSIC MEDICINE is the application of medical knowledge to the detection of error, or of guilt, and the defence of life, property, or character, in those difficult questions, which are connected with the anatomy and physiology of the human body, in its healthy or morbid state.

Most authors seem to think themselves honoured by the antiquity of the art or science on which they have bestowed their attention. Celsus * suggests that surgery is the most ancient department of the healing art, because Podalirius and Machaon, the two sons of Esculapius, are celebrated by Homer for their skill in the cure of wounds by external applications; but seem to have been unacquainted with the treatment of pestilence, and ignorant of the internal use of medicines.

Surgery, however, rests its claims to antiquity on more authentic records than profane history can furnish; and its first practitioners were perhaps more useful members of society than Podalirius, or Machaon, or their successors, the army surgeons of

b

* De medicinâ, Præfatio.

the present day. Whoever has read the book of Genesis, will be convinced that the *obstetric* branch of surgery, must have been an early and serious matter of attention; the midwives, therefore, as might be expected, are the most ancient, and not the least respectable professional artists on record. At the birth of Zarah and Pharez, one of these practitioners pronounces a medico-legal decision, which, (whilst it implies so much professional acumen and general knowledge, as demand our warm admiration,) proves that, even in the earliest ages, before the philosophers became physicians*, the midwives were philosophers of no ordinary attainments.

The first chapter of Exodus presents us with an occurrence still more remarkable, and reflecting the highest credit on Shiprah and Puah, who feared the Lord more than Pharaoh. I shall not detain the reader by any comments on the prudence and integrity of these honourable and honoured women; on the deference paid by their sovereign, or the very peculiar rewards vouchsafed by their Creator. Nor will it be necessary to remark, that Moses also, was profoundly skilled in forensic medicine, the medico-legal decisions which he promulgated, being very numerous, and such as all the learning of the Egyptians could not have supplied.

* Cels. loc. cit.

Having traced the ancient, I had almost said divine, origin of forensic medicine, it may be required that I should say something to prove its importance; but this seems to me scarcely necessary; for, except the author of a flippant article in the Supplement to the Encyclopædia Britannica, I have met with no one disposed to deny that the questions upon which the opinions of medical men are required, frequently involve the best interests of society.

To those who attend to the proceedings of courts of justice, and hear the contradictory medical testimony, too often delivered, on the most important occasions, no apology will be necessary for any publication that can tend to elucidate a branch of science, with which we have at present so slight an acquaintance.

In Dr. Parr's London Medical Dictionary, the article Forensic medicine exhibits concise views of the most important subjects; Dr. Percival's Medical Ethics contain a few good general remarks; and he refers his readers to Dr. Farr's Elements of Medical Jurisprudence, a small treatise, principally translated from the *Elementa medicinae Forensis Johannis Faselii*, and now out of print. Besides these, none of which can be termed a complete system of forensic medicine, I have perused a few papers in different periodical publications, and most probably there are others that have

escaped my observation; but no original treatise on the subject has yet appeared in this country. The paucity of English works is rendered more extraordinary, by the number of such treatises which have appeared on the continent. Dr. Young (*Med. Literature*, p. 438.) enumerates about sixty authors, none of whom has written in the English language; so that the author of the work from which the following pages are translated, seems to have laboured under a difficulty the very reverse of what we have to lament; and has been obliged to sacrifice a very considerable portion of his time, in collecting, arranging, balancing, and reconciling the voluminous and discrepant productions of his countrymen and contemporaries.

Dr. Mahon, the only systematic writer on forensic medicine that has fallen into my hands, held many important situations at Paris; we have this character of him from one of his friends, "His studies, his patients, his pupils, the duties of his several offices, his family and a few select friends, comprised the whole circle of his existence; to do good, to render himself beloved, was his care and happiness. He adopted as his own, four orphan children of his brother, to whom, and to his sister in law, he devoted the fruits of his labours and talents. Madame Mahon, his mother, when informed of his death, exclaimed,

“ my son ! my dear son ! shall I see thee no more !
 “ this is the first, the only grief I ever felt on thy
 “ account !”

Dr. Mahon's works were not published in a collected form till after his decease, but they were left prepared for the press, and several chapters had made their appearance in the *Encyclopedie Methodique*, during the life of the author ; and this essay was probably inserted in that work, under some of the following heads, *Infanticide* ; *Cordon ombilical* ; *Docimasie pulmonaire* ; *Ouverture du foetus* ; these being the titles of what I have numbered chapters I. II. III. and IV.

Should any one inquire my reasons for selecting a part only of Dr. Mahon's volumes, and especially this part, I reply that this essay is only presented to the public on trial, and in hopes that some one better qualified for the undertaking, will oblige the medical profession by a complete translation of his works *, or an original treatise on British medical jurisprudence ; I have published one part only with less scruple, because Dr. Mahon used the same mode of publication, and was led to select the essay on child-murder, by a variety of motives, principally by a sense of its necessity.

* *Medecine legale et Police medicale de P. A. O. Mahon* ; 3 tomes 8vo.

In the sixth volume of the Medical Observations and Inquiries, Dr. Hunter has inserted a paper on the uncertainty of the signs of murder in the case of bastard children. I feel myself compelled to examine this paper with some attention, because, after reposing in comparative oblivion for almost thirty years, it has recently re-appeared before the public in various forms; the sixth volume of Medical Observations and Inquiries being republished, the paper itself being also reprinted in Lancaster, for gratuitous distribution, and advertised for separate sale in London; it derives, also, from the reputation of its author a degree of importance, to which it would not otherwise be entitled. *Quin etiam obest plerumque iis, qui discere volunt, auctoritas eorum qui se docere profitentur: desinunt enim suum judicium adhibere; id habent ratum, quod ab eo, quem probant, judicatum vident.* (Cicero de Nat. Deor.)

Taking a favourable view of human nature, Dr. Hunter labours to prove, in the first place, that the crime of child murder can rarely occur; but this eminent man moved only in the highest circles of society, he breathed the air of a court never contaminated by vice or impurity, and his delineation of the female character proves that he had only the virtuous in contemplation. It may be admitted that the greater part of the female sex, in every land, are ornaments to society; but these,

whether they shed lustre on a throne, or give felicity to a cottage, are virtuous women, and the following pages have no reference to them.

Proportioned to the value of woman's chastity and virtue, is the mischief that results from her vice and profligacy. "The criminal commerce of the sexes," says the pious and philosophic Paley, "corrupts and depraves the mind and moral character more than any single species of vice whatsoever. That ready perception of guilt, that prompt and decisive resolution against it, which constitutes a virtuous character, is seldom found in persons addicted to these indulgences. They prepare an easy admission for every sin that seeks it; are, in low life, usually the first stage in men's progress to the most desperate villainies; and, in high life, to that lamented dissoluteness of principle, which manifests itself in a profligacy of public conduct, and a contempt of the obligations of religion and moral probity." (*Moral Philosophy*, Book III. Chap. 2.)

The murder of a new-born child is a crime so atrocious in the eye of God and man, and so repugnant to the strongest of animal instincts, that at first sight one might imagine that nothing could render a human being capable of penetrating so foul a deed.

Yet, a false sense of religion induced the idolaters of sacred history, and the heathen worshipers of Saturn, to offer their children in sacrifice.

Motives of policy influenced Lycurgus to destroy all the weakly and deformed children of the Spartans.

“The exposition of children was the prevailing and stubborn vice of antiquity: it was sometimes prescribed, often permitted, almost always practised with impunity, by the nations who never entertained the Roman ideas of paternal power; and the dramatic poets, who appeal to the human heart, represent with indifference a popular custom, which was palliated by the motives of oconomy and compassion. If the father could subdue his own feelings, he might escape, though not the censure, at least the chastisement of the laws; and the Roman Empire was stained with the blood of infants, till such murders were included, by Valentinian and his colleagues, in the letter and spirit of the Cornelian law. The lessons of jurisprudence and christianity had been insufficient to eradicate this inhuman practice, till their gentle influence was fortified by the terrors of a capital punishment.” (*Gibbon's Decline and Fall of the Roman Empire*, Chap. XLIV.)

A jealous dread of the Israelites compelled the tyrannical Pharaoh and Herod to decree the death of the children of the Jews.

The fear of famine causes the Chinese to put away about twenty thousand children annually. (*Barrow's China*, p. 169.)

In Otaheite there is a society consisting of dissolute wretches, denominated *Arrecoys*, who destroy their children as soon as born; should any man be found to co-operate with a woman in saving the life of a child, they are both excluded for ever from the society; the woman, from that time, is distinguished by the term *bearer of children*, which, in that part of the world, is considered a term of reproach. The murders, however, are committed in privacy, the perpetrators would be punished if detected. (*See Art. Otaheite in the Encyclo. Brit.*)

This is surely proof enough, that child murder has occurred in times of old, and does still occur in distant regions, amongst people strangers to true religion, or influenced by evil passions. It only remains to be proved that in this country, where the christian religion is established, where the belief in a future state of reward and punishment is professed, where the finest feelings of the human heart are supposed to be cherished, any person can be found, so forgetful of the commands of God and laws of man, so deaf to the voice of nature, so callous in feeling, so abandoned in principle, as to attempt the life of an inoffensive and helpless human being.

We are told every day of a something called *Honour*, more valuable than life, more valuable it seems than eternal life, whose laws are more binding on legislators than the laws of the land.

“Profaneness, neglect of public worship or pri-
 “vate devotion, cruelty to servants, rigorous treat-
 “ment of tenants or other dependents, want of
 “charity to the poor, injuries done to tradesmen
 “by insolvency or delay of payment, with num-
 “berless examples of the same kind, are accounted
 “no breaches of honour.
 “The law of honour is favourable to the li-
 “centious indulgence of the natural passions;
 “it allows of fornication, adultery, drunkenness,
 “prodigality, duelling, and of revenge in the
 “extreme; and lays no stress upon the virtues
 “opposite to these.” (*Paley's Moral Philosophy*,
 Book I. Chap. I.)

An honourable man, as we all know, may be
 guilty of many crimes, and may yet have so much
 character to lose, that he shall deem death itself
 a less evil than the imputation of a lie; rather
 than submit to such a blot upon his honour, he
 will madly take the chance of murdering his ad-
 versary, or of being murdered himself.

A woman, deluded and forsaken by such a man,
 in danger of incurring the disgraceful appellation
 of mother of children, and, consequently, losing
 her station in the *Arreoy* of honourable society,
 probably reasons in a similar manner, under similar
 circumstances, in England and Otaheite. Honour,
 she is taught to believe, is more valuable than
 life; but her own life is dearer than the life of her

child, and the infant must therefore die; punishment, indeed, awaits her, if convicted, but the impunity of others affords her encouragement; from human justice she fears little, and of divine vengeance she thinks less; her reputation is at stake, and must be defended at all hazards. These are the dire consequences of that heathen principle honour, which rather than permit the confession of a venial offence, demands the sacrifice of life. "I have generally observed," says Dr. Hunter, "that in proportion as women more sincerely repent of such ruinous indiscretions, it is more difficult to prevail upon them to confess it, and it is *natural*." The Spartan boy could not bear to confess he had stolen a fox, he *naturally* preferred that the fox should prey on his bowels and publish the theft to the world, such is the *natural* reasoning of the suicide and duellist, such that of deluded woman.

In the concluding pages of Dr. Hunter's paper, there is some tendency towards its ostensible object; *the signs of murder*, indeed, are scarcely noticed, but we find some judicious remarks on the rashness of supposing that a child has been murdered, when we have only proof of its having been born alive. This was the conclusion drawn by our law, at the time when Dr. Hunter's paper was written, but, that law being now repealed, it is no longer necessary to declaim against it. I do not

know upon what just principle we can now punish a woman for concealing the birth of her child, since such concealment cannot be deemed a crime, and they who are so punished, must be previously acquitted of the only offence laid to their charge *.

* "There are two cases in which women are charged with the murder of their bastard children, and from the particular mention made in the order of commitment, of the circumstance of the birth being concealed, it seems as if it had been considered as a substantive crime of itself, it is proper therefore to explain the law: by an Act of Parliament, passed in the reign of James, the concealment of the birth of the child in an indictment for its murder, was made conclusive evidence against its mother, unless she could rebut the inference by some direct evidence; but, a subsequent Act of Parliament has repealed this part of that Act, but left it in the power of the Judge, in cases where the Jury acquitted of the murder, but found that the person accused had concealed the birth, to inflict a punishment more or less severe, according to the case, and the concealment of the birth is still a circumstance to be considered, in connexion with the other parts of the case, but it by no means forms a conclusive proof of guilt, and you will not find a true bill, unless from other circumstances, you find probable grounds of guilt; nor can you find a bill for concealing the birth only, in no case, can this of itself form the subject of an indictment, or of a criminal prosecution. I have been induced to make these observations, from the stress which seems to be laid in the order of committal, on the concealment of the birth, as if it was an offence of itself, which might form the ground of a criminal charge."

Sir Simon Le Blanc's Charge to the Grand Jury of the County of York.

(York Herald, March 13, 1813.)

But, when pregnancy is concealed, when no preparations are made for affording the succour necessary to the infant, when the delivery is solitary, and the child dies in consequence of its mother's neglect, or want of foresight, her crime amounts to little less than murder, and ought to be punished as an aggravated act of manslaughter.

Dr. Hunter's remarks on the uncertainty of any opinions, founded on the sinking or floating of *putrid* lungs, may be admitted, until we shall be furnished with some means of distinguishing between the gas generated by putrefaction, and that inhaled from the atmosphere. Previous to respiration the specific gravity of the lungs is to that of water, as 22 to 21, (*Monro, Jun.*) and, since "the English courts do not admit this experiment as evidence," (*Parr*) every friend of justice and humanity will duly appreciate the test proposed by M: Ploucquet, (see § CXIX &c.) The one may impute guilt in consequence of a minute change in specific gravity, the other requires an addition capable of *doubling* the absolute weight.

"That the child may breathe before the delivery is complete, and die before it is fully born, is a fancy within the verge of possibility only;" (*Parr.*) I have considered this *fancy* at some length in a note on § XLIX &c. Those who regard these minutiae as too trifling, may find the following case in Blackstone's Commentaries, "the

“father and son were both hanged in one cart,
 “but the son was supposed to have survived the
 “father, by appearing to struggle longest; where-
 “by he became seized of an estate in fee by survi-
 “vorship, in consequence of which seisin his wi-
 “dow had a verdict for her dower.” (Book II.
 Chap. VIII.)

Mr. Scott, too, in his notes on Rokeby, re-
 lates a cruel case of child murder. In that in-
 stance, had the integrity of the judge equalled the
 sagacity of the midwife, the criminal would have
 been convicted by means of a few stitches in the
 curtain of a bed.

In conclusion, I cannot help repeating my firm
 conviction, that the lives of many children are an-
 nually sacrificed to public opinion, which visits
 on the weak, the crimes of the wicked.

Dat veniam corvis, vexat censura columbas. (Juv.)

* * * * *

“Every woe a tear can claim,

“Except an erring sister’s shame.” (Ld. Byron.)

Yet surely circumstances can rarely occur, to
 deprive an unfortunate penitent of every refuge
 in the hour of danger, nor is it credible, that a
 God of mercy has so constituted the human being,
 that the mother’s cares are insufficient, even though
 unassisted, to preserve the feeble life of her infant.

In the words, therefore, of honest Heister,
 “I intreat all potentates, every form of govern-

“ment, spiritual and temporal, and all proficient
 “in physic, to take this affair into serious consi-
 “deration, and, as much as in them lies, to prevent
 “this destruction of innocent babes.”

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sideration, and as members in their ties, to prevent
this destruction of innocent babes."

CHAP. I.

ON INFANTICIDE OR CHILD MURDER.

I. **THE** violent and premeditated death of an infant either born alive or at the time just previous to its birth, is termed Infanticide.

II. This term (§ I.) in its general acceptation extends to the embryo and the foetus enclosed in the womb of its mother ; consequently, whatever relates to abortion from a violent cause, relates to Infanticide, considered in this point of view ; but the extensive and complicated nature of the subject, compels me to limit the application of this term to the destruction of a child at its full time, whether previous or subsequent to its birth.

III. This crime (§ II.) differs from Homicide properly so termed, in this, that independent of the means which unnatural or wicked mothers may employ to deprive these helpless beings of life, the mere omission or negligence of necessary succour may equally prove the cause of death.

IV. The offence is the same in both instances, if it can be proved to be intentional ; however,

many circumstances may diminish its atrocity, especially in the latter case, which we are particularly to consider.

V. The lamentable influence of popular prejudice, which misleads our judgment of crimes, aggravates all those which cannot be cloaked in the garb of virtue. Infamy is reserved for the weakness of a moment, and we rigorously punish the sad consequence which the dread of this infamy produces upon minds generally weak, and only criminal in feeling too sensibly the loss of their honour. The voice of nature is not stifled in these criminal and unhappy mothers all at once, but is enfeebled by the fear of that opprobrium which awaits them; are we then to be surprized that this fear of disgrace, which so few can support should prevail over the sentiment of pity excited by an infant, incapable of feeling the loss of its life?

VI. The eye of justice is every where directed in search of crimes and criminals. We put our minds as it were to the rack, in order to dispel every cloud which might conceal them; Physicians are consulted, experiments instituted, statutes multiplied, punishments increased; nothing is omitted but the means of prevention. I would have spared myself details so offensive to every man of sensibility, so degrading to human nature, and painful to my own feelings, if attention had

been paid to the suggestions of many illustrious men. The institutions which these have proposed are by no means chimerical, the execution of them would be easy, and the effects extremely beneficial. How many schemes much less important and more expensive have been carried into effect ! But I am aware, that the public good has rarely in itself sufficient power to produce conviction, so long as it is insulated ; too many particular interests spring up, and all efforts are feeble, all strength is powerless, when merely directed to the objects of general benevolence.

VII. I proceed then, to execute my painful task, hoping that it may one day be reduced to the rank of superfluous knowledge, and forgot for want of use. It is enough for me to say, with a friend of mankind, that "*we can hardly deem it just or necessary to punish a crime, which the law has not attempted to prevent, by the best possible means.*" (Beccaria.)

VIII. Every pregnant woman concealing her situation attracts suspicion, and the laws oblige women if unmarried, in this state, to confess it. There are, however, many artifices of which the wicked avail themselves, for their own protection, and some circumstances which render them less the objects of punishment, these are,

IX. 1st. *The uncertainty of the signs of pregnancy.* Some authors maintain, that because the signs of pregnancy are uncertain, a woman might be ignorant of it, especially of the *first* pregnancy, when she can know nothing of the subject from experience.

X. I grant that the suppression of the catamenia is not so particularly a mark of pregnancy, as never to be ascribed to any other cause; the enlargement of the abdomen, especially in the region of the uterus, may depend upon an accumulation of blood, or of other fluids, in that viscus. Large hydatids may be situated in its cavity, or near the broad ligaments of the ovaries, where they are frequently found. The Mesentery may be schirrhous, there may be water in the abdomen. The motions of the child may be so feeble as to be mistaken for flatulence.

XI. However, all these possibilities will not avail the mother of a full-grown and healthy foetus. She may be so ignorant as to commit a mistake at the commencement of her pregnancy, especially if her education and mode of living have afforded her no means of learning the peculiarities of her sex, and other circumstances may contribute to confirm her ignorance, *si dormiens, vel convulsa vel temulenta comprimatur.*

XII. But a woman who yields to the importunities of her seducer, knowing that in all proba-

bility she will become a mother, who perceives the successive marks of pregnancy, that her shape is altered, and that milk escapes from her breasts, such a woman, I say, cannot under any pretext be supposed ignorant of her pregnancy, when the foetus has attained its full time and ordinary size. Extraordinary conformation of the foetus, can only afford legitimate excuse, when it is small, weak and emaciated; and the health of the mother delicate or impaired.

XIII. *2d. The rapid progress of labour.* Has labour been so rapid, that the mother had no timely notice of her delivery, nor opportunity to make the necessary provisions for preserving the life of her child?

XIV. This question is always one of the excuses for Infanticide; many observations prove, that there are women so happily formed, that the infant is expelled by the first pain of labour *. Harvey, Bartholinus, Pechlin, Schenckius, and many others, record such cases. "I have seen in

* There is not much reason to believe that many women in this country are exempted from the severe sentence passed on the sex at the fall. (Genesis III. 16). A woman was tried at Lancaster for the murder of her *first* child, and stated in her defence that she only experienced two labour pains; the translator was present at her *second* labour, which might be expected to be *less* difficult than the first; yet, it required some hours for its accomplishment.

“ a hospital” says Lafosse, “ a woman who feeling
 “ the first pains of labour, and ascribing them to a
 “ different cause, rose up for the purpose of going
 “ to the night chair, and was not convinced of her
 “ mistake, until the infant was partly born, fortu-
 “ nately assistance was obtained in time to prevent
 “ its falling on the floor.”

XV. In a first pregnancy it is difficult to suppose that the dilatation of the parts can take place with so little difficulty; we know that the first delivery is much more laborious than subsequent ones, and is generally preceded by smart pains with intervals of ease. It is not impossible, however, that by one of those exceptions, which though rare, do sometimes occur, a young woman may be delivered for the first time with as much facility, as other women who have borne many children. Nature is not uniform in her proceedings; in a healthy constitution and well-proportioned frame, the parts usually dilate with ease and promptitude.

XVI. 3d. *The impossibility of affording an infant the necessary attention.* When a female is at the point of delivery, is she to be supposed incapable of taking the precautions absolutely necessary for preserving the life of her infant?

XVII. This third doubt, of which unnatural mothers often avail themselves, to palliate their wickedness, can only demand attention under a combination of peculiar circumstances. A woman

must be solitary, and unable to procure succour, at the time when she is suddenly seized with the pains of labour; and, to add weight to this plea, she must be either uncertain of the time she is advanced in pregnancy, or from inexperience she must be ignorant of the period when labour ought to be expected, and of the dangers which attend it. These circumstances being supposed, it must still be a matter hard to be believed, that a well-disposed woman can be reduced to the necessity of forsaking the infant she has brought into the world, and leaving it to perish by hemorrhage, by cold, by external violence, or any similar cause.

XVIII. It sometimes happens, that labour is attended with excessive loss of blood, with fainting and convulsions, even previous to the birth of the child; should these symptoms continue after delivery, it is evident that the woman must sink into a state of insensibility, or it may be impossible for her to prevent her infant from falling, after it is born, or so much time may elapse, that hemorrhage or cold may prove fatal to the infant: but all these are extraordinary cases, and ought not to be admitted without sufficient proof. By examining the mother we may ascertain whether delivery has been accompanied with these symptoms, they leave behind them traces sufficiently evident, paleness, debility, oedema, swoonings, are their usual consequences; the state of the pulse, of the genital organs, the

size of the infant and placenta, the temperament of the mother, her general mode of living, and the quantity of blood which she may have lost, compared with the loss which usually attends labours, these circumstances will very often throw considerable light upon the object of our research.

XIX. If these are wanting, if it is not evident that accidents have occurred which would be sufficient to deprive the woman of consciousness, it would appear to me that she had criminally resisted the natural and powerful impulse, which directed her to succour the unfortunate being she had brought into the world.

XX. The tender emotion which nature has implanted in all mothers for the preservation of their offspring, is a species of physical necessity, inherent in their being; maternal love is delightfully portrayed, even in the most ferocious animals. Their vigilance is extreme and their exertions wonderful in protecting their young, and they are overwhelmed by despair, when these fall a prey to their enemies. Our females, who pass their lives in society, and under the protection of laws, are exempted from the cruel necessity of defending their offspring, from such attacks. The reciprocal aid afforded by the sex, supplies the place of those cares which were incumbent on each individual, in the primitive state of society. But this mutual compact does not destroy the

anxiety to be individually useful, which every woman experiences. This sentiment is equally as involuntary, and as independent, as that which unites the two sexes. In vain does custom compel a mother to entrust the soft cares of her child to hirelings, she longs to gaze upon it, to press it to her bosom, and moisten it with delightful tears, which wash away the remembrance of pain and seal the engagement she has contracted.

XXI. The debility experienced by a woman, previous to labour, is not such as to extinguish that pleasure which the hope of an infant inspires, she appears on the contrary to recruit her strength, and the instinct which binds her to the new-born being, derives new force from the pain she has endured.

XXII. I am not afraid of insisting upon the existence of an instinct, so closely allied to duty. If I should appear to over-rate this principle, let us censure our own erroneous propensity to judge by actions only, and to disbelieve those natural impulses which are not modified by prejudice and education.

XXIII. In every case of Infanticide there are generally many uncertainties to be elucidated.
1st. Was the child capable of living after birth?
2d. Was it alive or dead at the commencement of labour? *3d. Was it dead or living when born? Did*

it live any length of time after birth? 4th. What were the causes of its death? Did they occur before its birth or afterwards? 5th. Was the woman really delivered at the time supposed? 6th. What time has elapsed since the delivery took place?

XXIV. *1st. Was the child capable of living after birth?* The complete developement of the parts of an infant, and its perfect organization, are evident at the first glance. Every child which has attained the full term, without accident, or injury, or malconformation, and which was alive at the time of its birth, may be deemed capable of supporting life afterwards.

XXV. *2d. Was the child alive or dead at the commencement of labour?* According to Alberti, the appearance exhibited by a foetus which has died in the uterus, are softness and flexibility of the whole body; unevenness, or the softness of the skin; flaccidity of the abdomen; the commencement of putrefaction; yellow, livid, or discoloured spots, on the skin, with chinks or clefts; an escape of putrid sanies from various parts; absolute putrefaction, especially about the umbilicus; the umbilical cord flaccid, yellowish, livid, and flabby, the fontanelle depressed, the anus wide open, a cachectic or oedematous aspect of the whole body.

XXVI. The appearance of the umbilical cord, which Alberti mentions as proving the death of the foetus in the uterus, may nevertheless sometimes

lead us into error. The mere action of the air dries and hardens the cord, rendering it yellowish or livid, and easy to be torn away.

XXVII. It is always proper to examine the placenta and cord, as well as the infant, we can then place more reliance on the signs which I have just mentioned, (§ XXV.) and from the assemblage of these signs in a new-born infant, we may presume that it was dead, previous to delivery. We have not, however, any right to conclude, that a foetus which exhibits none of these appearances, must have been born alive.

XXVIII. Most of these marks (§ XXV.) are the consequences of putrefaction; now, it is possible, that a foetus may die in the uterus, a short time before birth, without any external violence, and there are also many instances in which the dead foetus has been retained for a long time, yet when born has presented no evident sign of putrefaction *. In these cases, the foetus floating in the liquor amnii, and enveloped in membranes, is protected from the external air, and may be considered a foreign body, defended, by its situation, from one principal cause of putrefaction. We find however in these instances that the membranes and placenta are more tender than ordinary, clotted

* See Heister, Mauriceau, Alberti, Hebenstreit.

blood is found in the umbilical vein, and the whole body of the foetus is dry and hardened.

XXIX. *3d. Was the child born alive or dead? And has it lived after its birth?* It is still essential, to ascertain the time when a child was born. For if our examination is long subsequent to the labour, and the climate, season, or place, where the child has been found, should be very warm, then this putrefaction, or the marks which denote it, may not depend upon death within the uterus, and may justly be imputed to these external causes. In this case, an infant may have been born alive, and may present every appearance of one which has died before its birth.

XXX. The extravasations of blood, sometimes discovered in children, do not always prove that they were born alive. We know that putrefaction gradually decomposes every part; it acts upon the veins which contain the blood after death, these vessels are frequently ruptured by the air which is generated, their liquid contents exude, and we sometimes find the blood of very distant parts borne insensibly along, towards an outlet through which it may escape, and form a very considerable extravasation. When we are examining dead bodies, it is not uncommon to witness considerable hemorrhages from the nose, the mouth, and other orifices, hence has arisen the ancient and absurd

attention to hemorrhage, as a sort of testimony against a murderer.

XXXI. In this uncertainty, which circumstances frequently render inevitable, we inquire, whether or not the child presents any marks from which we may conclude that it has lived? For instance, when we find marks of external violence, as blows, wounds, or bruises, an attentive examination of such injuries may enable us to discover the different accidents which have altered the appearance of a dead body. Blood is poured out from the wounds inflicted on a living body; blows and bruises produce ecchymosis, more or less extensive, and if these injuries are recent, the appearance of the fleshy parts clearly denotes that they have been inflicted upon a living child. It is also clear that the child has lived after birth, when we find proof of its having breathed; but the absence of these proofs, as will immediately appear, (§ XXXIII.) does not always imply that the child was still-born. The non-appearance of hemorrhage from the umbilical arteries when the cord is left untied, is one of the strongest proofs that the child has died before its birth.

XXXII. To these circumstances, allied to the state of the child, we may add a detail of the accidents experienced by the mother, during her pregnancy; the falls, the bruises, the violent exertions, the emergencies, the sudden alarms,

and numerous casualties of this kind, which may happen to the pregnant woman, and affect the life of her child. The child, even when near the full time, may die suddenly from these causes, or it may experience injuries which will prove fatal soon after its birth. The records of medical consultations at Leipsic, Wirtemberg, Helmstadt, &c. present a number of such cases.

XXXIII. Although the infant exhibits no mark of its having breathed, yet we are not always to conclude that it died before its birth. The ancients esteemed the respiration even of new-born infants to be essential to life. It is admitted, however, that the foetus whilst inclosed in the membranes lives without respiration, that it cannot respire until they are broken and it has been expelled from the uterus; that there are still many causes which, even after its birth, may obstruct its respiration without destroying its life. We see children born so weak that they are motionless, insensible, and unable to respire, even for many hours; fomentations and ablutions with spirits rekindle the vital spark, they exhibit signs of life, and at length recover perfect health. Such children as appear the most vigorous are not exempt from this indisposition, which does not always originate in the weakness of their frames. The placenta being too soon detached from the uterus, or the breaking of the umbilical cord may produce he-

morrhages to debilitate them. The pressure which they sustain *in transitu*, acts on their limbs, and especially on the head and breast, injuring those parts, and bringing on fainting or stupor. Zeller, Bohn, Alberti, and many others, admit the proposition which I have advanced. Bohn adds the testimony of experiment, to confirm what reasoning would lead us to expect. Young puppies, strangled at the moment they were brought forth, continued to live a considerable time, without respiring at all. The circulation of the foetus differs from that of the adult, and the difference between them disappears only in the course of time, after the lungs are dilated by the access of atmospheric air. The blood, which in the foetus passed freely through the foramen ovale and ductus arteriosus, continues to flow in the same direction after birth, until the lungs by their expansion obstruct these channels, the circulation is then carried on, and life, which is essentially connected with it, preserved.

XXXIV. The continued pulsation of the heart, and consequent circulation of the blood, is, in general, the most certain proof that the child has lived after birth. This function is, of all those which are exposed to our observation, the one most important to the animal economy. We may suspect that it has continued after the birth of the child, if, in consequence of any external injury being applied to its body, we can perceive an

ecchymosis. We know, that during life, blood may be extravasated in different parts of the body, in consequence of various injuries; such extravasations seem to depend upon the flow of blood towards the parts, and in consequence, to imply vitality. I believe, however, that they do not, without exception, afford positive proof of circulation, and have elsewhere (§ XXIX.) pointed out the marks by which the exceptions may be distinguished.

XXXV. Some authors who maintain that the infant cannot live without respiration, adduce in favour of their opinion, the case in which we find the foetus to have died by the mere twisting of the cord round the neck, assuring us, that the pressure of the cord upon the wind-pipe produces suffocation by obstructing the breath.

XXXVI. This absurd reasoning takes that for granted which is the matter of dispute. I ask, if, when the cord twists itself round the arms, the body, or the legs, the same obstruction to respiration is produced? Undoubtedly it is not, nevertheless, the foetus sometimes dies, if it remains for any length of time in this situation, especially if the cord is stretched tight; we must therefore assign some other cause, this can only be the pressure upon the umbilical cord, rendering its vessels impervious, and interrupting the circulation between the mother and the foetus; the cord itself

may be coiled in a knot, as has been sometimes observed by Mauriceau; or even the veins of the neck being compressed by the cord, the blood may be more sparingly transmitted towards the lower extremities, and become accumulated in the head, producing those consequences which result from congestion in the brain.

XXXVII. In short, it appears that the circulation between the mother and the foetus, cannot be interrupted, without producing the death of the latter, unless it has breathed, and the blood has found a new circulation.

XXXVIII. It follows, from what has been premised, that an evil-disposed woman may have destroyed the life of the child, whilst still unborn, or even after its birth, although the child has never breathed.

XXXIX. The principal criterion by which we decide, whether the infant has breathed before its death, or not, is founded upon an experiment admitted by most physicians, and familiar with every one who is at all conversant in questions of forensic medicine. A portion of the lungs of the child under examination, is thrown into water; if it sinks, the conclusion is that the infant has not breathed; if it swims, the contrary conclusion is drawn. In the foetus the lungs are dense and dark-coloured; they occupy a small portion of the chest, are drawn backwards and a little up-

wards, so that the heart and pericardium are exposed. Their spongy texture is not apparent, and in this state their specific gravity is greater than that of water. When the air has penetrated them, their cells are distended, their volume augmented, and they become specifically lighter. This experiment is decisive, but does it leave no room for doubt? Are there no accidental circumstances which may render it uncertain?

XL. Many observations have been brought against the validity of this experiment. Zeller (*de pulmonum in aquis subsidentia*), maintains that the foetus may respire whilst floating in the liquor amnii, because air is found within the amnion, he quotes histories of children which have cried within the uterus. Hippocrates, Galen, Vanderwiel, Nymman, Camerarius, Boyle, Needham, Lanzoni, &c. have professed a similar opinion, even Bohn does the same, and appeals to the authority of Boyle and Sennertus. But is the best possible authority sufficient to establish so extraordinary a fact? Few writers venture to say, with Bohn, that they themselves have heard it. Three-fourths quote hearsay and adduce witnesses. The love of the marvellous often distorts facts, it invents them and finds authority and proselytes. On the report of a fact attested by credible witnesses, we may give our assent to whatever is not contradictory in itself, but *conviction* is a much

greater degree of assent, and requires other proof. Bohn may have been deceived by the parson's wife, he may have heard some gurgling noise, and may have been led away by a want of facts to prove his opinion. This mode of reasoning and scarcity of facts, has given credit to Livy's history of a child, which cried "*Io triumphe*" in the belly of its mother. The folly has been carried so far, that we read of children that have laughed and cried in the uterus.

XLI. Heister maintains that the experiment on the specific gravity of the lungs is suspicious, because he has seen the schirrhous lungs of a consumptive patient sink in water, and a child may also have its lungs in a similar state of disease. I grant that a schirrhous or a tubercle taken from the lungs will sink in water; but are the lungs always schirrhous? Did not Heister find that other parts of this man's lungs where there was no schirrhous would float? If he never ascertained this he ought to have done it.

XLII. I will not say with Hebenstreit that the foetus has never either schirrhous or tubercle of the lungs, because I believe that every disease which attacks us after our birth, may attack us before it. I know that our parents may entail upon us all their infirmities, but, in reply to Heister, I will assert that if we take the precaution to divide the lung into many portions, we shall

find some one that will float, and this will be sufficient to establish the fact, that air has passed into the interior of the lungs. Heister adds that he has seen the lungs of a child which had cried after birth, and had lived upwards of twenty hours, sink to the bottom of water. It is to be lamented that in this instance Heister does not inform us whether he means the entire lungs, or only fragments of them. We know that there is a great difference between the immersion of the lungs quite entire, and the immersion of a part cut off from them. Some difference may arise from the quantity of water employed. No one can be ignorant that children at the time of birth are not all equally vigorous. We see some of them respiring feebly, or hardly respiring at all. It is possible, that so weak a power of inspiration may not be quite sufficient to distend the lobes of the lungs, but only some parts of them; Bohn relates instances of this kind. We may also believe, that an infant which at the instant of being born is thrown upon pavement, into a privy, &c. can have no time to make deep and successive inspirations. Hence arises the necessity of dividing the lungs into different portions, and immersing all of them in water.

XLIII. The most celebrated writers on forensic medicine assert, that putrefaction may distend the cells of the lungs so much by the disengagement

of air, as to prevent their sinking in water, hence they conclude that this experiment may still lead us into error. Heister, Alberti, and Bohn support this objection by very plausible arguments, drawn from observation and physiology.

XLIV. The result of experiment is directly contrary to these theoretical opinions. The lungs of children born in a state of complete putrefaction, always fall to the bottom of water; and no well-contrived and well-conducted observation, down to the present moment, has ever proved the contrary. I might cite some experiments performed by Faissolle and Champeau on many drowned animals; in these, putrefaction, after extending over the whole body, left the lungs in a natural state; lastly, in my anatomical researches I have always found the lungs in a natural state, after many other parts were changed. Some circumstances which need not be mentioned here, have misled those who in examining the lungs of putrid foetuses, have not carried their researches so far as to divide the lungs into portions before throwing them into water.

XLV. If the body is so far advanced towards putrefaction, that the lungs are affected, it is better to draw no conclusions from them, and leave to the magistrates the task of finding out other grounds of accusation.

XLVI. To the experiment before mentioned,

(§ XXXIX.) it is also objected that the foetus whilst jammed between the coccyx and other bones of the pelvis, might breathe after the rupture of the membranes, and die notwithstanding, from the obstacles which obstruct its passage.

XLVII. We may reply, that these cases belong to the number of difficult labours which in general require obstetric assistance, when the operator will promptly defend the accused, and explain away all difficulties; whilst the greater part of cases of Infanticide only occur after clandestine and easy deliveries. We may observe, moreover, that this supposition of an infant's having breathed before its birth, is a very bold one. There is but one clear case, in which the foetus can respire freely, before this time. This is, when after the rupture of the membranes the mouth presents itself at the os uteri, but we know that this presentation is one, which renders labour difficult, and requires the assistance of some experienced person. In every other situation, both whilst the foetus remains within the uterus, and even when the crown of the head presents at the os externum, the respiration of the foetus appears to me impossible. If its mouth bears upon the borders of the external orifice, the air cannot insinuate itself, and the contraction of the uterus added to the pressure made by the child, will leave no interstice for the admission of air, unless the

hand of an assistant be applied to enlarge the aperture.

XLVIII. After the head of the child has emerged from the vagina, it would seem very improbable that the rest of the child should not follow, and that it should die in this position, from the mere violence of labour. Every other part is less bulky. Moreover supposing it to be detained in this situation, it cannot respire by the mouth alone, a dilatation of the thorax is necessary, its sides should become more distant from each other, and the intercostal spaces should be increased. If we suppose the thorax to be compressed by the mouth of the uterus, or that of the vagina, this necessary dilatation seems to me impossible.

XLIX. I think, however, in opposition to Hebenstreit, that it is not impossible for a child to die in this situation. It may have received some considerable injury in the uterus; it may be already enfeebled when about to be expelled; the vessels of the umbilical cord may be ruptured during labour, and considerable hemorrhage may ensue. In these circumstances I conceive that having breathed for a few moments, if the breast is at liberty, the child may possibly die before being entirely expelled, and therefore the experiment of the lungs in demonstrating that it has breathed, will neither prove any thing against the mother, nor even establish the fact of the child's having lived after its birth. How can we decide in this difficulty? Undoubt-

edly, we can affirm nothing. We must use great circumspection in forming an opinion, and proceed no farther when facts no longer support us *.

L. I class this last objection with the one which supposes that the mother being alarmed, or an assistant being touched with pity, might breathe into the mouth of a new-born infant exhibiting no signs of life. Although it is not clear that the breath introduced at the mouth would easily pass

* Notwithstanding the opinion of Dr. Hunter, that "a child will very commonly breathe as soon as its mouth is born, or protruded from the mother, and in that case may lose its life before its body be born;" (Med. Obs. and Inq. VI. 287.) notwithstanding the admission of Dr. Mahon that it is "not impossible for a child to die in this situation." I think, that no woman charged with child-murder, will have the hardihood to plead that her infant was so nearly born alive, as to have been able to respire; in such a case, the proof of its vitality would be brought so close to the time of its complete expulsion, and its *respiration* must so effectually *prevent* the possibility of its death *in transitu*, that no reasonable man can hesitate to conclude that under such circumstances the child would in all human probability be born alive. It is not asserted either by Dr. Hunter, or Dr. Mahon, that any child did die in this situation, and the authority of Hebenstreit is admitted by the latter, as contrary to the possibility of this occurrence. Mr. Burns, a very acute and philosophical writer, says, (Principles of Midwifery, p 330.) "some children die owing to the head being born covered with the membranes some time before the body. This is the consequence of inattention, for, if the membranes be removed from the face, there is no risk of the child."

Again

down the wind-pipe of a dead child, on account of the mucous matter, which abounds in the

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Again he says, (p. 210.) "we attend to the head, examining that
 " the membranes do not cover the mouth, but that the child be
 " *enabled to breathe*, should the circulation in the cord be obstruct-
 " ed. *There is no danger in delay, &c.*" It appears to me
 a very fair conclusion, that if the life of the child is in no
 danger, so long as it has power to breathe, if necessary, still less
 can there be danger of its death, when its respiration has
 actually taken place. The case recorded in the republication of
 Dr Hunter's paper, (p. 19.) seems to bear strongly against his
 opinion, although apparently adduced in support of it. "*The*
 "*head of the child was protruded, and the expulsion of the body, for*
 "*a considerable time prevented, in consequence of a large excrescence*
 "*on the left breast of the child: during this interval, which was*
 "*about half an hour, the child frequently cried so loud, as to be heard*
 "*by the attendants.*" Now, I do not wish for a case more de-
 cidedly contrary to the assumption, that a child so situated, may
 probably die before the body be born: we find that even
 this child with a preternatural excrescence on its breast, existed
 alive in this situation, for "*about half an hour,*" and is not said
 to have died either before its complete expulsion, or soon after-
 wards; but, supposing it to have been still-born at last, no one
 could be surprised at the death of such a child, whether before
 birth or afterwards; it is enough for me, that it lived in this
 jeopardy, for "*about half an hour.*" The note, above alluded to,
 concludes thus, "*The act of crying during birth is no uncommon*
 "*event: it frequently occurs in the practice of many professional men.*
 "*This being an established and well-known fact, the lungs must in*
 "*such cases be inflated before complete delivery takes place.*" If
 this note be intended to strengthen or elucidate the enunciation
 of

throat, yet I know that by breathing rather strongly, or by using curved tubes the air may be introduced. Besides, the mucus opposing its admission is not always accumulated in equal quantity, and the throat is wider in some children than in others.

LI. This uncertainty leads me to admire the extreme confidence of many practitioners, who do not hesitate to form the most decided opinion, at first sight. Past ages afford us a thousand examples of this kind, and I lament to say that we have seen too great a number in our own time.

LII. The altered colour of the lungs affords no criterion on which we can rely, although, in general, the lungs of those foetuses which have not respired are dark coloured, whilst after respiration they become brighter. There are many accidental causes which may produce these varieties; the efforts of labour, and the consequent pressure sustained by the child, may cause a great determination of blood to its lungs, and produce a very deep colour even after the air has penetrated them.

LIII. The situation of the lungs within the

of Dr. Hunter's proposition, my readers can estimate the value of this improvement, by perusing the passage commented upon (Med. Obs. and Inq. VI. 287.) If, however, by the term "during birth" is meant a time anterior to the protrusion of the head, then I have only to remark that no such case, nor any credible history of one has occurred to me. *Translator.*

chest, (§ XXXIX.) appears to furnish a satisfactory proof that the infant has, or has not breathed. The knowledge of the manner in which they are placed in an infant, which has not breathed, is therefore necessary, in order to ascertain what changes they have experienced. But, although we could prove that the foetus has not breathed, we are not thence to conclude that it was still-born; (§ XXXI. & XXXIII.) these two consequences do not depend on each other.

LIV. The escape of meconium from new-born children, is no proof of their having lived after birth. The vital power does indeed cause these matters to descend as far as the anus, but mere pressure on the belly may expel them from dead bodies, and the commencement of putrefaction may produce an effect similar to that of the vital action of the intestines. If we move any animal after putrefaction has commenced, we frequently perceive that air escapes from different orifices, and communicates its effluvia to a considerable distance; this air does not always escape by itself, it carries other matters along with it, and is often observed to fly off with a sort of explosion.

LV. The changed position of the abdominal viscera, is one of the most evident signs that the foetus has lived after birth, and has respired. The depression of the liver, of the stomach, the projection or distension of the intestines, the falling down

of the ribs, the flattening of the diaphragm, are necessary consequences of the expanded state of the lungs, after they are penetrated by the air.

LVI. 4th. *What are the causes of the child's death?* When we have ascertained that a child was born alive, and has lived after its birth, we have next to inquire what are the causes of its death, whether they are owing to accident, or to the mother's malice or inattention? these are precisely the same as the causes of death in adults; except that there is one which is peculiar to the new-born child, viz. hemorrhage from the umbilical cord when that is left untied. The premature obliteration of the foramen ovale by its valve, is a very singular cause of death, which was remarked by Laborie, and in my opinion furnishes an explanation of many deaths, without apparent cause, and I should suppose this to be a more common cause of death than any other which has been assigned.

LVII. Amongst the causes of death common to infants and adults, are the various wounds of the head and other parts. These injuries may be sensible to the sight and touch. The consequences resulting from them are different, as are also the modes of treatment, infants cannot be confined to the routine prescribed by art, and they are rendered unfit to undergo the operation of trepan by the mobility of the bones of the skull.

LVIII. Infants readily bear violent compression

of the brain, which would be fatal to the adult. In difficult labours the child's head is so much altered in its figure, that bandages are necessary after delivery to restore it to its former shape. It is necessary, as it were, to knead the head of newborn children, not as Rousseau says, in order to give it a figure suitable to our own fancy, but merely to repair the injury produced by labour *. The extraordinary shape of the head amongst certain nations, sufficiently proves that considerable pressure may be applied to the skull of an infant, with very little inconvenience.

LIX. When we perceive many marks of violence on a child, as, for example, on the head, the breast, the belly, and that the umbilical cord is not tied, it is necessary to ascertain, in the first place, which are the mortal injuries, (it being understood that the infant has breathed); we examine the outside of these wounds, to see whether they are accompanied by ecchymoses; we afterwards inspect the cavities of the body, to which these correspond, in order to discover the extravasation; if no extravasation is found, and the veins

* Many authors are of opinion that this *kneading* of children's heads, so far from being proper, is generally injurious. During labour the compression takes place by insensible degrees. If the child be left to itself, the head gradually resumes its original form, but by using pressure we effect the change of figure too rapidly, and may produce paralysis, or even death itself. *Fautrel.*

also are empty of blood, it is evident that the child has died of hemorrhage from the cord. Blood being extravasated within the head, the breast, the belly, or even in the bronchia, (when there is mark of violence upon the throat), proves very clearly that this violence has been used against a living child, and from the extent of the extravasation, the seat of the wound, the parts which are injured, &c. we judge whether the wound was mortal or not.

LX. The examination of these wounds requires the utmost circumspection, in order to discover their extent, situation, figure, the ecchymoses, fractures, extravasations, &c. lest we confound the accidents which occur during dissection, with those which result from blows.

LXI. Wretches have been known, who were artful enough to murder the child, by means of a needle plunged into the brain at the temples, the fontanell, or the neck. Guy Patin says, that a midwife was hanged at Paris, who in this manner had destroyed many children, whilst they were still in the uterus, and whilst the head was presenting at the *os externum*. Alberti and Brendel relate similar examples. On shaving the head we find in these cases, a slight ecchymosis around the wound.

LXII. The extravasations which facilitate our discovery of the causes of death in children, only take place after the rupture of some vessels; but

the cruelty of the mother does not always leave such distinct traces behind it. This is the case with all causes of death depending on injury of the nerves.

LXIII. Children have been killed by mere bending the neck, either forcibly twisting it round, or pulling it backwards. The spinal marrow is commonly either bruised or torn by the vertebræ, the ligaments of which are sometimes broken in these dislocations, and we know that instant death follows injuries of this organ. In these cases we find a little blood effused amongst the muscles of the neck, or the vertebral canal, and there is a fracture either of the first or second vertebra, or both.

LXIV. All contusions or ecchymoses are carefully to be distinguished from the discoloured spots, which appear on the surface of the body, at the commencement of putrefaction.

LXV. The suffocation of new-born children may proceed from many causes. That from strangulation presents the same marks as in adults, we perceive livid marks, ecchymosis on the neck or throat; the face is livid or black; the tongue swollen and projecting; the vessels of the pia mater and the jugular veins are gorged with blood, the lungs livid and spotted, the mouth frothy, &c. sometimes we even find on the neck, marks of a cord. These are sufficient proofs that strangulation has taken place, but we are to consider whe-

ther they do not arise from a suffocation which has accidentally taken place in the uterus. Thus, for instance, it is possible, that the umbilical cord being coiled round the neck of the foetus, may produce the circular mark and other appearances of strangulation, but in this instance, the foetus being born dead cannot have respired, it has died not from strangulation, properly speaking, but from apoplexy, or rather from a congestion in the blood-vessels within the head. In this case, the signs of respiration in the infant, are the means of deciding whether the death is accidental, or the result of external violence, committed by the mother or other persons. I would not, however, place too much reliance upon this mode of ascertaining the sort of violence, that has been employed. For, if the strangulation should happen to be produced by the umbilical cord, during the pains of labour, whilst the foetus is assuming various positions in the uterus, it seems probable to me, that the impression of the cord may be such as to produce a fatal apoplexy, attended with all the marks of congestion, which I have enumerated, and that the foetus after its birth, may still have been able to breathe before its death.

LXVI. The effects of apoplexy, or of sanguineous congestion, are not such as must of necessity interrupt respiration, which is observed to be regular, deep and free, whilst the actions of the

heart and arteries undergo the most important alterations. The pulse becomes almost imperceptible, towards the fatal close of an apoplexy, whilst the respiration continues sensible, and is scarcely retarded until it is entirely suspended by death.

LXVII. If the neck presents no marks of violence, it is very difficult to refer the other signs of suffocation to a true cause; they may proceed from intense cold, or, especially if the child be of considerable size, from difficult labour. We may sometimes find different substances in the child's mouth, viz. chaff, feathers, sand, even excrementitious matters, or bits of cloth, when it has been born alive, and afterwards suffocated between matrasses, or in chaff beds, or amongst hay, or thrown into a privy, &c. According to Alberti, we may know from the livid appearance of the lungs, if a woman has suffocated her child, by the fumes of burning sulphur.

LXVIII. Those which imply a criminal act on the part of the mother, or assistants, are not the only causes of death; the child's life may also be lost by the omission of such attentions, as its weakness requires. If it continues laying on its belly with its mouth open, closely applied to any substance, the breath may be obstructed, and the dilatation of the chest rendered laborious; now, the child not having the power of turning itself round, may be suffocated in this posture. If it

be laid on its back, the viscid matter which fills its nose and mouth, may pass into the trachea, and either obstruct it altogether, or produce that kind of convulsive cough which, unless speedily relieved, is invariably fatal. Nurses take care to place children on one side, and as this practice prevails universally, an evil-disposed woman may profit by the knowledge of this fact, so as to get rid of her child, and elude the pursuit of justice.

LXIX. The early separating of the foetus from the placenta, is of much consequence, because of the feeble life which the child enjoys, after it is detached from the uterus; the blood which flows from the placenta after the birth of the child, is almost coagulated, cold and insalutary, and those midwives are reprehensible, who, when they perceive children to be weak, endeavour to revive them by pressing blood along the cord. It is easy to conceive that a spongy mass like the placenta, when exposed to the action of the air, without vitality or heat, must afford fluids very pernicious to the infant.

LXX. The common practice of washing new-born children, and of wrapping them in warm clothing, is founded on very proper views. The new-born infant is covered with moist and glutinous matter, it has quitted a warm situation, and the new order of functions which it has to discharge, require certain precautions. It is neces-

sary that its pores should be open, in order that the perspirable matter may readily pass off. It is probable that too sudden a change from warmth to cold, would injure its delicate system. Must we then charge as a crime, the omission of these precautions, because the attention to them is an established custom? I do not think that this is reasonable, unless we perceive that the result has been fatal to the child, and that there was an evident evil intention on the part of the mother, or of other persons. If the cold be severe, we are well aware that the child may suffer from its influence; but the examples of other nations, whose treatment of infants varies from ours, teaches us that we ought not to establish any general rule, which rests upon no other authority than common practice.

LXXI. 5th. *Was the woman we accuse, actually delivered at the time supposed?* When tracing out the murder of an infant, we are frequently obliged to inquire whether a woman has actually been delivered or not? It is essentially necessary to make our examination as soon as possible, as, in a few days, all the parts resume their natural state, and this change is the more rapid in proportion as the woman is more vigorous and better formed. And we know that most of those women who meditate the destruction of their children, encourage them-

selves by the hope of secrecy, and a reliance on a good constitution and rapid recovery.

LXXII. 6th. *At what time has delivery taken place?*
When there is only presumptive evidence against the perpetrators of Infanticide, it is of great consequence to establish a connexion between the child's birth, and the signs of delivery, in the woman who is suspected; the fresh appearance of the child, the firmness of its flesh, its rosy colour, and the absence of putrefaction, indicate a very recent birth, and, in consequence, we ought to find in the mother clear proofs of a delivery, equally recent. If this coincidence is not evident, and we can only discover equivocal indications, our presumption is evidently doubtful. This caution, which in my opinion is of great importance, has been frequently neglected, especially in cases where the reporters being prejudiced by public rumours, and judging as it were by anticipation, were unable to free their minds from that delusion which mistakes probability for proof.

CHAP. II.

ON THE UMBILICAL CORD.

LXXIII. IN most cases of Infanticide, related by writers on forensic medicine, as well as in those which occur in daily practice, nothing is more common than to find the tying of the umbilical cord, either performed with a criminal negligence, or even omitted altogether. I think it necessary, therefore, to enter into some detail, on the nature of this species of evidence, in proof of a crime which brings upon the guilty the last severity of the law; so that we may clear away all obscurity and doubt, and be enabled to estimate its just value in every possible case.

LXXIV. The foetus has a communication with the mother, by the medium of a fleshy cord, which is united to the placenta at one extremity, and to the navel of the child at the other. This cord contains three vessels, one vein and two arteries; the vein brings from the placenta the blood which is furnished by the mother, this blood is received into the sinus of the vena portæ of the foetus, which thus receives its proper nourishment; the

two arteries, which most commonly pass off from the iliac arteries of the foetus, carry the superabundant blood to the placenta, and from the placenta it passes to the mother.

LXXV. From the moment when the child is born *, the umbilical cord becomes useless, and it is necessary to divide it; but by so doing we open three large vessels, from the mouths of which the foetus would lose much blood, and would speedily die of hemorrhage, as is proved by many examples, unless we should tie a proper ligature round that part of the cord, which is still attached to the child; hence this practice has been established in all ages and amongst all nations, and physicians have generally regarded as established, the maxim that the want of a ligature on the umbilical cord, would cause, in the foetus, an hemorrhage necessarily and absolutely fatal.

LXXVI. This, even to the present day, was regarded as a certain and irrefragable assertion, and no one thought of limiting its application; thus, whensoever it was asked if a child had died a violent death, (*a causâ violentâ*) if its umbilical cord was not found to be tied, not only the physicians, in their evidence before courts of justice, but even the medical colleges, in their medico-legal decisions, pronounced that the child had died of

* Rather from the time it begins to breathe. *Translator.*

hemorrhage from the umbilical cord, whether the cord had been neglected by design, or the omission had happened through ignorance, or inattention. I shall content myself with quoting the twenty-first consultation recorded by Valentini, in his pandectes medico-legales. Part 2. Sect. 7. A child which was alive at the time of its birth, had fallen from a height upon the floor; it was afterwards placed upon a bed, and died before a ligature was made upon the cord. On opening the body the occipital bone was found depressed, and there was an extravasation of blood within the skull. However, the faculty of medicine at Leipsic declared, in their report to the magistrates, that they regarded the omission of the ligature, as the true cause of death. *Utique præsentissimam mortem et lethaliatem absolutam caussatur non facta vasorum umbilicalium deligatio dum hac ratione infans sanguine et spiritibus vitalibus privatur, prout experientia suffragiis suis hoc comprobat. Ideo etiam medici sine exceptione non factam umbilicalium vasorum deligationem pro absolutâ et simpliciter lethali reputant.*

LXXVII. Schultzius *, Professor in the University of Halle, was the first who doubted the necessity of a ligature, on the umbilical cord of

* In a dissertation published in 1733, *an umbilici deligatio in nuper natis absolute necessaria est?*

new-born infants. He labours to prove that the hemorrhage from it cannot be so excessive as to prove fatal, and therefore that the omission of the ligature ought not to be regarded an absolute cause of death. He adduces one argument in favour of his opinion, from the analogous structure of the umbilical vessels in man, and in other animals which do not require any ligature. He founds another argument on the supposition, that the umbilical vessels whether cut or torn, possess a property of contracting, and thus presenting a sufficient obstacle to the loss of blood. Lastly, Schultzius relates some cases which favor his conclusions. The first is a case of twins, the elder after its umbilical cord was broken, remained without any ligature for a long time, until the midwife had extracted the younger child and the placenta. Having accomplished this, she perceived that the first born had lost no blood, and was quite lively; in a second case, he relates that an infant, which had been left without any ligature, lost very little blood, but died of the cold, which it endured for a whole night. On opening the body there was no appearance to indicate that much blood had been lost.

LXXVIII. In the year 1751, Kaltsmidt maintained the same proposition at Jena. The spontaneous contraction of the arteries which, in many surgical operations, is quite sufficient for the

prevention of hemorrhage, and the similarity of structure in the umbilical cord of large animals, and that of the human species, led him also to conclude that a fatal hemorrhage would not take place from the umbilical vessels of a new-born child, (*quod et in infante lethalis hæmorrhagia ex vasis umbilicalibus oriri non debeat*). He even ventured to try the experiment upon two children, one of them hardly lost six drops of blood, the other only twenty drops.

LXXIX. Alberti * relates an instance in which no hemorrhage occurred, though the cord was broken off near the umbilicus, yet the child lost much blood by the mouth. This infant only lived six hours; on examination, ecchymoses were observed on the head, blood was extravasated between the scalp and the skull, and between the brain and its meninges. The operator declared in his report, that the rupture of the umbilical cord had been the cause of death, although it was evident, even from the report itself, that no hemorrhage had taken place from the vessels which constitute the cord. The medical faculty at Halle, however, assigned the death of the child to other causes. Alberti also testifies that there are numerous examples of the ligature on the umbilical cord being neg-

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* *Syst. Jurisp. Med.* T. 3. c. 13. p. 138.

lected, without any injury resulting from it. *Non desunt observationes funiculi ombilicalis non deligati, unde vitæ infantis nullum contigit damnum.*

LXXX. Since it appears that some infants have experienced no hemorrhage, although the ligature was omitted, and in others the hemorrhage was not fatal, we are not authorized to assert that this omission must universally be deemed the cause of death.

LXXXI. But a majority of cases having proved that the omitting of this ligature, or negligence in tying it, is more frequently fatal, it becomes a duty, in all cases where this circumstance occurs, to ascertain, if possible, by an examination of the body, and by all other means, whether the death has really been the consequence of hemorrhage or not. This effect cannot be supposed to have been produced, unless the loss of blood from the umbilical vessels has been so great as to leave the heart and blood vessels nearly emptied. Practical anatomy teaches us, that even in the bodies of those who *have not* died from hemorrhage, the arteries are found empty, whilst the veins, the heart and its auricles are distended with blood; hence in those who *have died* from hemorrhage, not only the arteries, but even the veins, the heart and its auricles ought to be either almost or altogether empty, and we learn from practical anatomy, that this is the case. Heister (in his *compendium ana-*

tomicum) relates the dissection of a woman who, being delivered of a healthy child, died in a quarter of an hour, from excessive uterine hemorrhage, before she could be delivered of a second child; he found the heart and blood vessels of the mother, as well as those of the second child, entirely empty.

LXXXII. From what has been premised, we may draw the two following conclusions. 1st. If, on opening the body, we find that the heart and its auricles, the principal veins, especially the *venæ cavæ*, as well as the *vena portæ*, are full of blood, then the foetus has not died of hemorrhage; and the want of a ligature on the umbilical cord, is not to be deemed the cause of its death. 2d. If, on the contrary, these cavities or vessels are found either empty or nearly so, the loss of blood arising from the want of a ligature, is undoubtedly the cause of the child's death, unless it should appear that the infant has received some wound, from which the loss of blood might be so great, as to prove fatal.

LXXXIII. Hence, a practitioner when examining the body of a child, which is supposed to have died from external violence, is obliged to bestow a scrupulous attention, not only upon the external parts of the body, but also upon the contents of the three principal cavities. He will commence with the head, brain and neck, proceeding next to the breast, he will elevate the sternum,

and, before removing the lungs to examine them more particularly, will also open the abdomen. Then, the heart and large blood vessels being completely exposed, he can ascertain, by inspecting and handling them, whether they are full of blood or not. Proceeding in this manner, he will be less embarrassed, and more precise in the results of his examination, than if, before opening the abdomen, he should extract the lungs and heart from the thorax, which could not be effected without injuring the vessels within the cavity of the belly, and losing the blood contained in the heart and venæ cavæ.

LXXXIV. The fulness, or emptiness of these blood vessels being evident to the operator and his assistants, the appearance must be noted down, along with the conclusions which may be drawn from it.

LXXXV. Some authors advise us to examine the clothes in which the infant is wrapped. But who can be certain that the marks upon them have proceeded from the infant, and not from the mother? The same may be observed of the place, where the child is found. Moreover, Alberti judiciously remarks, that an artful woman may wipe a child which has died of hemorrhage, and afterwards wrap it in clean linen; or may wash the floor which has been stained with blood; hence this circumstance is very uncertain.

LXXXVI. In the large work of Alberti, we find a mass of reports in favour of the method which we propose, for estimating the degree of confidence merited by that species of proof of Infanticide which is drawn from the omission of the ligature upon the umbilical cord. The authors of these reports attest that the whole vascular system was emptied of blood; that the bowels, which are generally red, were pale and colourless; that the dissection of these young subjects was accomplished without the effusion of any blood; they discovered, also, as well by the confession of the accused, as the depositions of witnesses, that the new-born infants had really sustained a considerable hemorrhage, from the umbilical vessels. This is the opinion of Alberti himself, and also of Teichmeyer, of Bohn, and the faculty of medicine at Helmstadt.

LXXXVII. This is the only method which we can employ with certainty. In fact, it sometimes happens that the ligature on the cord is not necessary, and that bandages or clothes, by effecting a degree of pressure, or that even the external cold, or the weakness of the child itself, or, lastly, the particular conformation of the umbilical vessels in the subject which we examine, have prevented the occurrence of hemorrhage. Moreover, the child may have died from an internal cause; even if there are signs which indicate that it has lived after

birth, and if we find that the ligature has not been applied; yet it may possibly happen that, the head having been expelled from the uterus, the child may have breathed before its complete birth, and the delivery being retarded, it may have sustained such injury as would cause its death in a short time afterwards, without any criminality on the part of the mother. The opening of the child's body proving that the infant has breathed, and the fulness of its vessels disproving its having died of hemorrhage, the want of a ligature on the umbilical cord, is not to be deemed the cause of its death; and, if no other marks of Infanticide are visible, all suspicions arising from concealment of pregnancy, and clandestine delivery, are completely removed.

LXXXVIII. By these means, the science of forensic medicine will rescue from unmerited punishment, those innocent women whom a hasty decision would otherwise condemn; and, on the other hand, it will detect the nefarious arts of wicked mothers, who may attempt to conceal from inattentive observers the cause of death in the unfortunate victims of their ferocity, by tying the cord after the child has died of hemorrhage.

LXXXIX. To return: in every dissection of a new-born child, a scrupulous examination of the heart, of its cavities and of the principal veins which border upon it, as well as of the vena portæ,

is absolutely necessary, and furnishes the only solid foundation, upon which a medico-legal decision can rest.

XC. It has already been stated, that all the best writers on forensic medicine, insist upon the necessity of such an examination, the following passage corroborates this assertion. "By dissection," says "Bohn, we must examine whether the large vessels are full of blood or not; if they are, it is probable that the foetus has not died through want of a ligature, upon the umbilical cord; if they are found empty, we draw the opposite conclusion." Boehmer says, "we are to suppose that hemorrhage from the umbilical vessels has occurred, if the large veins and the cavities of the heart are empty." The following words of Alberti, comprise the whole of what has been advanced on this subject: "*Quam circonstantiam medici et chirurgi sectionem administrantes accuratissimo studio annotare et denunciare debent, quoniam hujus observationis et relationis defectus casus præsentes valdè confundere, et quoad catheticam decisionem impedire, potest. Admonendi itaque sunt medici, ut datâ occasione hanc circumstantiam probè observent, referantque præcipuè quantum sanguinis in corde, vasis pulmonalibus, venâ cavâ, hepate, et capacioribus venis, invenerint.*" This author informs us, that a report was censured by the medical faculty of Halle, because the death of

a new-born child was attributed to the want of a ligature, without specifying that there were any traces of hemorrhage, or that the large vessels were emptied of blood ; and another report was treated in the same manner, by the same faculty, because a similar conclusion was drawn, although much blood was found in the left ventricle of the heart. The learned medical societies require that we should examine the large vessels, in every part of the foetus, in order to prove that it has died of hemorrhage, from the umbilical cord ; and they deem the proof incomplete, if, on examination, a few only of the reservoirs of blood are found empty ; because it is a well-known fact, that life can be supported, if only a small quantity of blood remains in circulation.

XCI. The most complete proof of hemorrhage from the cord, is not a proof that the child has been murdered, and the physician must examine and estimate all other circumstances, which may discover the guilt or innocence of the party accused.

XCII. Thus it happens sometimes, as in the case which has been quoted from Heister, (LXXXI.) that the entire or partial separation of the placenta, whilst the infant is still in the uterus, may occasion so considerable a loss of blood, that the child must inevitably die, either before, or during, or immediately after delivery, the heart and all the

large vessels being exhausted of blood. In this case, it is evidently beyond the power of the mother to stop the hemorrhage, and, consequently, she cannot be accused of premeditated murder, nor even of culpable negligence or ignorance.

XCIH. If the umbilical cord should encircle the limbs of the child, and the infant should be seized with convulsions, the cord may be broken and hemorrhage ensue.

XCIV. In these two cases, (§ XCII. & XCIH.) the mother will almost inevitably experience consequences similar to those incurred by the foetus *, and this consideration may contribute to attest her innocence.

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* This proposition must be taken with much limitation, Mr. Burns, having proved that no direct communication takes place between the foetal and maternal vessels, maintains, that "if a direct communication be necessary, then, in every instance where the cord is not tied, the mother must bleed to death; which the experience of the youngest practitioner must prove not to be the case." "In the next place," he proceeds, "the converse of this must likewise be true; and whenever the mother loses blood, the child also must lose blood; and, if the bleeding from the mother continues, the child must die. *But the collections of the writers on surgery disprove this, and show, that, although the mother dies from the division of large vessels, yet the child remains as full of blood as formerly, and lives after the mother's death.*" (Anatomy of the gravid uterus, p. 164. et seq.) With great respect for the talents of Mr. Burns,

XCV. A violent contraction of the uterus may suddenly expel the foetus, whilst the mother is

Burns, I am obliged to dissent from the opinion contained in the passage printed in italics. There are certainly many facts which prove that the child may be almost exhausted of blood, without affecting the mother; uterine hemorrhage, however, is frequently fatal to both. Indeed the judicious practical remarks of Mr. Burns qualify the whole passage quoted above. "Sometimes" says he, "the vessels of the cord burst and blood is poured into the uterus—if the foetal and maternal vessels should communicate, the mother is weakened, and may even faint; and, in every instance, the child suffers, but does not always die." (Principles of Midwifery 124.) "Uterine hemorrhage, if timely means of relief be not employed, ends in the death of both mother and child," (ib. 177.) Dr. Hamilton, treating of uterine hemorrhage, warns us that "the neglect of half an hour or less may be fatal to the mother and child." (Outlines of Midwifery 390.) The case recorded by Heister and so often alluded to (§ LXXXI.) proves the same. Morgagni records the history of a woman who miscarried after two profuse *hemorrhoidal* discharges, with fever, for which blood was taken from the arm and foot. Although the patient is not said to have sustained any loss of blood *per vaginam*, yet "nothing of blood and indeed nothing of bloody colour appeared in any part of the foetus; almost all the viscera were pallid and nearly destitute of colour." (Let. XLVIII. 5.) It would be easy to collect similar cases but the preceding extracts will suffice to prove: 1st. That a child may die, before birth, in consequence of *hemorrhage from the umbilical vessels*, without affecting the health of the mother, although, in some instances, hemorrhage from the child is injurious to both. 2d. *Uterine hemorrhage* is not unfrequently fatal, both to the mother and child, but the child may die from *hemorrhage affecting the mother*,
although

standing or walking about. In this case, the cord, if too short, must either break off, leaving the placenta in the uterus, or, the weight of the foetus may possibly drag the placenta after it. Now, the woman labouring under this violent spasm, or being panic-struck, may swoon away, and hemorrhage from the cord may destroy the child, without any criminal act or intention on her part.

XCVI. Lastly, a woman, if alone when seized with convulsions, may drop the child at her feet, or, whilst rolling about, may snap asunder the cord by which they are connected together. I ask, if, under these or similar circumstances, of which the history of midwifery furnishes many examples, the unfortunate mother ought not to be reputed innocent?

XCVII. This question has been asked : Can we ascertain, by the inspection of the heart and large vessels, whether the foetus was born alive or not? Some authors, supposing the action of the heart and the circulation of blood to be the necessary cause of hemorrhage, believe that loss of blood from the umbilical cord must prove that the child

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although not to a degree endangering her life. Consequently, where we find signs of hemorrhage in the mother, it is probable that the child may have died from loss of blood sustained before birth, but the absence of these signs in the mother, does not prove that the child cannot have died in consequence of such hemorrhage.

Translator.

was alive at the time when it took place, because, say they, the dead do not bleed. The absence of hemorrhage will, for the opposite reason, prove a sign of the child's death before its birth. This is the opinion of Bohn and Hebenstreit.

XCVIII. But may we not object, that the entire or partial separation of the placenta frequently occasions hemorrhage, which proves fatal both to the foetus and its mother, before the delivery is accomplished. I will, once more, advert to the conclusive observation of Heister, (§ LXXXI.) The absence of hemorrhage is very limited in its application, because the blood has been remarked to escape in very small quantity, or even not at all, from the umbilical cord abandoned to itself without any ligature. The experiments of Kaltsmidt, (§ LXXVIII.) give great force to our objection.

XCIX. The inspection of the heart and large vessels cannot do more than afford presumptive evidence, and, along with the other signs furnished by anatomy and physiology, contribute to attest the life or death of the foetus before its expulsion.

although not to a degree endangering her life. Consequently, where we find signs of hemorrhage in the mother, it is probable that the child may have died from loss of blood sustained before birth, but the absence of these signs in the mother, does not prove that the child cannot have died in consequence of such hemorrhage.

CHAP. III.

EXAMINATION OF THE LUNGS.

C. BY the term *Docimasia pulmonum*, German writers on forensic medicine generally understand the various tests, to which the lungs of a newborn infant are subjected, in order to ascertain, whether it has been born alive, or has died previous to delivery.

CI. The lungs, either entire or divided into portions, being placed in a vessel of water so capacious that they do not touch its sides, will either sink to the bottom, or float on the surface; or, after floating some time, will descend at last; or parts will float, although other parts, or even the entire lungs had previously sunk to the bottom.

CII. Should the lungs descend, it is manifest that their specific gravity exceeds that of water, and, since sound lungs, which have been distended by the inspiration of atmospheric air, or by the artificial introduction of it, do always float; we may suppose that those which sink have not contained air, and of course that the child has not breathed nor lived after birth.

CIII. But, when the lungs are uniformly observed to float, we conclude that they have been distended with air, and rendered lighter than an equal volume of water. Then, supposing that the air has not been artificially introduced, and that the distension of the lungs has not been produced by putrefaction, and lastly, that this diminution of specific gravity neither proceeds from a considerable Vomica, nor from that species of mucous decomposition, which Hueber and others suppose might possibly take place, we deem ourselves entitled to maintain, that the air has penetrated the lungs in consequence of respiration, and, of course, that the child has lived after being born.

CIV. If it happens that an entire lung descends to the bottom, but, the same lung being divided into pieces, some of them float, this difference is to be attributed either to ulcers affecting certain portions, or to a commencement of respiration at the very moment of delivery, or to a partial inspiration, or, lastly, to a certain degree of putrefaction. (§ XLIII. & XLIV.) The same causes are supposed to operate when the lungs which floated at first, descend at length to the bottom of the vessel.

CV. Moreover, the lightness which the lungs acquire when distended with air, is merely relative, their weight far from being diminished is in reality increased. It is their increase in volume, which produces this diminution of specific gravity.

CVI. Galen was the first who made these experiments on the lungs, but it was not until long after his time, that they were resorted to in questions of forensic medicine; doubts have arisen respecting the legitimacy of the conclusions to be drawn from them, and these doubts are not entirely destitute of foundation.

CVII. The floating or sinking of the lungs may easily mislead us, because the former circumstance merely implies the presence of air within the cells, but by no means the introduction of it by respiration, since there are many other ways by which so much air may be introduced as will produce this effect.

CVIII. *The first is an artificial inflation of the lungs.* (§ L.) Hebenstreit, it is true, doubts the possibility of effecting this, and Roederer only deems it practicable after the foetus has respired spontaneously. In this case, such a supposed inflation ought not to influence judicial researches, instituted to prove or disprove a charge of Infanticide. But a contrary opinion is supported by the authority of Bohn, Teichmeyer, and others, and the accurate experiments of Camper remove all doubt on the subject. Büttner also succeeded in similar experiments, and instances a mother who practised this operation. These attempts do not always succeed, because the lungs are sometimes scirrhus, and it is also evident that a spontane-

ous respiration causes the air to penetrate more completely, because during expiration the ramifications of the bronchia expel any mucus, that would otherwise obstruct the admission of air at the next inspiration.

CIX. It is astonishing that civilians and physicians, that Eschenbach, Roederer, Camper, and above all Haller, the friend of humanity, should forbid us to suppose that a woman accused of Infanticide, can have inflated the lungs of her child. They would, of course, presume that every woman so accused must be guilty. Is it then impossible, that, intending to conceal her delivery, and to place her infant in a hospital, or to bring it up in some other way, a woman should bear a dead child, or one scarcely able to breathe, that she should attempt to restore its suspended animation and should fail in her attempt? The instance related by Büttner, (§ CVIII.) clearly proves the injustice and cruelty of such a supposition. Besides, it is easy to obtain a degree of evidence on this subject, by inquiring of the accused the particular means she adopted. For without certain precautions, such as closing the nostrils of the child, it is impossible to inflate the lungs through the mouth.

CX. *Secondly, the lungs may contain air in consequence of emphysema.* Although such cases are

rare, yet they prove that the presence of air ought not exclusively to be ascribed to respiration *.

CXI. *Lastly, is it not possible that in consequence of putrefaction, so much air may be generated in the lungs that they may float when placed in water?* (§ XLIII. & XLIV.) Some answer this question in the affirmative, others in the negative. Ludowic does not think this cause sufficient to produce such an effect. Bohn adopts the same opinion, Wrisberg says that although all parts of the human body do not float alike, yet all of them, the bones excepted, are so much augmented in volume by putrefaction, and the consequent disengagement of air, that they rise gradually to the surface of water, and, when putrefaction has taken place to a certain extent, they float altogether, and do not sink again, until after a complete decomposition, when the earthy parts subside to the bottom. Haller relates that he procured the lungs of a child which had died before its birth. They were of a dark red colour, and sunk in water both when quite entire, and when divided into portions. A portion being left to putrefy in water, which was not changed, its colour became red, it was covered with air-

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* How a foetus can become emphysematous before birth, I am at a loss to conceive. *Translator.*

bubbles, ascended gradually as the putrefaction proceeded, and at length reached the surface, where it continued to float. Fabricius observed the same phenomena, and adds, that when the decomposition was complete, the remainder sunk again; undoubtedly because the gaseous and volatile particles detached themselves, and were diffused through the atmosphere. Eschenbach and Torrezius obtained the same results, Joeger and Mezger add the remark, that the slightest pressure, is sufficient to cause the lungs to sink again, when they floated in consequence of putrefaction.

CXII. However, some respectable authors attest, that putrefaction does not always cause the lungs to float, and that these organs, even in a state of putrefaction, remain at the bottom of a vessel filled with water. Joeger, who has just been mentioned, has sometimes witnessed the same circumstance. Teichmeyer observed, that the lungs of a calf, when left to putrefy, for three, or even eight weeks, always sunk to the bottom, if thrown into water, only they did not sink so quickly as fresh lungs. This illustrious professor thought he might lay down, as an established axiom in forensic medicine, that by putrefaction, the specific gravity of the lungs is not so much diminished, as by respiration, and that the lungs never do float in consequence of putrefaction. Morgagni, Lieberkühn, Camper, and many others, have also

observed putrefied lungs, to remain at the bottom of water. Büttner relates six experiments, which did not produce uniform results, in two, the lungs were observed to float, but, in the remaining four, they sunk to the bottom. Lastly, Mayer varied the experiments, and conducted them with great care. He selected the lungs of new-born children, which had not afforded any signs of respiration. These lungs were left to putrefy in water, in the air, in the shade, in the sun, sometimes along with the heart, sometimes detached from it, sometimes entire, sometimes cut in pieces. These experiments were made in the months of July and August. Pure spring water was used, and the vessels were so capacious, that the parts experimented upon, did not touch the sides. He obtained the following results. Recent lungs invariably sunk to the bottom. After an immersion of two or three days, the water became turbid, the lungs, which were dark coloured, increased in volume, some bubbles of air ascended to the surface, a putrid odour became perceptible. These phenomena increased from day to day, and, at the sixth, or seventh, or eighth day at latest, the lungs floated, whether they were entire or divided into portions. When connected to the heart, they did not float until the commencement of the eighth day. If carefully removed from the turbid, into pure water, they continued to float, but a very

slight pressure caused them to sink. Lungs which, for the sake of experiment were placed in water, and exposed to the sun, floated on the sixth day, those which were left in a current of air, required ten or eleven days. They continued to float until the twenty-first or twenty-fifth day, increasing more and more in volume, and emitting an odour more and more powerful, but at length they all descended, and did not rise again, although suffered to remain seven weeks, or even longer.

CXIII. These experiments of Mayer, corroborate the opinion of Fabricius and Joeger, and it is not difficult to reconcile them with the opposite doctrines maintained by others. In fact, it is very probable that sufficient care was not bestowed upon those experiments, where the lungs floated at first, and sank when removed into fresh water, for in order to cause this sinking, only a very slight compression of the putrid lungs is necessary, this compression Mayer, Büttner and Mezger, carefully avoided. All the observers whom we have quoted, have not happened to remark that the lungs which previously floated, in consequence of putrefaction, did at length sink to the bottom; undoubtedly because they did not carry their experiments so far, as to witness this consequence of extreme putrefaction. An aeriform fluid is generated in the lungs, and especially on the external parts of them, its bubbles detach the

enveloping membrane, and, like so many small bladders, buoy up the part to which they are attached, towards the surface of the water. If, by pressure, or an excess of putrefaction, these small bladders are burst, the lungs sink and do not float again.

CXIV. Independently of the general marks of putrefaction, in the animal body, we are not to look for any in the lungs of a new-born infant; nor are we to expect that they will float within six days, at least, from the time of delivery, in a warm season. In winter, six weeks will elapse before this takes place, as is proved by Büttner; an infant was born on the 29th of January, and on the 11th of March, its lungs, although become very putrid, sunk in water. In the intermediate seasons, it will be necessary to reckon a few days longer than in summer.

CXV. Besides, there can be no fixed rule on this subject. The temperature of the season, the place where the child has been deposited, viz. in water, in the ground, amongst filth, &c. all these circumstances ought undoubtedly to modify the grounds of a medico-legal decision.

CXVI. We have entered into this circumstantial detail, respecting the effects of putrefaction on the lungs, because this organ is almost the only one from which we can draw any information, in the tardy examination, which we are sometimes

obliged to make, respecting the dead body of a new-born infant, when the cause and manner of its death are uncertain. In fact, all other parts of the body, the bones excepted, are decomposed more rapidly; the integuments and muscles, on account of the large surface which they present; the abdominal viscera, because they are the instruments of those changes which seem to be effected, by a series of successive decompositions; of the vital organs, the lungs resist for a longer time, because their texture is more solid, they are closely compacted, they have not yet begun to execute their office, and are protected by an impenetrable covering. Although therefore, all the rest of the young subject should be in a putrid state, we may subject the lungs to certain experiments, from whence we may ascertain, whether the foetus has been alive, either during or after delivery, or has died previously.

CXVII. The changes effected in the lungs by the atmospheric air, do not merely influence their *cells*, but extend to the *vessels*, through which the blood, which proceeds from the right ventricle ought to pass. The air, which distends the cells during inspiration, is not entirely expelled at the succeeding expiration; part of the blood, also, which the heart propels into the pulmonary vessels, at the time of their diastole, is detained there, and the last expiration, which immediately pre-

cedes death, leaves the lungs more or less surrounded with this fluid. The dilatation of the lungs and of their blood vessels, must favour the influx of blood, during life, and its detention after death.

CXVIII. Therefore, on opening the body of a child, which has respired, we shall find the blood vessels of the lungs more distended, than in a foetus which has died, before having breathed; of this we can have ocular demonstration, by cutting into the lungs, whence much blood will flow; but, lest we should be led into error, by such an experiment, it would be necessary to collect the blood, in order to estimate the quantity, and this could not be done with any degree of certainty.

CXIX. The most certain, and perhaps the only method of obtaining, a precise knowledge of the quantity of blood, introduced into the lungs, by respiration, is *the balance* which was proposed by Mr. Ploucquet. The weight of the blood introduced, must increase the weight of the organ of respiration, in a remarkable manner. But we can only attain precision on the subject, by a multiplicity of facts deduced from children, of whom it is perfectly certain, whether they have respired or not. We must compare the total weight of the body, with the weight of the lungs, and the results will afford a certain rule for directing our experiments, in these perplexing cases.

CXX. Mr. Ploucquet, 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, found it to weigh 53,040 grains. The lungs, closely compacted, dense, and not at all distended by air weighed 792 grains, the weight of the body, therefore, was to that of the lungs, as 67 to 1 nearly. In another foetus the proportional weight was as 70 to 1. Yet in a third child which had not quite reached the full time, but had breathed after birth, the relative weight was as 35 to 1.

CXXI. From these facts Mr. Ploucquet concluded that the blood, introduced into the lungs during respiration, doubles their weight, and therefore, in doubtful cases, so great an augmentation might furnish one mean of deciding, whether the foetus has respired or not. The weight of the lungs being only 1-70th of the whole body, before respiration, if it should amount 2-70ths, or 1-35th, this difference affords us a certain proof, that respiration has taken place.

CXXII. It is even easy to perceive that by a number of observations, we shall be able to determine the precise weight of the lungs, both in children that have, and in those that have not breathed, and then, by the mere examination of these organs, we may pronounce that respiration has, or has not, taken place. For instance, if the

ordinary weight of the lungs of a foetus, at the full time be 12 or 15 drams, and those we examine weigh 25 or 30 drams, we shall have sufficient reason to believe that the child has respired.

CXXIII. The results afforded by these trials, are not subject to vary either in consequence of incipient putrefaction, or air introduced after birth, or emphysema, or air-bubbles attached to the lungs. In fact, when the circulation is once stopped by the child's death, none of these can cause the blood to flow into any vessels of the lungs. It is desirable, therefore, that this method should receive the sanction of public authority, on account of the certainty which it affords, and the facility with which it may be employed. It is true that the following objections may be urged against it, but they are probably specious, rather than solid.

CXXIV. 1st. *Is there a constant relation between the weight of the body, and that of the lungs?* We know that some parts of the body, are frequently disproportioned to the rest. Thus, the heart is sometimes extremely large, sometimes very small; so is the nose; the chest is sometimes capacious, sometimes narrow, and its dimensions must necessarily limit the size of the lungs; the abdominal viscera if very large, would repress the diaphragm into the cavity of the thorax, opposing an obstacle to the growth of the respiratory organs.

CXXV. I answer that these exceptions to the ordinary laws of nature, these *preternatural* conformations, do not militate against opinions drawn from the usual structure, because they are by no means common, and the latitude of which our rule is capable, renders it applicable, in almost every case. In fact, these deviations cannot *double* the weight of the parts, and the influence of them is limited within a small extent. Besides, unless the new-born children should be really monsters, these *lusus naturæ* must occur much more rarely in them, than in adults, who during a course of years, are exposed to a variety of circumstances, capable of altering that constitution, which they possessed at birth.

CXXVI. *2d. Supposing the relative size of the lungs, and the rest of the body, to vary at different periods of gestation, will there not be required different rules for children born before, and those that are born at the full time?*

CXXVII. I ask whether the reality of this unequal growth, has been proved by accurate observations, and whether this supposition is not entirely gratuitous? If the foetal head is so large, when compared with the rest of the body, are we to suppose that the size of the thorax, must be equally disproportionate? What analogy can lead us to such a conclusion? Moreover, it would be no difficult task, to ascertain the mean relative

weight of the lungs, at some period, short of maturity? For with respect to foetuses, incapable of life, or *abortive births*, strictly so called, they are out of the question, and any examination of them would be entirely useless.

CXXVIII. 3d. *Might it not happen than an excessive congestion of blood, in the lungs of a foetus, which had never breathed, should render them equal in weight, to the lungs of a foetus, which had respired; or even that being inflated, they should resemble the latter, floating like them in water, and presenting no apparent difference to the eye of an observer.*

CXXIX. To this objection, M. Ploucquet replies, that it is impossible for such a congestion to take place in lungs, which have not been dilated by the act of respiration; because the foramen ovale and canalis arteriosus, present such facility to the current of blood, even when flowing with the greatest rapidity, that there can never be any considerable determination towards the vessels of the lungs. In support of his own opinion, he states two striking cases, recorded by Roederer. In the first, the foetus remained eight hours in the vagina, violently compressed by the os uteri, and although it moved after birth, yet it died in a short time. All its blood was determined towards the chest; the vessels of the heart were horribly distended, and when its cavities were laid

open, the blood filled the thorax. The membranes, also, which lined the cavity of the chest, were very red, and highly inflamed, the vessels of the brain and those of the abdomen, were, on the contrary, either empty, or but slightly supplied with blood. The subject of the second case, was an infant which died after delivery, without having respired. The auricles of the heart, the veins, and arteries, were distended with blood, to an indescribable degree, and the membranes of the chest were so red and inflamed as to appear injected.

CXXX. In neither of these cases, does Roederer mention the state of the lungs, which is a negative proof that this great man, so well versed in forensic medicine, and so diligent in collecting every fact, capable of directing us in the study and practice of it, did not find the lungs distended with blood, to the same degree, as the other contents of the thorax. He certainly would not silently pass by a circumstance so important. We may therefore conclude, that a congestion of blood cannot take place, in the lungs of a foetus, which has not respired; and can only admit that the dilated orifices of the pulmonary vessels, may sometimes receive a small quantity of blood, but not enough to increase the weight of the lungs so much, as it is increased by respiration.

CXXXI. 4th. *Must not the putrefaction of the*

foetus alter the proportion which is supposed to exist, between the weight of the lungs, and that of the rest of the body? If the putrefaction is extreme, such an effect may be produced, but in this case, the foetus cannot be subjected to any examination, upon which a medico-legal decision can be founded. (§ XLV. CXI. et seq.) But, if the putrefaction has not advanced far, as the lungs resist its effects longer than any other part *, we may apply the proposed test, to corroborate the results afforded by the hydrostatic trials.

CXXXII. Some authors suppose the sinking of the lungs, to afford a decided proof, that respiration has not taken place, but this is a hasty and erroneous conclusion, because the lungs of certain adults, of those for instance, whose death is caused by a collection of mucus, do not always float.

* Although this fact has been noticed more than once, yet the translator hopes to be excused for superadding the very respectable authority of Dr. Parr. "It is contended that
 "when putrefaction has taken place, the lungs of a child who
 "has never breathed will swim. This fact is positively denied,
 "by at least equal authority, and in reality the lungs are
 "scarcely susceptible of putrefaction, even when it has taken
 "place, in a considerable degree, in the other parts of the body.
 "If there were, however, any ambiguity, it may be at once
 "removed by a slight attention. The air, separated by putre-
 "faction, may be observed in the water, passing along the
 "divisions of the lobules, while the air within them is invisible."

Lon: Med: Dict: II. 181.

This mucus distends or compresses the pulmonary cells, and increases their specific gravity so much, that some portions will frequently sink in water, and even carry the sound parts along with them.

CXXXIII. Norreen and De Haen have observed the same phenomenon, as occurring in persons who died of sudden cold. (*Ratio med. tom. II. 123. v. 50. ix. 29.*) Haller (*Opusc. Pathol. obs. xvi. his. t. 2, 3.*) found the lungs of consumptive persons to sink in water: Stoll. (*Rat. Med. I. 54. 87.*) observed that this effect was also consequent to violent inflammation; and Wrisberg says, that it is not unfrequently observed after small pox. The existence of scirrhusities, and other indurations, in the substance of the lungs, of newborn children, is demonstrated by the observations of Wrisberg and Morgagni *.

CXXXIV. Moreover, all these facts obtained by weighing the lungs, may serve to prove that the child has breathed, and consequently, that it has possessed life, but the presence or absence of them, contributes nothing towards proving the infant to have been still-born, because children may be born alive, and may not breathe. This is the opinion of Hebenstreit, when he says, a child may live after its birth, by the same circulation as in the uterus, without using its lungs, and

* See Additional Note A.

without the inspiration of air, the channels, viz. the foramen ovale, and the canalis arteriosus, by which the blood continues to flow, and avoid the lungs remaining open. Bohn observed puppies to live a long time after birth, although the trachea was tied; and it is well known to practitioners in Midwifery, that children, after remaining apparently dead for some time, at length begin to breathe.

CXXXV. Heister, Mauchars, and Loder, relate facts, which prove new-born children to have breathed a considerable time, and even to have uttered cries, although their lungs after death did not appear to differ from those of still-born children *.

CXXXVI. The sounds emitted by these children, might easily proceed from air, which had merely entered the trachea, and its large branches, but had not proceeded to its more minute ramifications, nor to the cells of the lungs. Haller remarks, that the lungs of certain children did not float in water, because they only breathed a short time, *quia parum respirarunt*.

CXXXVII. Many circumstances may frustrate the efforts of new-born children, attempting to breathe, and may render their respiration either absolutely impossible, or very incomplete.

* See Additional Note B.

CXXXVIII. It is probable that the air penetrates the left lung, with less facility than the right *. Frequently also a very tough mucus

* Subjoined is an extract from Dr. Duncan's Analysis of M. Portal's Memoir on this subject. (Hist. de l' Academie Royale des Sciences, 1769.) *Translator.* "The trachea when
 "it reaches as far down as the second or third vertebra of the
 "back, divides into two branches. These branches, which are
 "termed Bronchi, differ from each other in thickness, length
 "and direction. The right is about one-fourth part thicker,
 "and one-fifth shorter than the left, while the direction
 "of these tubes undergoes changes at different ages. The left
 "bronchial tube, in a foetus, is more inclined backwards than it
 "is in an infant after respiration has once taken place; and the
 "right, in an infant born to the full time, is more elevated than
 "before birth."

"In a kitten, which M. Portal killed a few minutes after
 "being brought forth, the right lung was of a whitish colour,
 "filled the whole cavity of the chest, and swam in water. The
 "left was of a dark-red colour, in a collapsed state, and sunk
 "in water. But, upon being blown into, it kept upon the
 "surface of the water, in the same manner as the right. From
 "this he concluded, that, in the first respiration, the air enters
 "only into the right lobe of the lungs. In this opinion he
 "was confirmed, by repeated trials, made upon other animals,
 "and upon a human foetus which had never breathed. Upon
 "blowing into the trachea, he found the right lung much more
 "distended than the left." "He concludes, with pointing it
 "out as a particular, well meriting the attention of those who
 "are called in criminal cases, to determine whether a child has
 "breathed or not. The right lobe may swim in water,
 "while the left sinks. From trusting to a single trial, there-
 "fore, disagreeable mistakes may be produced.

(Medical Commentaries I. 409.)

obstructs the nose, mouth, trachea, bronchia, &c. and is a frequent cause of death in new-born children; because one or two respirations are not sufficient to expel it, but tend rather to collect it in the glottis, through which the air passes with more difficulty, than through the trachea itself.

CXXXIX. The general debility of the foetus; its apoplectic state; a spasm of the respiratory organs, and other diseases of the same parts; the choking up of the glottis, by a doubling back of the tongue; pressure on the neck, by the uterus or umbilical cord; compression of the lungs, by the distended abdominal viscera preventing the descent of the diaphragm, by swelling of the thymus gland, by steatomatous tumors or hernia within the thorax, by an enlarged heart, or fat on the surface of it, or disposition to aneurism, by scirrhus of the pericardium, by aneurism of the aorta or pulmonary artery, by dropsy, empyema, extravasation of blood, or emphysema of the chest; the existence of all these phenomena, and the effects of them are recorded by numerous authors, as sufficient to prevent respiration in new-born children.

CXL. Besides these diseases, there are other circumstances, the effects of violence casual or premeditated, which are capable of preventing the respiration of children born alive. Harvey, Stalpart, Vanderwiel, and Camper, attest that chil-

dren are not unfrequently born, either with the head or the whole body enveloped in a membrane.

CXLI. Such are the numerous experiments and practical facts, which, taken together, constitute the examination of the lungs. This department of forensic medicine, requires to be confirmed and modified by new researches, in order that we may obtain the degree of certainty desired by every honest friend to humanity, who wishes that his decisions, on which may depend the life, the honour, and the interest of his fellow creatures, should rest upon the firmest, and on the most incontrovertible basis.

CHAP. IV.

DISSECTION OF THE FOETUS.

CXLII. WHEN the cause or manner of death is to be ascertained by dissection, we must use precautions, which are not necessary if our object is merely the attainment of anatomical knowledge, or the investigation of a particular disease.

CXLIII. Besides the general precautions required on every subject connected with forensic medicine, there are certain objects to which we must particularly attend, when it is our duty to confirm or disprove a charge of Infanticide. This, more than any other of the crimes which are most contrary to nature, seems to demand the completest proof; and the least presumption in favour of a mother, charged with child-murder, ought to weigh with courts of justice, and incline them to place more confidence in the strong instinct of maternal tenderness, than a barbarous ferocity which must always remain inexplicable.

CXLIV. We find, however, in the voluminous collections of Alberti, Valentini, &c. that the reports on cases of Infanticide are, for the most

part, filled with useless and ridiculous details, and that they exhibit none of those researches, or authenticated facts, from which only we are capable of estimating with precision the maturity of the foetus, of deciding whether it was alive at the time of delivery, or ascertaining the cause of its death. One would be led to believe, that most of these reports were anterior to the revival of knowledge, and to the study of anatomy and physiology, which may be considered as the great lights of forensic medicine. But, if it is difficult, even with every aid, to prove the manner of death, and to detect traces of a small spark of life after birth; for this reason, it becomes our duty to omit no fact, which the examination of a new-born child may present to the eyes of an anatomist, labouring to investigate the truth.

CXLV. To collect, from the best authors, those signs which most certainly point out the degree of maturity and strength, the life or death, of the foetus; to exclude those which are evidently erroneous, to weigh in an accurate balance those which are doubtful; lastly, to assign to every one its exact value; this, says, M. Dreyer, is what remains to be done, in order to answer certain questions relative to Infanticide, and to avail ourselves of the progress made by anatomy and physiology, during the last century.

CXLVI. Taking these sciences for our guides,

we must follow such an order, that our first examination shall leave those parts, which are to be the subjects of our final researches, perfectly entire.

CXLVII. But there are many extraneous circumstances, the previous knowledge of which will throw considerable light upon the object of our inquiry, by leading the anatomist, engaged in dissecting the foetus, to the most attentive examination of certain parts, and rendering him careful and precise in the minutest details. Amongst other considerations, we may inquire the age of the mother? Her state of health during pregnancy, and at the time of delivery? If this is her first labour? What has been the state of her breasts? If the pains of labour were attended with loss of blood? If the placenta was detached prematurely, or, if not, how long it was retained in the uterus? How much blood was lost at the expulsion of the placenta? How long the hemorrhage continued? At what time did the discharge change its colour? Did the pains of labour begin suddenly and continue, with increasing force and frequency, until the child was born? Was the labour rapid or otherwise? At its termination, was the woman standing or sitting, or lying down? Did the child at the time of its birth, utter any cry, or make any motion? Was the umbilical cord tied? If it was, by whom? Were two ligatures made upon it,

one on the part attached to the child, and the other on the part connected with the placenta? Was the cord entire or broken, when the ligature was tied? Was the ligature made in proper time? Was any air blown into the mouth of the child? Supposing the delivery to be instantaneous, from what height did the foetus fall? Should this circumstance happen to a woman pregnant of a first child, at the full time, it is next to impossible that the perineum should escape laceration; we can easily ascertain whether this accident has happened or not, and whether the place upon which the foetus is said to have fallen, be hard and uneven, or, on the contrary, soft and incapable of injuring it.

CXLVIII. We must inquire also, whether the child has been abandoned to the cold or not, and how long it has been denied the necessary succour? Whether it has been covered so as to exclude the air? The temperature of the atmosphere in general, and that of the particular place where the child is deposited? The length of time during which it has been exposed? The hemorrhage that has taken place, if the cord has not been tied? The coverings of the child? Its posture? The nature of the air to which it has been exposed? The care which has been bestowed upon it? The possibility that some enemy of the accused, may have had the villany to imprint marks of violence upon the child, after it had died a natural death.

CXLIX. All these and many other circumstances, which may be deemed extraneous, with regard to the examination of the body, are attended to in courts of justice; but the most essential are frequently found to have been overlooked or neglected, although a knowledge of them would have contributed materially to the discovery of truth.

CL. It is unnecessary to spend much time in proving how much each of these facts might contribute to so a desirable an object; such a detail would divert us too far, and we shall have occasion to review the most important of them, in the course of this chapter.

CLI. The placenta furnishes some indications which are not to be neglected. When it is unequal in different parts, when it is found to contain scirrhous indurations, or particles like gravel, or hydatids, along with the occurrence of other symptoms, we may conclude, not only that the foetus did not attain its full time, but that it has died within the uterus. The natural texture of the placenta is well known, but cannot easily be described. It shrinks when the foetus dies within the uterus, and its natural colour is succeeded by a dark livid tint; but this change of colour is not to be depended upon, because it may be communicated by the commencement of putrefaction. The convex part of the placenta attached to the uterus, appears as if composed of many small

placentulæ connected together; it is possible for one of these portions to detach itself, either at the commencement, or during the progress of labour; the umbilical vessels, which ramified upon this part, must, of course, be ruptured, and the accident will be attested by the uterine hemorrhage which ensues, and which may cause the child to lose all its blood. This is an occurrence worthy of much attention, because it would render every proof of Infanticide drawn from the omission of a ligature, and the empty state of the blood vessels perfectly nugatory.

CLII. It will also be necessary to examine, whether the umbilical vessels which ramify on the placenta, are flaccid and empty of blood, although a ligature should have been tied on the umbilical cord; or, if the ligature has been neglected, whether they contain coagulated blood or not.

CLIII. The umbilical vein and arteries, are enveloped in a tenacious transparent gluten, the consistence and quantity of which are very variable. When the quantity is small, the cord appears slender, and its colour bright red, but this colour is obscured, and the cord is rendered thicker, and more easily broken, when this gelatinous substance is more abundant. The length of the cord ought also to be noticed, this is generally about two feet *; when it exceeds

* "It varies in length from six inches to four feet." *Burns.*

this length, it may be coiled round the limbs of the foetus, in which case, the vessels may be compressed, the circulation of the blood interrupted, and the communication between the foetus and placenta intercepted. Sometimes, the cord, being coiled round the neck, may be stretched so tight by the action of the uterus, as to strangle the child. (§ XXXV. & LXV.) When the delivery is instantaneous and unexpected, the child may be dropped down, and injured by the fall, if the cord is too long; or, if on the contrary it should be too short, the placenta will be dragged after it. Moreover, the cord may impede the descent of the foetus, and protract the delivery.

CLIV. *Has the cord been cut or broken off? And at what distance from the umbilicus?* We have reason to believe, that there is less danger of hemorrhage from the cord when torn asunder, than when divided by a sharp instrument, more especially, if it is broken off at some distance from the umbilicus. When the umbilical cord of a mature and healthy foetus does break, the accident is always observed to happen at one extremity, and we have no well-authenticated instance of its occurring in the middle. If the cord has become shrivelled, or if it belongs to an immature foetus, it will readily break at any part. We term the cord shrivelled (*fletri, marcidus*) when it is very slender, of a dark greenish colour, and its vessels

either empty or filled with thin and vitiated blood. With this state of the cord the placenta is very soft, and its vessels empty; and, unless these changes have been effected by long exposure to the air, we are to conclude that the child has died some time previous to delivery.

CLV. In chapter II. I have detailed the mode of deciding whether the child has died from want of ligature on the cord or not, it is therefore unnecessary to repeat any remarks on the subject in this place.

CLVI. Although the cord has not been cut near the umbilicus, it will be proper to examine both the part within the ligature, and the part beyond it. If the spongy portion of the part beyond the ligature contains blood, the cord was probably divided before being tied, or the ligature has been carelessly applied. If the vessels of that part of the cord, which is between the ligature and navel, are distended with blood, we are to conclude that the foetus died either previous to the commencement, or during the course of labour. The vessels of the umbilical cord, of a living new-born child, hardly contain a drop of blood.

CLVII. Knots upon the umbilical cord are very rare, and can only occur when it is of extraordinary length; Mauriceau and Smellie, however, record such accidents. In this case, the foetus,

whilst passing through the pelvis, may coil the cord in such a manner, as to intercept the circulation necessary to its life *. We are not, however, to mistake for real knots, prominent inequalities in the vessels of the cord which are varicose, and more distended with blood in some places, than in others.

CLVIII. When the foetus has not attained the usual term, the mere omission of necessary succour after its birth, may effectually extinguish its faint spark of life. A woman, therefore, may allege in her defence against a charge of Infanticide, that she was unable to render the assistance requisite to the feeble being, which she brought into the world. In this case, it would be necessary to prove the foetus immature, in order that the omission of such cares, may be regarded a sufficient cause of death.

CLIX. Every one will acknowledge that the foetus is more completely protected in the uterus, where it experiences a constant temperature, than when exposed to the vicissitudes of a variable atmosphere; the blood too, which is derived from the mother, through the medium of the placenta, furnishes nutriment better suited to its feeble frame than the milk which it might draw; lastly, in the

M 2

* Baudeloque denies that knots on the cord can endanger the child's life, and relates one particular case, in which the funis was quite matted together by numerous knots. *Fautrel.*

uterus, the child escapes the double motion of respiration, which is performed, after birth, thirty thousand times a day. Hence the uterine mode of existence is indispensably necessary to the child, until it attains such a size, and so much strength, as will enable it to generate and maintain a natural temperature, to bear the light, and the air, to perform the act of respiration, to draw, swallow and digest milk, to convert it into blood, and to throw off all the excretions. The foetus capable of executing these functions, may be supposed to have arrived at maturity.

CLX. *But how many months must elapse before the foetus attains this maturity? And by what signs can we know that it has attained it?* At the expiration of nine months, the foetus seems to require no more than the ordinary attentions, to accommodate it to its new existence. Thus, when it comes to light during the ninth month, we have a well-founded hope, that its powers will not be insufficient for its support, during the early and critical moments of its new life. On the contrary, in proportion as its birth precedes the natural term, in the same proportion do we fear that all our attempts to prolong its frail existence will be vain. The indigence or inexperience of the mother, may be pleaded in her favour, if there are no proofs of wilful negligence, nor any considerable wounds, ecchymoses, or fractures, especially of the skull,

nor marks of suffocation, or of hemorrhage, or of external violence, and especially if the child appears to have died previous to delivery. In general, the proofs of Infanticide obtained by opening the child, are most applicable to a foetus at the full time, or, at least to one born in the ninth month, and not at all to one which is premature.

CLXI. We are best enabled to estimate the maturity of the foetus, by attentively examining new-born children; unless we are in the habit of doing this, we can scarcely distinguish a child born at the full time from another, which is less advanced, or has only completed the sixth or seventh month. A foetus at eight months, resembles one at nine very closely. Redness of the skin is one sign of immaturity. During the first months, the foetus is pale-coloured; afterwards, when the circulating system becomes more vigorous, the blood is deeper coloured, and the muscles beneath the skin, as well as the skin itself, glow with a bright red. As the foetus approaches the full term, the different parts of the body lose this red colour in succession. The face, the palms of the hands, the soles of the feet, the scrotum and the nipples retain it the longest. Sometimes this red becomes livid. An immature foetus presenting a livid colour, has probably died some time previous to delivery, from some other cause than want of nourishment; or it may have been expo-

sed to putrid effluvia, during the time that has elapsed between its birth and dissection. It cannot be supposed to have died of hemorrhage, as, in that case, its colour would be pale. The mature foetus frequently assumes a livid colour, in consequence of a difficult labour. Although, very respectable witnesses have seen the foetus of six months, with hair on the head, bright silvery colour, and perfect nails; yet, when these are wanting, we cannot conclude that the child under examination is born long before the natural term. When the skin is lax, and moveable upon the bones and muscles, the loss of tone, and the wrinkles which furrow the skin, indicate a want of necessary nutriment for some time previous to birth.

CLXII. The weight and length of the child, may contribute to prove whether it has, or has not attained the full term. Authors are less agreed respecting the first test than the second. Mauriceau says that a child, born at the expiration of nine months, generally weighs 11 or 12lbs. of 16oz. to the pound; one at eight months, only 7 or 8lbs. one of seven months, only 4lbs. or thereabouts. According to Mr. Augier, the weight of the mature foetus is 7 or 8, or at most 10lbs. Lastly, Roederer, one of the best authors, not only on Midwifery, but on forensic medicine, after one hundred and thirteen experiments, conducted with the greatest care, pronounces as a rule hardly

liable to exception, that a mature foetus exceeds one that has not attained the full term, one-fifth or more in weight, and upwards of one-sixth in length *. The ordinary measurement of a child at the full time, is from 16 to 22, or 23 inches, but usually between 18 and 20 inches. These differences in opinion, must prevent our reliance upon any standard of measure, or of weight, except in conjunction with other signs furnished by physiology †. The results which

* "In the eighth month," according to Mr. Burns, "the foetus measures about 15 inches, and weighs 4 or sometimes 5lbs. Dr. Roederer concludes from his examinations, that the average length of a male at the full time is 20 inches and a third, whilst that of a female is 19 inches, and 17-18ths. Female children, who, at the full time weigh under 5lbs. rarely live; and few males who even weigh 5lbs. thrive. They are generally feeble in their action, and die in a short time. (Introduction to Midwifery, 116.)

† Considerable obscurity has arisen from our ignorance of the weights used in these experiments. Dr. J. Clarke, of Dublin, has ascertained the average size of male and female children, at the full time, with considerable accuracy; his conclusions being entitled to the greatest confidence, the translator has subjoined the following table of the average results.

	Avoirdupois				Circumference of the Head.	Dimensions from ear to ear.
	lbs.	oz.	dr.	gr.		
Males	7	5	7	14	14	7-1/4th
Females	6	11	6	0	13-5/8ths	7-2/9ths

The

Osteogeny * might afford, would doubtless have great weight in deciding the time that might have elapsed after conception. But so many experiments would be required, and there would be so much difficulty in establishing every circumstance necessary for the deduction of legitimate conclusions, that it is not probable the medical art will soon attain results so desirable.

CLXIII. The first circumstance which we generally observe in a dead body, is its rigidity; this is the more remarkable when the subject has died of hemorrhage, or in convulsions, especially if it has been exposed to cold immediately after death; the contrary is observed if, by reason of the warmth of the atmosphere, or any other cause, it has been gradually deprived of its natural heat. Hence, we might conclude, with much probability, that a child, whose limbs are rigid, has only ceased to live at the moment of delivery, whilst another, with limbs more flexible, has died some time before birth. But an appearance, which may be modified by so many circumstances must be very uncertain.

The circumference of the head was taken from the most prominent part of the occiput, around over the frontal sinuses; and the transverse diameter from the superior and anterior part of one ear, across the fontanelle, to a similar part of the opposite ear. (Lond. Med. Journ. ix. 190. Phil. Trans. vol. 76. for 1786.)

* The doctrine of formation of bones.

CLXIV. We have already (§ CLXI.) pointed out the use to which the colour of the different parts of the body may be applied, in estimating the maturity of the foetus *. Abortive births are pale, so are those children which have died in consequence of inanition, or of hemorrhage. Livid colour often depends upon other causes than immaturity. The child's head may be locked, and violently compressed in the narrow part of the pelvis; an inverted position of the child will produce the same determination of blood, towards the descending parts, that would be observed in adults so situated; other parts of the body may be jammed, and bruised in a similar manner; the umbilical cord may impress a livid mark round the neck. These accidents, however, can only occur in consequence of protracted and laborious delivery, for after an easy labour, although no assistance be afforded, we do not observe on the child any marks of violent pressure, except, perhaps, on the vertex. When there are marks of bruises on the body of the foetus, the accused can only account for them, by pleading that the child has had a fall. Therefore, unless the livid colour can be ascribed in a satisfactory manner, either to the immaturity of the foetus, or

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* See Additional Note C.

the spontaneous accumulation of fluids, suffusing the integuments in large, smooth patches, (as frequently happens when a foetus, abounding with blood, dies previous to its birth,) we are to institute an accurate examination of the dead body. Removing the integuments, we follow the course of the muscles, endeavouring to ascertain the depth of the ecchymoses, and the destruction of parts that has taken place. Every uncommon tumefaction must be examined in the same manner. Roederer very justly remarks that the face is not always livid, even when the child's neck has been compressed, either by the os uteri, or umbilical cord, to such a degree as to prove fatal. Although the colour of ecchymoses varies from a slight tint at first, to a bluish colour which seems to be compounded of blue and black, and although the discolorations produced by putrescence are dark green, yet, when putrefaction has taken place, it will be difficult to form any decided opinion. In general, extreme putrescence will prevent our ascertaining either the fact of the child's having lived after birth, or the cause of its death. Even at this time, however, we can discover fractured bones, or deep wounds; but how is the observer to know that these injuries have been inflicted, during the life of the child? We are certain that a child born in a putrid state, must have died in the uterus, but we must not conclude

that it was born alive, because no marks of putrefaction are apparent.

CLXV. If we discover a wound, we must pay particular attention to every circumstance connected with it, its length, depth, direction, &c. Having raised the integuments, and separated the muscles from each other, we must examine the large blood vessels and principal nerves, tracing the course of each as far as appears necessary. Punctures appearing as if made with slender instruments, must be carefully noticed, in order to ascertain their depth, and the parts which have been injured. The fontanell and articulation of the head with the neck presenting such appearances, will require our particular attention.

CLXVI. We are next to determine the existence of malconformation; should any be observed, we are to specify the deviation from the usual structure of the human body, especially with regard to the brain and organs of senses; we must also notice the imperforation, or deranged structure of the mouth, nose, anus, urethra or vagina, and consider whether these defects were, or were not, compatible with the future life of the child under examination.

CLXVII. Having taken a general view of the whole body of the child, we proceed to a detailed examination of its different parts. The head must be postponed to the last, especially if we can fore-

see that the texture of the brain will be so softened and broken down, as to baffle anatomical scrutiny. Commencing, therefore, with the neck, we are to notice any livid zone round about it, which might indicate that it had been compressed, either by a ligature, or by the umbilical cord; next we attend to appearances of puncture in the back part of the neck, then turn the head round, and try whether the chin will pass beyond the shoulders. Although the joints of children are more moveable, and more capable of extension, than those of adults, yet the head can never be turned half way back; when the head of the child, therefore, can be moved so far, we have grounds for suspecting that it has been killed by twisting its neck; and it will be proper to examine the muscles, some fibres of which will be lacerated, or there will be well-marked ecchymoses on the neck; the processes of the second, third, fourth, or even fifth cervical vertebra may be broken or dislocated, and their ligaments ruptured. The spinal marrow also may be smeared with blood, and the cervical and accessory nerves, which arise from it, may be broken. The state of the large vessels, particularly of the internal jugular vein, will also merit attention. It will be highly proper to ask, if the patient has been assisted by any person? And, if so, what was the position of the child? What force was applied to the head, or

was it twisted too far towards either side? For we might possibly accuse the mother of consequences which resulted from the ill-timed officiousness of an assistant, ignorant of the obstetric art.

CLXVIII. Proceeding to the trachea, we lay open its whole length, beginning at the larynx. Should water flow out, we may suppose the child to have been drowned; for no fluid is imbibed by a child after death. But, should we find no water, we cannot declare, on that account, that the child has not been destroyed in this manner, since experiments prove that drowned animals do not always take in the fluid in which they expire. If the bronchi contain tough mucus, or much fluid of any kind, it will sufficiently account for the child's death. If much blood, or other thick, or slimy matter, be found in the bronchi, we are to conclude that the child has lived after birth, and has been destroyed by some obstruction to respiration, unless the appearance can be ascribed to putrefaction. Can we concur with the best authors on forensic medicine, in asserting that most of the women who destroy their children, effect their purpose by some species of suffocation? Deeming it highly improbable, that a child born of a healthy mother, by an easy labour, after having overcome the first obstacles to its new mode of life, should die of mere debility, they

ascribe its death to some violent cause, capable of stopping the act of respiration *. If the presence of slimy matter in the bronchi renders this a probable supposition, may we not reply that the mucus may arise from natural causes? For example, children at this age are subject to epilepsy; now, one symptom of epilepsy is the escape of frothy matter from the mouth, this terrible disorder therefore, may destroy a child without any crime on the part of its mother. Indeed, Roederer assures us that, according to his own observation, children do not begin to breathe, till after the evacuation of a fluid which impedes respiration; and he has ascertained that the lungs and trachea, were loaded with this fluid, in a child that died after having moved the breast and abdomen for a quarter of an hour, then voided a considerable quantity of this mucous matter, and, at last, carried on an imperfect respiration for twelve hours. An humour therefore, which naturally abounds in the lungs, may impede respiration, may become frothy, and finally suffocate the new-born child, by choaking up the passages for air. Lastly, whatever im-

* The observations of Dr. Bland, and Dr. J. Clarke, prove the mortality of male infants to be greater than that of females, and since the former are about one-twelfth larger than the latter, it seems probable that compression of the brain during parturition, is one principal cause of death in children during labour, and soon after birth. *Translator.*

portance may be attached to the existence of this frothy mucus in the bronchi, it is not to be attended to, when putrefaction has made much progress in the lungs; because the lungs so affected will always present this appearance, although no air has been introduced, either by respiration, or by artificial means.

CLXIX. When we come to examine the chest, we cut through the superjacent skin and muscles, beginning the incision at the articulation of the clavicle with the sternum, and descending laterally, in order to divide the cartilages near their union with the ribs. This incision must be carried alternately along the right and left side, through one or two cartilages of the ribs at once, taking care that the scalpel does not penetrate so deep, as to injure the contents of the thorax; if any fluid should escape, its quality and quantity must be noted; should the pleura adhere to the lungs, it must be detached by the finger; we then observe the situation of the lungs, whether they entirely fill the cavity of the chest, or are compressed together, occupying only a small part of it.

CLXX. But we will not again detail the numerous facts to be deduced from the lungs, and from the fulness or emptiness of the heart and blood vessels. These are minutely detailed in the second and third chapters, let us therefore pass on to the *abdomen*.

CLXXI. An ecchymosis or wound in this region, will awaken the operator's attention, and excite him to make as accurate an examination of the abdominal viscera as possible. In order to effect a convenient opening, he will make two incisions, which, beginning at the superior anterior spinous process of the ilium, will meet together, forming an angle, above the navel; two other incisions may be carried from the navel to the region of the kidneys. Proceeding in this manner, we shall not divide the umbilical arteries, and can discover if they are filled with blood, before passing out at the umbilicus; the indexes which they afford have been pointed out already. Since these vessels, in many instances, are not entirely obliterated in adults, and since they are always distended with blood in the young living subject, should we find them empty in the foetus we have reason to suspect that it has died of hemorrhage. After the supply from the placenta is cut off, the contents of the umbilical vein will pass on to the liver; we have therefore to examine the sinus of the vena portæ, should it be found empty, our suspicions of hemorrhage will be strengthened, and they will amount to certainty, if the other vessels of the abdomen appear empty also, and the viscera colourless.

CLXXII. Sometimes the abdomen contains a considerable quantity of fluid. Its colour

commonly resembles that of water in which raw flesh has been washed. This appearance is of little importance; in the immature foetus, a similar light coloured fluid is frequently found in the cavity of the thorax, and the sac of the pericardium. Roederer met with this sort of liquor in a foetus at the full time, which had sustained considerable compression on the head. A slight rupture or mere dilatation of the extremities of the blood vessels, will permit such an effusion of watery fluid. Should there be an extravasation of pure blood, with ecchymosis in the integuments, there will be more cause for suspicion, but no certain proof of violence, since it is possible that a similar rupture or dilatation might permit the escape of pure blood. And this extravasation is rendered entirely insignificant when it appears, by dissection, that the vessels are gorged with blood, in which globules of air are interspersed. In fact, the air disengaged by putrefaction, which ruptures the blood vessels of the lungs, so as to cause a discharge of blood from the mouth and nostrils, may, in like manner, burst the vessels of the abdomen, and produce extravasation in that cavity.

CLXXIII. When examining the abdominal viscera, we have to notice the appearance of each; the livid marks, the ecchymosis, the petechial discoloration it may present. We must remember, however, that the colour of these parts is

deeper in children than in adults ; and the appearance of the liver is, more especially, liable to vary in a short time after the access of air.

CLXXIV. In the stomach of an immature foetus, we find a viscid mucus, of a light brown colour, but paler than the fluid contained in the gall bladder. In the full-grown child, there is also a thick mucus of a pale ash colour. If we should meet with a clear fluid without tenacity, with a slightly saline taste, we may suppose it to be some of the liquor amnii, which the pressure of the uterus has forced into the alimentary canal. The same pressure may also force some of the fluid into the trachea and bronchi, such a circumstance, if it should cause the child's death, ought not to be laid to the mother's charge. Should the stomach, however, contain water, either pure or contaminated, there will be a probability that the child has been drowned in such a fluid. But the opposite supposition cannot always be maintained, because the child, as we have observed already, may be drowned without imbibing any liquid.

CLXXV. Although the best authors are of opinion, that the quantity of the meconium in the rectum, is not a proof either that the child has survived its birth, or has died before delivery, yet, it will not be improper to examine how much of it is contained in this gut, and the sigmoid flexure of the colon.

CLXXVI. The state of the bladder merits more attention. In fact we learn, from dissection, that although the bladder is rarely quite full, yet it is often more than half filled; if, therefore, it should be found nearly empty, or containing only a few drops, it is probable that the child has been born alive, and has lived long enough to void urine by its own efforts; for pressure of the uterus on the abdomen of the child is less capable of expelling urine from the bladder than meconium from the intestines. Convulsions, however, may affect the child before birth, and cause it to evacuate its urine in like manner as the meconium is often voided from the anus. This circumstance, therefore, is not to be considered as an infallible criterion of the child's having lived after birth; and, since it often happens that children, which were born alive, die before voiding urine, any conclusion drawn from the distended state of the bladder, might lead us into error.

CLXXVII. The examination of the child's head, merits all the operator's attention. Should it be smeared with blood, he will examine whence the discharge has proceeded, whether from the mother, or some wound inflicted on the foetus. Sometimes, blood proceeds from the lungs of children which have been drowned, or suffocated in any other manner, or violently bruised on the chest; bruises will be discovered by ecchymoses

and other marks of violence. We have already (§ CLXVIII.) stated, that the lungs may pour out even large quantities of blood, in consequence of putrefaction; we must notice any mixture of froth in this blood, or in any other fluid discharged from the mouth.

CLXXVIII. Opposite conclusions have been drawn from the open or closed state of the mouth, therefore no reliance can be placed upon it. The tongue at the time of birth is generally applied to the palate; and, since the chin is forced down upon the sternum, by the ordinary process of labour, it cannot be easy for the child to thrust the tongue out of its mouth; the anatomical structure of the parts renders it almost impossible in the child, and extremely difficult in an adult, with this posture of the head. Therefore, the *projected tongue* affords a probability that the child has lived after birth. It is true that convulsive motions, capable of producing this effect, do sometimes, though rarely, occur in children before birth; however, the possibility of such an occurrence is sufficient to invalidate the evidence drawn from this appearance.

CLXXIX. In order to discover any injuries affecting the pharynx, or the larynx, we divide the symphysis of the lower jaw, conducting the scalpel along its interior surface on each side; then beginning at the commissure of the lips in each

cheek, we carry the incision through the *musculi buccinatores, temporales et pterygoidei*. Each side of the lower jaw being now easily turned back, we have convenient access to the throat, and can discover any foreign matters, such as mucus, water, filth, sand, &c. Proceeding to the glottis and trachea, we examine whether the first efforts to respire have collected together so much mucus as might suffocate the child. Our suspicions of Infanticide will be confirmed or disproved by the presence or absence of such matters.

CLXXX. The depressed appearances of the fontanell is, very properly, deemed a proof that the child has died before birth.

CLXXXI. Lastly, we are to examine every part of the head, in order to discover any marks of external violence, as wounds, punctures, excoriations, depressions, fractures or ecchymoses.

CLXXXII. With respect to ecchymosis, it is difficult to determine the precise degree of value which we can attach to it, this must be modified, by various circumstances. Since it can only take place whilst life and circulation continue, it proves the foetus to have been alive at the time of delivery, unless the labour has been difficult, in which case, although the child should be still-born, we may find about the fontanell, and the parts behind it, either well-marked ecchymosis, or at least considerable tumefaction.

CLXXXIII. "A child," says Roederer, "is rarely born without some tumefaction about the head, except it dies before delivery. But, unless the tumefaction occupies one circumscribed situation, it has probably been caused by violence exercised against the child." This, according to Mr. Dreyer, is a rule with at least one exception, viz. when the seat of the circumscribed tumefaction is distant from the vertex; for, in the ordinary course of labour, the infant presents the vertex at the os uteri, the circumference of which, by its resistance, excites on the parts a tumour with ecchymosis. But, should the tumours be distant from the vertex, or circumscribed within a small space, or should they penetrate quite to the bone, there will be reason to suspect that they were caused either by obliquity of the uterus, or wrong position of the head, or a violent blow. But the obliquity of the uterus, and wrong position of the child's head, are great obstacles to delivery, even when the best assistance is afforded, and must therefore operate much more strongly, to counteract the unaided efforts of nature; ecchymosis, therefore, should not criminate the mother, unless there is evidence that her labour was not protracted by unavailing efforts. Should the ecchymoses be numerous and circumscribed, but not deep, it is possible that they only proceed from the impressions which the edges of the different bones con-

stituting the cranium, may have produced, in consequence of the compression they have sustained from the action of the uterus. Ecchymoses, of limited extent, as to their surface, and quite unconnected with each other, are more characteristic of external violence than if they were more extensive, because the latter, if they border on the fontanell, are most probably owing to the action of the uterus, whilst the prominent form of the others, proves them to have been produced by the impulse of hard bodies. If they are deep and contain pure grumous blood, it will be difficult to assign them to any thing but external violence, supposing the mother to have had an easy and quick delivery. An oedematous tumour, between the common integuments and the aponeurosis which covers the bones of the cranium, is scarcely a mark of violence; if it contains bloody serum, it is more suspicious; if pure blood, our suspicions are strengthened, and, still more, if the blood be grumous. But if the ecchymosis affects not only the skin and cellular membrane, but also the aponeurotic expansion, breaking its connexion with the bony coverings, our suspicions become more and more strong, always supposing that the labour has not been protracted; and, if the diploe of the cranium is soaked in blood, the proof of violence is still less equivocal. But must we not modify these deductions, in consequence of ple-

thora of the child, either general, or confined to the head; debility of the vascular system, or the violent compression of the skull against the bones of the pelvis? Even when there is an injury of one or both tables of the skull, when the dura mater is detached and blood is effused upon it, the thinness of the foetal skull; the hardness of the pelvis; the possibility of malconformation, which may have escaped notice; and the prodigious expelling power of the uterus; all these will doubtless add weight to the considerations just enumerated *.

CLXXXIV. In the successive examination of each part, the anatomist will have occasion for all his knowledge and dexterity. He must carefully distinguish between injuries produced by himself, in the prosecution of his perplexing enquiry, and those appearances which result from the natural

* The translator has been favoured with a perusal of certain depositions, sworn before a coroner in this neighbourhood, by a physician and surgeon, who do not reside in or near Lancaster. "On making an incision into the integuments at the crown, in "a direction straight back, a quantity of extravasated blood rushed out, which, on extending the incision, was collected, to "the quantity of half a tumbler glass. Proceeding to remove "the scalp, the bones of the skull were covered with clotted "blood, this being removed, both parietal bones were found "fractured across; these are phenomena, however, sometimes produced by the violence of a woman in labour." It is needless to say that the woman was acquitted.

structure of the parts, from the action of the uterus, or the criminal measures which have been resorted to. Having noted the colour of the scalp, he will make a crucial incision, will note the colour and consistence of the matter covered by any tumour or bruise, will examine the pericranium, the external table, the diploe and internal table of the skull. In order to expose the brain, he will separate the parietal bones with proper precautions, avoiding both the spinal artery of the dura mater, which runs at their anterior and inferior angle, and the lateral sinuses situated at their posterior and inferior angle. He will make an incision at the coronal suture; then, with the handle only of the scalpel, will separate the dura mater from the parietal bones, he can then detach and elevate the frontal and occipital bone; he must carefully examine whether the dura mater is red and inflamed, on that part which corresponds with an ecchymosis on the integuments; a correspondence between these signs, will be a strong proof that both are the consequences of criminal violence. At this part of the dissection, it will be easy to observe blood or bloody serum, effused beneath the dura mater. The inferences to be drawn from such an effusion have been detailed already; we must remember however, that the very delicate vessels of

the brain may effuse their contents, not only in consequence of rupture, but of anastomosis. We witness effusion into the ventricles of the brain every day, without any violent cause. A deep red and inflamed appearance of the cortical substance of the brain, with ecchymosis on the scalp, is a very strong proof against the accused. When, after having removed the cerebrum and the cerebellum in layers, and carefully cleared away the blood poured out from the divided vessels, we arrive at the medulla oblongata and medulla spinalis, it will be proper to examine whether the supposed twisting of the neck has caused an effusion of blood on these parts, or lacerated the cervical and accessory nerves. (§ CLXVII.)

CLXXXV. Lastly, we are to look for fractures of the bones which constitute the cranium, their situation, extent, fragments, splinters, depressions, fissures, &c. &c.

CLXXXVI. Finally, ecchymoses and extravasations of blood or lymph, wheresoever they may occur, and at whatsoever period of the infant's life, can afford no legitimate conclusions when putrefaction has taken place to a considerable extent; for in consequence of putrescence, the texture of the vessels is broken down, and their contents are rendered thinner and more acrid. If, therefore, on throwing a portion of brain or abdominal viscus

into water, we observe it to float, it is not proper to proceed in an examination, which might endanger the life or the character of a human being.

END OF THE TRANSLATION.

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ADDITIONAL NOTES, BY THE TRANSLATOR,

Additional Note A, page 70.

Extracted from De Haen.

Quædam de Pulmone innatante aut subsidente in aqua.

“**I**N dubio Infanticidio solet vulgo ex pulmone, fundum aquæ pretente, judicari infantem post partum non vixisse; eodem vero innatante, vixisse, respirasse. Observationes in Nosocomio factæ quandam hic prudentiam suadent, ne peccemus. Ter enim, quaterve, jam demonstravi publice notabiles portiones Pulmonis Adultorum, in aquam injectas, fundum petere.”

“Etenim obstructions, mucus copiosus, schirrhi, indurationesque pulmonum, reddunt eorum portiones, imo lobos integros, graviores, aeri impervios, ita ut etiam leviores cæterum vicinæ portiones una deorsum trahantur: si vero gravior pars parva sit, in aqua a leviori sustinetur; separata autem fundum petit. Plures nunc relationes, ad judicem factæ, argumentum habent ex abscissa portione pulmonis, innatante, vel submersa aquis. Nonne hinc in proclivi fit, ut fontes fœminæ absolvantur, fallanturque Judices? Et si horis diversis, ob diversitatem jurisdictionis, a diversis chirurgis examen cum frusto pulmonis fiat, nonne hinc e diametro oppositæ relationes haberentur?”

“Consulentes autores Anatomicos, similia detegimus. *Dimerbroeck* pulmonem Adultorum schirrosum vidit aliquoties aquæ fundum petiisse. *In bist. Acad. Sc. Par.* 1733. unius lateris pulmo integer innatavit aquæ, alterius submersus est totus. Ex *Zellero & Bobnio* patet tum vituli, tum infantis, post nativitatem respirantium pulmones, fundum in aqua petivisse. cujus causa aut mucus, aut valida in utero nata obstructio. Ita quidem ut

aer non obstructam post nativitatem partem implevisset, obstructam minimine."

"Sed prætera vagit nonnunquam infans in partu, eo quod capite jam prodiens aeris inchoet usuram: deficientibus interim viribus matris, aut uteri orificio se arctius circum ejus collum constringente, infans ante nativitatem moritur. Pulmo hic innatabit aquæ, quamvis infans mortuus sit natus, reaue infanticidii agetur, secundum leges susceptas, mater. Castigandæ ergo & emendandæ erunt regulæ artis ibidem loci, ubi adhuc more communi fiunt ad Judicem relationes; ne vel judicem fallendi, vel sontes absolvendi, vel insontes damnandi, evidens periculum incurrere pergant."

(Ratio Medendi, Tom I. Cap. XVIII.)

Additional Note B, page 71.

IN the following remarks, Morgagni probably assigns a due quantum of credibility, to certain strange stories of children crying before birth, when he hints, that "they depend upon the forced testimony of contemptible women," and afterwards warns us, lest we be "deceived by the craft of an old woman."

After some hesitation on the subject, I think it proper to publish the following case, being certain of its authenticity; it will serve to shew how easily accoucheurs may deceive themselves, and now plentifully cases in point may be found. A medical practitioner, unable to superintend a lingering case in midwifery under the care of his apprentice, requested a professional friend to give his occasional advice; the latter, happening to call, found the young operator in anxious expectation of a second child, *one* being born some time before. Circumstances however occurred to render the operator's opinion somewhat doubtful, but he declared himself quite positive, *because he had heard the second child cry*. After all, the case ended in a single birth of a child that had been dead some time.

Extracted from Morgagni.

"I see it therefore objected, that the lungs of an infant who was born alive may, nevertheless, subside in water, if they have either been not sufficiently distended from a want of strength in the infant, or have been made heavy from disease, or from suffocation itself: and that on the other hand, the lungs of the infant, who was born dead, may swim on the surface, if they are distended with air, which either putrefaction may have discharged, or itself may have drawn in, before it came into the world, or some person afterwards, in order to excite respiration, has blown in, through the mouth. And these, and any other dangers of deception whatever, it is necessary to know, and to be cautious of, in the manner which will be immediately pointed out."

"And first, there is no reason to doubt of what that very grave man, Laurence Heister *, testifies his having seen (for as to some other observations, not much unlike this in other respects, as far as belongs to the crying of the infant, I see that they depend upon a forced testimony of contemptible women) that an infant, after living nine hours, weakly indeed, and continually sending forth feeble lamentations, the lungs, which were in other respects sound, appeared just in the same manner, as in those who never breathed, and subsided in water, as they are wont to do in this kind of infants: which ought not to seem very wonderful, if you observe with this author, whom I have already commended †, that air sent by us, into the lungs of a foetus, in small quantity, and with little impetus, is unequal, as he has often found by experiment, to the task of expanding so many vesicles of the lungs, as is necessary, in order to render them specifically lighter than water. And this being the state

* Dissert. de fall. pulm. infant. exper. n. 10. & seqq.

† Ibid n. 16.

of the case, before we argue, from their subsiding, that the infant was born dead, we must inquire into the marks of its weakness, from the foregoing or present disorders of the mother, from the difficulty of the birth, from the state of the child's body, after death, and other things of that kind : and if there be none of these things, and no other argument, to the contrary ; we shall not doubt but the child was born dead."

"Yet on the other hand it will be evident, that we cannot trust to the sign in question, if at any time we should observe, that the lungs are not endowed with that gravity which is natural and peculiar to a foetus, but with a morbid gravity ; either because they are schirrhous, or because they are inflamed, or because they are so far affected, with some kind of infarction or other, that if they were even the lungs of an adult man, they nevertheless could not swim, on the top of the water, which most anatomists, and I also, sometimes, have experienced. For that in foetusses, there may be sometimes infarctions of this kind, is not only indicated by reason, but confirmed by experience, as, for instance, in the observation made by Zeller *, on a calf, which had lived half an hour."

"But finally, if suffocation itself can, sometimes, fill the lungs with so great a quantity of blood, in an infant, as I have mentioned that they have been overwhelmed with in strangled adults, from the observation of others, and particularly of Harvey ; yet suffocation will not be able to hide itself, under the sign in question. For although all the external marks thereof should be wanting, yet certainly a different state of the lungs from that which is useful in the foetus, and the enlarged bulks besides, would admonish us, that although they did not happen to swim in water, we should not be too hasty in trusting to this sign. Besides, it can scarcely happen, in those who have drawn in air, but that some small parts of the lungs shall retain so much of it, as to make them swim, though the other

* Disput. quod pulm. infant. in aq. &c. Vid. Hist.

parts descend; so that these parts are to be examined into, by cutting the lungs piece-meal, and throwing them separately into water, as well as by other means, and these both in this and the two former cases, that we may not be easily drawn into error, from the subsiding of the lungs."

"But on the other hand, that we may not be imposed upon, by the swimming of this viscus; we must, particularly, attend to this, that although learned men have not been wanting, who have seen the lungs of foetusses fall to the bottom in water, even after the highest putrefaction has taken place, we cannot, nevertheless, deny the truth of the assertions of those persons, who affirm that they have seen the contrary: amongst whom is the celebrated professor Weissius, whose observation if you read *, you will readily confess, that the lungs of a stinking foetus, who was never able to draw in air, "were spongy" to the touch, and "swam on the top" of the water, for no other reason but because they were already "infected with putrefaction," which discharged the air. And I should suppose that Frederic Ruysch † had a view to the same thing, when he wrote, "that the lungs, when properly formed, would never "swim upon the surface of the water, if the foetus should die "in the womb of its mother," (where he complained of them who disputed this circumstance with him formerly, which controversy is perhaps, the same with what Boerhaave has made mention of, in some part of his lectures ‡.) When therefore we find, that the lungs are not "in a good state," but tainted with putrefaction; we must not, although they swim in water, for that reason, pronounce the child to have been born alive."

"And much less still, whenever there may be a probable suspicion, that amidst the throws of a very difficult birth, the

* In Medit. Behling. sup. cas. rupti. in partu uteri.

† Thes. Anat. V. n. 40.

‡ Praelect. ad Instit. § 691.

foetus might have drawn in the air by means of a rupture of the membranes, before it could be possibly extruded, by reason of that delay, and by this means have died in the birth, as Palfin also, among the rest, has admonished: although it can scarcely happen, that in this case, and the last preceding, we shall be deceived by the craft of an old woman, since both of them require helping hands, nor the circumstances which precede, or accompany, or are the consequence of them, can be easily either sufficiently concealed or dissembled."

(*De Sedibus et causis Morborum*. Alexander's Translation, Letter XIX, § 45.)

Additional Note C, page 89.

"THE blood of the foetus," says Mr. Burns, "differs from that of the adult. It forms a less solid coagulum, for in place of fibrous matter, it yields a soft tissue almost gelatinous. *It is not rendered florid by exposure to air*, and it contains no phosphoric salts. *But soon after the foetus has respired, the colouring matter, exposed to oxygen, acquires the vermillion tint; and salts are formed, particularly the phosphate of lime.*"

(Introduction to Midwifery, p. 119.)

Professor Berzelius, according to Dr. Young, makes the following remarks. "It has been supposed, that the blood of the foetus undergoes, in the placenta, a change similar to that which takes place in the lungs of the adult, and that it returns of a scarlet colour through the veins (vein) of the funis; but credible authors assure us, that in the foetus the eye cannot distinguish the venous blood from the arterial. The principal object of the process, which is carried on in the lungs, appears to be the preservation of temperature; while the foetus borrows its temperature from the surrounding medium, and consequently has no particular occasion for a supply of heat, which could only have the effect of raising

“ its temperature much above the common standard of ordinary
 “ animal heat. This circumstance therefore excludes the possi-
 “ bility of a change of the colouring matter in the foetal cir-
 “ culation, although there are many reasons for supposing the
 “ blood’s passage through the placenta to answer some other very
 “ important purposes.” (Dr. Young’s Medical Literature, p. 505.)

The aerated blood received by the foetus through the umbilical vein, is so evidently florid, that it surprised me to find Mr. Burns advancing a proposition apparently incompatible with phenomena commonly observed. He alludes to some experiments of Bichat, on whose authority the assertion alluded to is probably grounded. The arguments of professor Berzelius, rest upon an assumption, that the aeration of the blood is principally requisite for the generation of animal heat; an hypothesis which the observations of Mr. Brodie have rendered extremely doubtful. (See Phil. Trans. for 1812.) We have, therefore, good grounds for the common opinion, that the foetal blood whilst circulating in the placenta, undergoes changes very similar to those which take place in the lungs of adults; but since, before birth, the *aorta* is supplied with blood aerated to a less degree, than the fluid which it receives in the adult circulation, we have reason to suppose that there can only be a slight difference in colour, between the arterial and venous blood, in the body of the foetus. Hence, it is very probable that the skin of a still-born child, can never assume the florid appearance which we observe, after respiration has taken place, and we may perhaps be warranted in assuming the florid appearance of a dead child, as one proof that it has respired.

Si quid novisti, &c.

THE END.