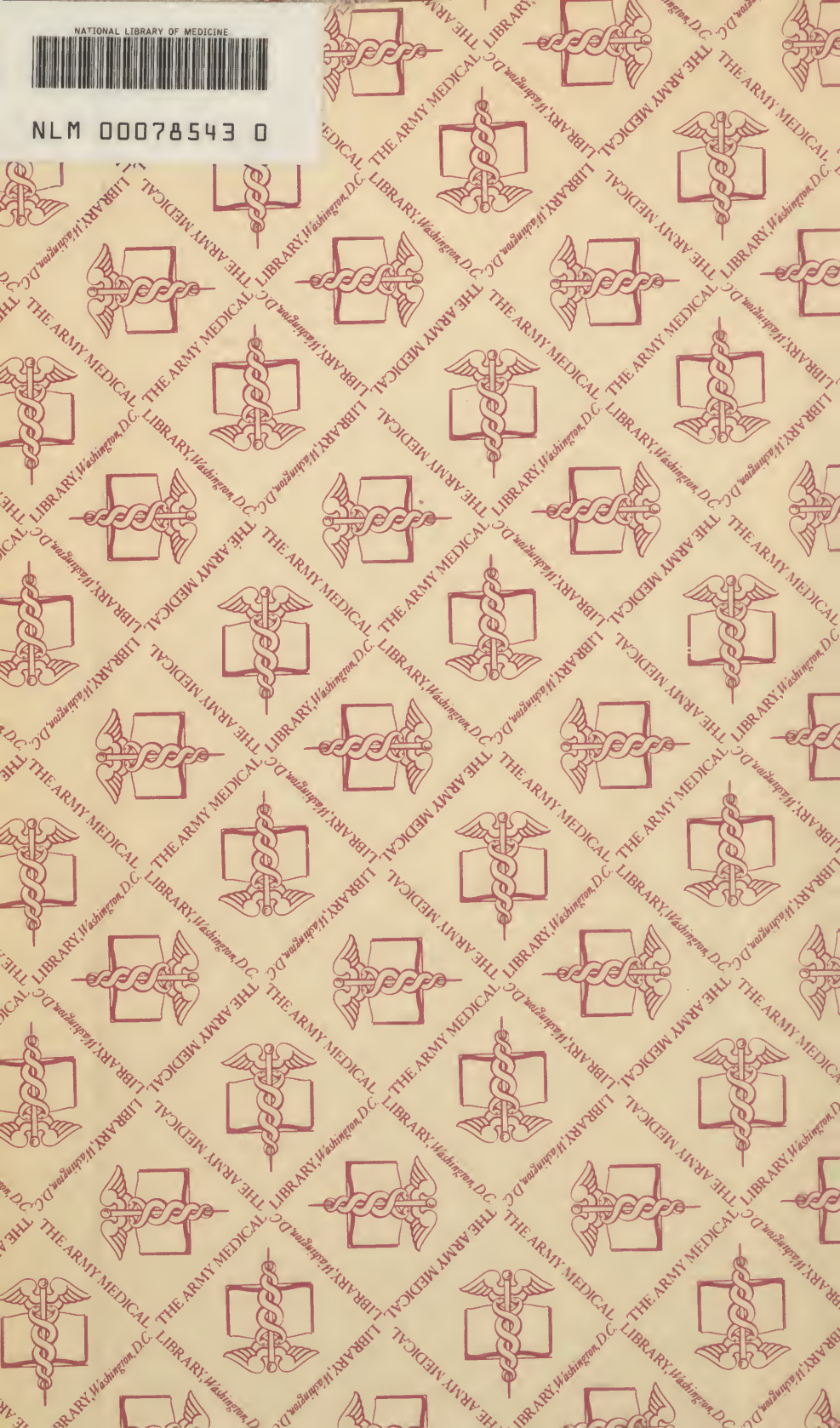


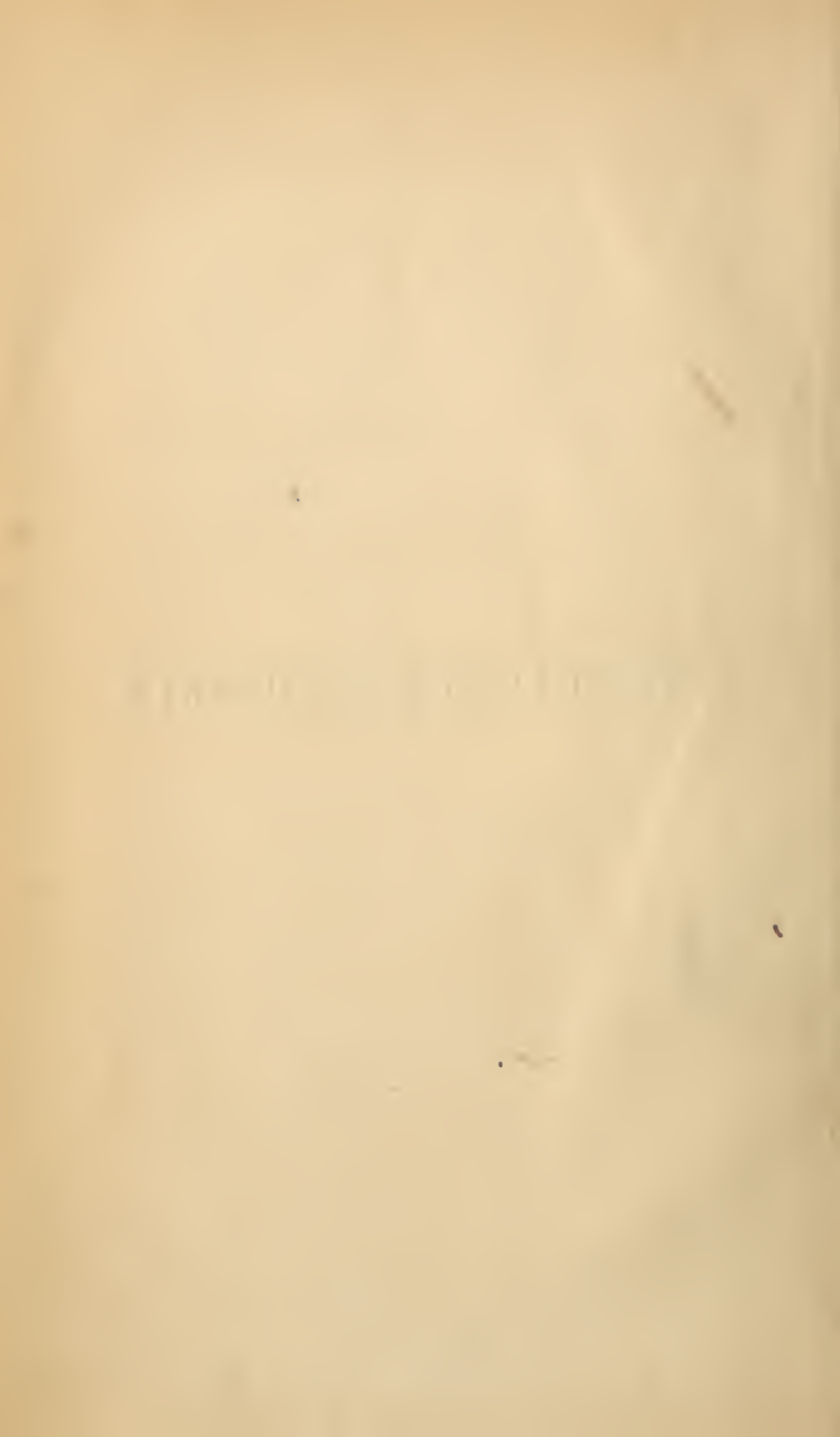


NLM 00078543 0





MEDICAL JURISPRUDENCE.



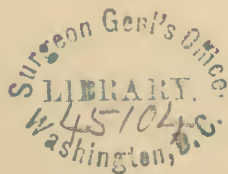
WHARTON AND STILLÉ'S

MEDICAL JURISPRUDENCE.

THIRD EDITION.

VOL. II.

PART SECOND.



PHILADELPHIA:

KAY & BROTHER, 17 AND 19 SOUTH SIXTH STREET.

1873.

W
600
W 554m
V. 2, Pt. 2
1873

Entered according to Act of Congress, in the year 1855, by
KAY & BROTHER,
in the office of the Clerk of the District Court of the United States in and for the
Eastern District of Pennsylvania.

Entered according to the Act of Congress, in the year 1860, by
KAY & BROTHER,
in the Clerk's Office of the District Court of the United States in and for the
Eastern District of Pennsylvania.

Entered according to Act of Congress, in the year 1873, by
KAY & BROTHER,
in the Office of the Librarian of Congress, at Washington.

PART II.

OTHER FORMS OF VIOLENT DEATH.

CHAPTER I.

WOUNDS.

I. GENERAL CONSIDERATIONS, § 685.

- 1st. What a wound is, § 685.
- 2d. General definitions, § 686.
- 3d. How far dangerous, § 687.
- 4th. Examination of the body, § 689.
- 5th. External phenomena, § 690.
- 6th. Internal phenomena, § 690.
- 7th. Wounds made before or after death, § 691.
- 8th. Ecchymoses from natural causes, § 700.

II. CLASSIFICATION OF WOUNDS, § 702.

- 1st. Incised and punctured wounds, § 703.
- 2d. Lacerated and contused wounds, § 704.
- 3d. Gunshot wounds, § 707.
- 4th. Wounds from wadding and gunpowder, § 714.

III. HOMICIDAL, SUICIDAL, AND ACCIDENTAL WOUNDS, § 717.

- 1st. Situation of wounds, § 717.
- 2d. Direction, § 719.
- 3d. Position of body and of weapon, § 722.

IV. BLOOD-STAINS.

- 1st. General appearance, § 724.
- 2d. Chemical examination, § 726.
- 3d. Microscopical evidence, § 753.

V. CAUSE OF DEATH IN WOUNDS, § 769.

- 1st. Hemorrhage, § 770.
- 2d. Shock, § 774.
- 3d. Mechanical injury, § 775.
- 4th. Diseased condition of body, § 777.
 - (1) Wounds inflicted on pregnant women, § 779.
 - (2) Indirect complications, § 780.
 - (3) Tetanus, § 782.
 - (4) Erysipelas, § 783.
 - (5) Hospital gangrene, § 784.
 - (6) Nervous delirium, § 785.
- 5th. Surgical operations, § 786.

VI. WOUNDS OF VARIOUS PARTS OF THE BODY.

- 1st. Injuries of the head, § 790.
- (1) Concussion of the brain, § 791.
 - (2) Fractures of the skull, § 793.
 - (3) Wounds of the substance of the brain, § 795.
 - (4) Wounds of the face, § 800.
- 2d. Wounds of the neck, § 801.
- 3d. Wounds and injuries of the spine, § 803.
- 4th. Wounds of the chest, § 815.
- 5th. Wounds of the lungs, § 816.
- 6th. Wounds of the heart, § 820.
- 7th. Wounds of the abdomen, § 827.
- (1) Superficial wounds, § 827.
 - (2) Penetrating wounds, § 828.
- 8th. Wounds of the liver, § 829.
- 9th. Wounds of the diaphragm, § 830.
- 10th. Wounds and rupture of the bladder, § 831.
- 11th. Wounds of the genitals, § 835.

CHAPTER II.

BURNS AND SCALDS, § 839.

CHAPTER III.

SPONTANEOUS COMBUSTION, § 849.

CHAPTER IV.

HEAT AND SUNSTROKE, § 869.

CHAPTER V.

LIGHTNING, § 878.

CHAPTER VI.

COLD, § 880.

CHAPTER VII.

STARVATION, § 884.

CHAPTER VIII.

SUFFOCATION, § 895.

CHAPTER IX.

STRANGULATION, § 907.

CHAPTER X.

HANGING, § 919.

CHAPTER XI.

DROWNING, § 943.

CHAPTER XII.

SIGNS OF DEATH, § 960.

CHAPTER XIII.

MEDICO-LEGAL EXAMINATIONS, § 1006.

CHAPTER I.

WOUNDS.

I. *General Considerations.*

§ 685. 1st. *What a wound is.*—The term “wound,” in popular language, can hardly be misunderstood. It is a form of bodily injury caused by external violence, and involving a breach of continuity in the soft parts. It may be questioned whether burns and scalds can properly be ranked as “wounds.” The immediate effect of the application of a burning or heated body to the skin may not be such as to cause more than a redness of the surface, or an elevation of the cuticle into a blister; but the surface of the skin may afterwards, by the giving way of the cuticle, be exposed. Hence the reader will perceive that any legal limitations of the meaning of the word, whether based upon popular or professional definitions, are liable to be erroneous, if the intention be really to designate the results of external violence by a name which shall comprise them all. In treating of this subject in its medical aspect alone, we shall make use of the word *wound* as expressive of any form of bodily injury caused by external violence, since it is only by such a course that the medico-legal bearings of the subject can be properly considered. Hence we have used the term WOUNDS as a convenient designation for this chapter, entirely irrespective of the possible surgical or legal limitations of the word.(a)

(a) The legal meaning of the term “wounds” is considered in another treatise, Wh. Cr. Law (5th ed.), § 832.

§ 686. 2d. *General definitions.*—Wounds are usually classified, in reference to their visible marks upon the skin, into incised, punctured, lacerated, contused, and gunshot wounds. Although a division into mortal and non-mortal would appear to have a more direct and useful bearing upon legal medicine, yet the unexpected complications, and the various extraneous causes which give gravity to the simplest cases, and, on the other hand, the favorable termination of some injuries of apparently the most dangerous nature, render any such classification impracticable. These facts will become apparent in the course of this chapter, and the reader will not fail to perceive that in medico-legal practice, every wound must be judged by itself; the general principles and rules of surgery being subject to constant modifications from individual peculiarities.

§ 687. 3d. *How far dangerous.*—The varieties and the degree of danger attending wounds in general, depend very much upon some of the following circumstances: “the extent of the injury; the kind of instrument with which it has been inflicted; the violence which the fibres of the part have suffered in addition to their division; the size and importance of the bloodvessels and nerves which happen to be injured; the nature of the wounded part, in respect to its general power of healing favorably or not; whether the operations of the system at large and life itself can be well supported or not, while the functions of the wounded part are disturbed, interrupted, or suspended by the accident; the youth or old age of the patient; the goodness or badness of his constitution; and the opportunities which there may be of administering proper surgical aid and assistance of every kind.”(b)

§ 688. But in this country the physician is seldom called upon by a legal tribunal to offer an unconditional opinion upon the probable danger of a wound, his assistance is more frequently invoked for the purpose of deciding how far a given wound was the cause of death, and hence his testimony is required before the coroner upon the post-mortem examination. No one should be willing, upon theoretical grounds alone, to give an opinion as to the agency of the wound in

(b) Cooper's Dict. of Pract. Surgery.

producing death. A careful post-mortem inspection will either reveal the violent cause of death, or demonstrate that it was not due to external violence; it is the duty of the physician whose opinion is desired, to make the examination most carefully himself, and to base his opinion entirely upon this, and not upon previous notions of the probable nature and effect of the wound.

Whatever parts of this examination call for the application of knowledge of which he may not be possessed, as the use of the microscope, or chemical analysis, should be committed to one who is really an "expert" in these branches. The idea is much too prevalent, and should be corrected, that the practitioner of medicine must necessarily be acquainted with all the appliances and new modes of investigation which modern science has produced; in other words, that every physician is equally competent to undertake the examination of a case involving the question of homicide. It is to this cause chiefly, viz., the disparity in the attainments of one physician as compared with another, and also to the natural division of medical science and practice into numerous departments, some of which may be cultivated to the exclusion of others—that the "disagreement of doctors" is really due. Men of equal medical attainments will rarely differ upon an essential point of pathology or practice, but ignorance, or defective knowledge in medicine, does not differ from that in any other branch of science, in being usually associated with presumption and obstinacy. Still, there are few practitioners of medicine who are thoroughly prepared to enter upon an examination of all the medical aspects of a case of violent death; familiarity with the means required to carry through such an investigation can be gained only by special study, for which, to the majority, time is wanting.

Circumstances may, however, impose upon the physician the duty of making an examination for which he does not feel himself fully competent. In remote or interior parts of the country the means for the successful prosecution of a medico-legal inquiry are usually not at hand; whoever may be obliged to undertake an examination under such circumstances should endeavor to obtain the assistance of a colleague,

and should candidly represent to the authorities the necessary imperfection of the examination, and what influence this may have upon the objects of the inquiry.

§ 689. 4th. *Examination of the body.*(c)—The following points must be carefully noted; the locality, the direction, and the dimensions of the wound; whether there is a loss of substance or not; and whether the wound was inflicted before or after death, with the grounds of the opinion; the probable cause of the wound, and position of the body at the time; the results of the injury (ecchymosis, swelling, hernia of internal organs, concussion, inflammation, suppuration, ulceration, gangrene); notice of the clothes of the deceased, especially the portion (if any) corresponding to the place of injury; comparison of the weapon with the wound; medical assistance, and by whom rendered. Besides these general points which claim attention, a very carefully detailed account of the wound itself is required, not only to ascertain the nature of the weapon with which it was given, but also to learn how far it has penetrated the body, and what organs have been wounded. And, moreover, the importance of a general and careful examination of all the organs of the body should not be forgotten, for notwithstanding the immediate cause of death may be evident, it is still advisable to be sure that there was no cause of death in any other part. Although there may be no suspicion of poisoning, the stomach should be opened. In a case often referred to, a girl died while her father was chastising her for stealing, and on account of the marks of violent treatment upon her body, it was supposed that this had caused her death. On opening the stomach, however, it was found to be inflamed, and contained a white powder, which was proved to be arsenic. The girl had taken the arsenic in dread of her father's anger, upon the detection of the theft; she vomited during the flogging, and died in slight convulsions.

It may even happen that although no marks of violence can be found externally, or at least none which will explain the

(c) A more detailed account of the changes after death will be found in Chap. XII.

person's death, internal injuries may be discovered upon dissection, which will render it certain that the death was violent. Indeed, Casper goes so far as to declare that as a general rule when death follows an injury, suddenly or speedily, in consequence of internal hemorrhage or other effect of laceration of an internal organ, the signs of external injury are either slight or are entirely wanting. Among numerous instances of this description, furnished by Casper's experience, the following is one of the most striking. On a cold winter's night a wagoner was descending the hill from Spandau with a heavily loaded wagon, and dismounted, in order the more easily to guide his team. In doing so, he was thrown violently against one of the poplar trees which line the road, and where, in the course of the night, he was found dead. The only external injuries consisted of a slight abrasion upon the left arm, and a similar one upon the right temple. In the head there was nothing worthy of note, except that the transverse sinus was unusually distended with blood. On opening the spinal canal, about a quart of dark fluid blood escaped. The spinous process of the first thoracic vertebra was broken off. The deeper spinal muscles were ecchymosed, but the spinal marrow was uninjured. The left pleural cavity contained about thirty ounces of liquid blood. The pericardium was torn completely across, and the heart, severed from its large vessels, lay almost entirely loose in the cavity of the thorax. The open ends of the aorta and pulmonary artery were distinctly visible. The heart itself was sound and firm, and on both sides, but in the ventricles especially, contained much dark coagulated blood. The left lung was entirely torn through its middle portion, and in the right lobe of the liver was a laceration two inches long, by half an inch deep. And yet the exterior of the body presented nothing remarkable.*(d)*

A case is reported by Dr. Ellis, of Boston, of a woman who was knocked down and run over by a sleigh. She lived for ten days after the accident, and there was no mark of external injury. On examination after death, the liver was found to

(d) Gericht. Med., i. 122.

be lacerated, the common bile-duct was torn across, and several fractures appeared in the right kidney.(e)

§ 690. The phenomena which intervene between death and putrefaction are often of assistance in throwing light upon the mode and period of death. The changes which take place in the body after death are due to physical and chemical laws.

5th. *External phenomena.*—Soon after death, while the body is still warm, the peculiar cadaveric smell (not putrefactive) is perceived at the same time that the surface becomes pale. The blood sinks gradually to the more dependent parts, occasioning a discoloration of the skin resembling in some respects a contusion produced during life.

The complete cooling of the body (with the disappearance of the peculiar smell just referred to) is accomplished much more slowly than is usually supposed. According to Bock,(f) it does not take place in less than from fifteen to twenty hours. Externally, the reduction of temperature occurs more rapidly than in the interior of the body, but in both cases it is dependent upon the temperature of the surrounding air. The bodies of old people and children, of the thin, anæmic, and wasted, grow cold at quite an early period after death. But in those who die suddenly, in the fat and robust, the animal heat is more slowly parted with. *Rigidity*, or *rigor mortis*, occurs generally within twelve hours after death, and lasts from thirty-six to forty-eight hours. It is more complete and lasting in those who have died suddenly, or in the course of acute inflammatory diseases, while in the weak and those exhausted by long illness it is feeble and transient. It may be distinguished from the rigidity occurring in cases of apparent death (syncope) by the fact that in the latter case the rigidity is spasmodic and partial, arises and disappears suddenly without any regularity, and returns after the contracted limb has been extended, which is not the case to the same extent in true post-mortem rigidity.

6th. *Internal phenomena.*—The blood usually remains fluid for two or three hours after death. It accumulates in the

(e) Boston Med. and Surg. Journ., April, 1860, p. 222.

(f) Gerichtliche Sectionen des Menschlichen Körpers.

veins, owing to the last contraction of the heart and arteries having more or less completely emptied the arterial system. The amount of blood found in the cavities of the heart, and the existence of coagula, depend upon the nature of the blood itself, and the mode of death, whether rapid or protracted.

§ 691. 7th. *Wounds made before or after death.*—The distinction between wounds made before and those made after death depends upon the signs of vital reaction in the wound and its vicinity. If the signs of inflammation, or its products, are found; if the wound be swollen and discolored; if plastic lymph have been thrown out between its edges; if suppuration, or gangrene, or cicatrization have taken place; we have not only certain proof that the wound was inflicted during life, but also that death could not have been immediate. The question, therefore, as to *post-* or *ante-mortem* infliction of the wound, cannot arise when any of the processes referred to have taken place. But, when none of these signs are recognized, there may be room for doubt as to the period of its infliction. Many cases occur in which no traces of suppuration or inflammation can be detected, although an injury was received during life. This is especially the case when death results rapidly from hemorrhage from a large artery or vein, so that if a wound is made upon the dead body near to that which occasioned death, it will be impossible to distinguish the one from the other by any characteristic sign.

If death have resulted from a wound, not immediately, but still before the effusion of plastic lymph, its edges will be found swollen and everted, and coagulated blood effused in the track of the wound and in the adjoining cellular tissue. When, however, it has proved immediately fatal, as in some penetrating wounds of the heart, aorta, and spine, the above mentioned characters will not be found. This fact is most probably due to the rapid drain from the capillaries, in consequence of internal hemorrhage, or to the sudden cessation or the action of the heart. Thus, in a case related by Casper, in which a woman was instantly killed by a table-knife which was thrust through the arch of the aorta, entering the chest between the first and second ribs, the wound presented sharp and smooth edges, without a trace of either fluid or dried

blood; in fact, it was exactly like a wound made upon the dead body.(g) It is therefore of importance to remember, that in wounds which prove immediately fatal, there may be no signs of vital reaction, and no outward effusion of blood. A case is very easily supposable, in which a wound in the region of the heart might be designedly inflicted after death; as, for instance, to divert attention from the real cause of death, which may have been due to poisoning. Although no distinction should be possible, from an inspection of the external wound, the absence of internal hemorrhage would, in such a case, betray the period at which the wound was made.

§ 692. Dr. Taylor endeavored to solve the question of the differences between wounds inflicted before and after death, in an experimental way. In one experiment, an incised wound, about three inches long, was made in the calf of the leg, two minutes after its amputation. The skin retracted considerably, the adipose tissue underneath protruded between its edges, but the quantity of blood which escaped was small. Examined after the lapse of twenty-four hours, the edges of the wound were found red, bloody, and everted; the skin not in the least tumefied, but merely flaccid. A small quantity of loosely coagulated blood was found at the bottom of the wound, but no clots were found adherent to the muscles. In the second experiment, which was made ten minutes after the limb was amputated, the skin appeared to have already lost its elasticity, the edges of the wound became very slightly everted, and scarcely any blood escaped from it. On examination, twenty-four hours afterwards, the wound presented *none* of the characters of a wound inflicted during life, except that, at the bottom of the wound, a few coagula were found. Other experiments were made at a still later period after the removal of the limbs, but it was found that the wounds then made possessed still fewer points of similarity with wounds inflicted during life. From these experiments, one fact, at least, may be fairly inferred—that the coagulation of the blood is not a safe criterion of the time at which the wound was made, but that, as long as the body retains its warmth after death, this

(g) Gericht., Leichen-öffnungen, 1s. Hundert., Fall. 9, 1853.

apparently vital process may still take place. If, therefore, a wound be made upon a person just dead, it is not impossible that the blood will coagulate in the wound. Facts, more pertinent than the above experiments, are, however, required to establish the fact beyond a doubt, as the accidental determination of the question upon the entire body would be naturally more conclusive than experiments upon separate limbs. On dissecting the body of a person who died of the low typhus fever which prevailed during the autumn of 1847, in a district inhabited by the lowest class of negroes, the blood was quite fluid, although death had taken place but six or eight hours before; but when allowed to stand in a cup, or in the chest whence the lungs had been removed, it speedily formed a dark and moderately firm coagulum.^(h) Several cases in which the blood retained its coagulability after death, are reported by Casper. In one of these, relative to a man who was suffocated by coal gas, it is stated that four days after death, and during very cold weather in January, the blood flowed freely when the body was opened, but coagulated quite rapidly, and so firmly that the clots could be raised quite easily with the handle of a scalpel.⁽ⁱ⁾ Although the swollen and everted condition of the lips of the wound is a good indication of its having been inflicted upon the living person, this appearance may be removed by causes acting after death. Thus, if the body have lain in the water, this, together with the blood effused in the wound, may have disappeared before the inspection is made, by the maceration to which the body has been thus subjected, and it is also often materially changed by the advance of putrefaction, since, by this process, the skin very soon becomes puffy, and many of the relations of the wound are changed. This is strikingly true of fat bodies, in which wounds, and especially incised ones, often assume, when the body begins to swell, an appearance which it is very difficult to distinguish from the effects of the inflammatory process.

§ 693. The amount of *hemorrhage* is generally a reliable test of the period at which the person was wounded, but is, of

(h) A. Stillé, Gen. Pathology, p. 426.

(i) Gericht., Med. i. 29.

course, only applicable in wounds involving a solution of continuity. In those made after death, even while the body is yet warm, the amount of blood poured out will, of necessity, be far less than while the active circulation of the blood is going on. This is especially true of wounds of certain parts which prove unavoidably fatal by copious and sudden hemorrhages, such as those of the heart, aorta, or any of the great bloodvessels. In fact, wounds involving the left side of the heart, or the arteries, would probably, if made after death, be attended with no hemorrhage whatever; whereas, in the division of any of the venous trunks, soon after death, the amount of blood lost would be far smaller than would have been poured out during life, and would depend, in a great measure, upon the position of the part injured. In a celebrated case of assassination, tried in Berlin, the head of the murdered person had been severed from the body, but, at the same time, other injuries of a fatal nature had been inflicted. Dr. Casper gave his opinion that the neck had been severed before life was extinct, for the reason, that a very large amount of blood was found to have been effused from the cervical vessels. The chief distinction, therefore, between hemorrhage before and after death, is, that in the latter case the amount lost is comparatively trifling and exclusively of a venous character.

§ 694. While the signs we have referred to are the principal means of discrimination in wounds involving a loss of blood, there is another large class of wounds to which they do not have so extensive an application. Thus, although in *contused* wounds the coagulation of the blood under the surface injured sometimes affords, especially in injuries of the head, an indication of the blow having been given during life, yet, on the other hand, the want of coagulation is no proof that it was not inflicted till after death. The blood may, from various causes, remain fluid after death. Its coagulability may be impaired by disease, or by the mode of death. If, for instance, the person murdered has been affected with scurvy, or his death caused partly by any mode of asphyxia, the fluidity of the blood under contused wounds, or indeed in any kind of wound, in such an individual, would not be inconsistent with the opinion that the wound was given while the person was alive.

§ 695. *Ecchymosis, or suggillation.*—The meaning of this term is an effusion of blood under the skin, but in general medical parlance the name is applied to the discoloration of the skin produced by this extravasated blood. In cases where it is necessary to discover whether the person was living at the time his injuries were received, it is customary to rely upon the presumptions afforded by the appearance of the ecchymoses. Their color varies according to the time elapsed since they were produced; at first they are purple, and pass through various shades to black, then through violet, green, and yellow, until their disappearance. In general, the discoloration appears within twelve hours after the injury, and sometimes, immediately after it, the violet color is seen on the third day, the green from the fifth to the sixth day, and the complete disappearance of the spot is, in healthy persons, from the tenth to the twelfth day. The changes are more rapid in the young than in the old, and depend also upon the force and extent of the blow.

If the extravasation be deeply seated, the external discoloration will not immediately occur, but may be delayed even for several days, and, in parts where the cellular tissue is abundant, will not always correspond to the spot on which the injury was received, but will be found over that to which the blood has gravitated. Indeed, the cutaneous discoloration may not appear until after death. Thus, in a person who died in thirty-five hours after having received a violent kick from a horse, rupturing the bladder, there was no ecchymosis in the seat of the blow until after death.⁽ⁱ⁾ The amount of blood extravasated, except it lie immediately under the skin, cannot be determined by the degree of the external bruise, since, in many of those cases of violent death, in which a heavily loaded vehicle has passed over the body, or a great weight has fallen upon it, there has been, externally, no discoloration whatever, or in such a slight degree, that the vast amount of internal disorganization and hemorrhage could hardly be suspected. In the case already quoted from Casper, in which a wagoner was crushed to death, and upon opening the body the lungs

(i) Taylor, Med. Jur., p. 177.

and liver were found to be ruptured, and the heart completely torn from its attachments, the only external injuries discoverable were two trifling abrasions of the skin upon the temple and the arm.

§ 696. The marks observed in those cases where contusions have been purposely made upon the dead body, resemble, in some cases, those which are made during life. From experiments made by Dr. Christison, it appears that blows inflicted two hours after death will produce a discoloration of the skin, similar to what might be expected during life, except in regard to extent, which does not correspond with the severity of the blow. The experiments of Dr. Christison establish a strong presumption, that, when contused wounds have been inflicted *immediately* after death, the external similarity will be still greater, and the correspondence between the amount of violence and the discoloration more exact. While this author was performing his experiments to ascertain whether blows given after death would produce similar appearances to those inflicted during life, he selected, as a subject for a series of these experiments, the body of a female who had died in the infirmary. The body, being afterwards carried to the dead house, and there seen by some persons who were not aware of the experiments having been performed, was not allowed to be buried until an inquiry had been made into the circumstances, so persuaded were these persons that the woman must have died in consequence of barbarous treatment received during life.

§ 697. In this connection, the following remarks of Casper are not without importance:(j) “Where death has been caused by violence, it is extremely common, especially where the bones lie immediately under the skin, to find suspicious spots upon the body. They are from one to three-quarters of an inch in diameter, usually rounded, red or reddish-brown, or dirty yellowish-brown, more or less hard to the touch, and tough under the knife, but exhibiting no real suggillation. These spots may perplex the examining physician, and, indeed, when the mode of death is unknown or attended with suspicious circum-

(j) Op. cit., i. 127.

stances, demand the closest examination and description, because they may possibly indicate and throw light upon a struggle in which life was lost. In the majority of cases, however, these pseudo-suggillations are produced at the moment of death by the body grazing or falling against some hard substance, and consequently have no relation to the cause of death. They may even be produced after death by the rough handling or carrying of the body, and may be imitated, after the lapse even of several days, by friction with a coarse brush or cloth, and so as not to be distinguishable from similar injuries produced during life." "When," says Engel, "these excoriations are found upon parts of the body in which the blood cannot settle after death, the portion of dried integument acquires a yellowish-brown color, and is translucent at the edges; on the other hand, if they form in situations where the blood tends to accumulate, their color is a very dark brown, and they cannot be distinguished from excoriations produced during life." Casper insists upon the practical importance of these distinctions, declaring that the cases are numberless in which ignorance of them or inattention to them has led to the most erroneous conclusions and mischievous consequences.

§ 698. The inference from the considerations here presented, is not that there is no distinction possible between ecchymosis produced before and after death, but that great caution is necessary in giving an opinion upon this point. The external bruise must be carefully compared with the effusion into and under the skin and adjacent tissues. If the latter be at all extensive, and especially if the blood be coagulated, we think there need be little hesitation in declaring that the injury must have been inflicted during life. Moreover, there are few cases of vital ecchymosis, without attendant swelling of the skin and other signs of vital reaction. If, while the body is fresh, the ecchymosed spot be found at all swelled, there can be no suspicion of post-mortem violence. Also, if the ecchymosis, though trifling in extent, be accompanied with excoriations or abrasions of the skin, as is often found in cases of strangulation with the hand, the fact of the violence having been done upon a living person will be manifest. The difficulty of

discriminating between contusions made before and after death will be much enhanced by the putrefactive process, the effect of which is to so alter the consistence and color of the skin and subjacent parts as to destroy all characteristic signs.

§ 699. Devergie (*k*) has remarked that ecchymoses are often concealed on the bodies of the drowned, when first they are removed from water, owing to the sodden state of the skin; they may become apparent only after the body has been exposed for some days, and the water has evaporated.

§ 700. 8th. *Ecchymoses from natural causes.*—It can hardly be necessary to caution the physician against the possibility of mistaking the ecchymoses observed in *certain diseases* for the effects of violence. The morbid states of the system in which they are seen have so many other striking peculiarities during life and after death, that it would hardly be pardonable for a professional inquirer to overlook or misinterpret them. Thus in scurvy, purpura hemorrhagica, and petechial typhus, the shape, size, and diffusion of the spots, in various parts of the body, the absence of swelling or other indications of violence, and the pathological changes in the mucous membrane of the mouth and the intestines, together with the fluidity of the blood, will afford more than sufficient reasons for rejecting all suspicion of violence.

The spots and blotches (suggillations) produced by *cadaveric changes* are more likely to give rise to mistakes. In persons unaccustomed to inspect the bodies of the dead, the stasis or congestion of the blood in the capillary vessels of the skin, which sooner or later invariably occurs, may lead to the suspicion of violence having been inflicted before death. This lividity is most apparent and extensive in those who have died suddenly in full health, by some asphyxiating cause. It occurs in almost any part of the body, but is usually deeper and more distinct in those which are the most dependent. The time at which it is developed varies from the moment of dissolution up to the occurrence of rigidity, and is, of course, hastened or retarded by various causes, such as the mode of death, the season of the year, and the age of the subject. The blood is

(*k*) Taylor's Medical Jurisprudence, sixth American edition.

merely superficially diffused in the outer surface of the skin, and this mark alone¹ ought to suffice to distinguish these discolorations from those produced by violence, since in the latter the blood is effused in the whole substance of the cutis and generally also in the subcutaneous cellular tissue, muscles, etc.

§ 701. The *forms* assumed by the marks of cadaveric lividity are various: sometimes the skin is mottled, at others large blotches spread over the surface, and at others again the lividity is more uniformly diffused, without necessarily appearing on a dependent part. The marks of the clothing which the deceased wore, if they have remained upon him until rigidity has taken place, give a very singular appearance to the skin. Those portions which have compressed the body tightly will be recognized by the paleness of the surface, while the intervening spaces may be deeply tinged. The folds of a sheet often thus communicate to the body an appearance of flagellation, the back being covered with stripes. These are called *vibices*, and are familiar to every one accustomed to the inspection of persons recently dead. This stage of cadaveric lividity, which is due to the congestion of the capillary vessels, runs gradually into another at the approach of putrefaction. This stage is characterized by the uniform purple or dark red discoloration of all the depending portions of the body, and arises from a transudation of the serum and coloring matter of the decomposed blood. Hence, when an incision is made into parts thus affected, as, for instance, over the occiput, the skin and subjacent tissues will be found thickened and infiltrated with bloody serum. But neither of these stages of cadaveric lividity ought to mislead the physician; the diffusion, the superficial character of the infiltration, or, as in the latter case, the peculiar kind of effusion, the want of any external injury to correspond with the internal marks of apparently great violence, and many other considerations, which it is hardly necessary to specify, ought to render the distinction an easy one. We are disposed to think that the possibility of serious error arising from the distant resemblance between cadaveric lividity or the discoloration of the skin caused by certain diseases of the blood, has been in general over-estimated, by writers upon legal medicine.

Blisters produced by heat, says Böcker, although when laid open they may disclose a red skin, do not present characters which enable us to determine whether they were raised before or after death. For intense heat produces the same immediate effects in either. Scalding liquids, however, do not blister the dead body, they only cause the epidermis to peel off in shreds. The skull, when subjected to the action of flame, cracks and exfoliates.

II. *Classification of Wounds.*

§ 702. Wounds are classified according to the nature of the means by which they were produced, as, for example, “an incised wound,” “a lacerated wound.” It will at once be seen that, in legal medicine, the name by which the injury is designated, thus indicating the means by which it was inflicted, may, unless much discrimination be used by the physician, lead to incorrect inferences. It becomes important, therefore, to establish the relation between the injury and its supposed cause. In other words, it being recognized that the wound was produced on a living person by mechanical violence, by what instrumentality was it effected? This is not always evident upon a first inspection. In order that a correct judgment may be had, the earlier the post-mortem examination is made the more likely will it be to yield useful and positive results, for the occurrence of putrefaction, maceration in water, and various disturbing causes may materially alter the aspect of wounds.

In some kinds of wounds the nature of the cause is far more apparent than in others; thus incised and punctured wounds convey the idea of the employment of cutting or pointed weapons, whereas the cause of a contused or lacerated wound is much less easily discovered. Hence the caution is necessary that the means by which the injury was inflicted should be described in general terms only, and especially should the physician avoid giving too positive an opinion as to the particular weapon or other means by which it was produced, since he will often find himself deceived in his opinion. By indicating upon insufficient grounds any particular weapon as the one by which the homicide was effected, the ends of

justice may possibly be defeated, or an innocent person wrongfully suspected or accused.

§ 703. 1st. *Incised and punctured wounds*.—Such is the name given to wounds made by weapons with a sharp cutting edge or point. In the former the superficial extent of the wound is usually greater than its depth; in the latter, the reverse is the case. In both these kinds of wounds the edges are cleanly cut, the edges separated and not contused unless the cutting portion of the weapon have been dull or possessed considerable convexity. The regularity and evenness of the incision is, therefore, a mode of distinction between wounds inflicted with weapons, properly so called, and those made by glass, crockery, nails, etc. The shape of the wound differs somewhat according to the region of the body and the tissues divided, as well as the state of tension or relaxation of the skin, and the direction in which the blow is given. Thus, when the weapon has penetrated in an oblique direction through the tissues, or when the latter are irregularly stretched, the shape of the wound will not correspond to that of the weapon; in such cases an incision is apt to assume a crescentic form, and if inflicted on a limb in a state of tension, its edges will be widely apart, and in the skin more so than in the subjacent parts. If a punctured wound have been made obliquely through the skin, it will present an oval or elliptical shape, and the orifice will usually be smaller than the diameter of the weapon producing it. A wound made in parts where the skin is thrown into wrinkles may present the appearance of several distinct wounds, as in the neck. From the experiments of M. Filhos, in 1833, it appears that a conical and rounded weapon produces small elongated wounds, with two acute angles; but these trials having been made upon the dead subject, the results are not fairly applicable to wounds on the living, because the vital contractility of the skin will necessarily greatly modify the shape of the wound. Nevertheless, several punctured wounds, made by the same weapon, may differ in shape, and be either triangular or oval, according to the circumstances already indicated as influencing the shape of the wound. Superficial wounds, and especially incised wounds, may, it is well known, give rise to fatal hemor-

rhage, if they happen to reach a large superficial bloodvessel. In such cases, as Casper has remarked, it is extremely difficult, if not impossible, to determine where was the commencement and where the end of the incision, whether, *e. g.*, it was made from left to right or in the opposite direction. And such points become of the greatest importance when we are called upon to determine whether a homicide or a suicide has been committed. Attendant circumstances, as whether blood is found upon the right or the left hand, or on which portion of the clothing a cut exists, will help to remove doubt.

It is often also very difficult, or quite impossible, to determine the precise vessel from which the fatal hemorrhage took place. Nor is it often necessary; for the existence of the wound on the one hand and of the hemorrhage on the other suffices to explain the result.

A punctured or penetrating wound may be single upon the skin, and yet two or more internal wounds have been made by the same weapon. This is effected by the weapon having been only partly withdrawn after the outer wound was given, and then plunged into the body in another direction, as is often the case in a close struggle. Thus, in a case related by M. Bayard, the deceased presented a single gaping wound in the breast, out of proportion to the weapon found at the spot where the murder was committed, but the left ventricle of the heart was perforated entirely through, and its walls were wounded in another part also (*l*)

§ 704. 2d. *Lacerated and contused wounds.*—These being frequently due to accident, and seldom presenting any peculiarity by which the use of a weapon can be positively inferred, an opinion can rarely be given, merely from an inspection of the wound, of the cause by which the injury was produced. A medical witness may indeed be enabled to state the possibility of the wound having been made with a blunt instrument, similar to that which is perhaps shown at the inquest or trial, or found near the deceased, but can seldom, on the other hand, deny that it may have been of accidental origin, or caused by a fall. Blunt instruments produce their effects

(*l*) Briand, Méd. Leg., p. 317.

partly by pressure, and crush, tear, or only bruise the part struck, according to the force of the blow and the resistance which it meets. A smooth blunt weapon produces ecchymosis and swelling; angular instruments, in addition, give rise to punctures, fissures, and laceration. When an instrument is at once smooth, blunt, and heavy, it may cause internal injuries of which little or no trace is visible upon the surface. In general, all such wounds bleed but little, and tend to heal by suppuration.^(m) When, however, they are situated upon the skull, they often bear the aspect of incised wounds, the edges being apparently cleanly cut, and capable of being adjusted together. The division of the integuments is not, however, straight and regular as in an incised wound, and the angles of the wound are generally less acute. The contusion of the neighboring integuments, the extravasation of blood under portions of the skin, not embraced in the apparent incision, and often the existence of an irregular fracture of the bone, with internal extravasation, will not permit of more than a momentary mistake. But, practically, the chief difficulty in judging of the origin of lacerated and contused wounds is, that injuries of this kind may be received by a fall in a quarrel, or in the retreat of one of the parties, and similar in appearance to those which might have been produced by a direct blow. In such cases, the position of the wound compared with the known relative position of the parties at the time of the receipt of the injury, will be the chief source from which information will be derived.

An effect, and by no means an unusual one, of blows inflicted with blunt weapons, is the rupture of internal organs. Sound organs, says Casper, never rupture spontaneously, and only when subjected to extreme violence. Fissures of the base of the skull, rupture of the liver, lungs, kidneys, etc., are sure evidence of such an agency. The first of these always occur transversely, never longitudinally, and generally are within the anterior third of the skull. Rupture of the brain is extremely rare, and so is that of the trachea and œsophagus, that of the lungs is not common, and laceration of the

(m) Böcker.

pericardium or heart is even less so. Rupture of the liver, on the other hand, is both positively and relatively frequent. The direction of the fissures is usually transverse. A case is mentioned by Casper in which the anterior edge was entirely separated from the body of the organ. Rupture of the spleen, and of the gravid uterus also, takes place transversely; this injury of the remaining abdominal organs is extremely rare.

Casper appears to question the occurrence of rupture of the bladder, and states that he never met with an instance of this injury. It is not, however, extremely rare.⁽ⁿ⁾

§ 705. In some cases it may not be unimportant to consider whether the wound may not have had a *spontaneous* or *accidental* origin. A number of criminal trials have taken place in Scotland in consequence of women, for the most part pregnant, having died of hemorrhage from the pudendum. In most or all of these cases, it has been averred that the wound was inflicted with criminal intent by the husband or others. A case occurred at Dundee, in which there were no grounds for suspicion that the woman had received a wound. She lived on good terms with her husband and neighbors. She had been straining at the night-stool when the hemorrhage came on. A large quantity of blood was found about her person; it had flowed from the genital organs, but not from the uterus, which was fully expanded in pregnancy. On examining the vagina, Dr. Kyle found a recent aperture in one labium, which he traced into a large vein; one of a plexus which extends some distance into the vagina. A case is related by Dr. Thomson, in which the woman, however, recovered after losing a large quantity of blood. In this instance, the woman's husband, a cattle drover, had been long absent from home, and on his return, remained alone with his wife about half an hour. The bleeding commenced immediately after this visit. A wound was discovered large enough to admit the finger to the depth of about half an inch, in the anterior wall of the vagina, at the union of its upper with its middle third. It was probably an accidental laceration, but if death had actually resulted, the existence of the wound

(n) *Vide* § 863.

might have given rise to suspicions of criminal violence.(o) Dr. Menzies relates that a woman three weeks after delivery, on rising from bed, accidentally fell on the top rail of a common stuff-bottomed chair. Profuse hemorrhage ensued, which, on examination, was found to proceed from a wound in the vagina nearly half an inch in length, and which looked exactly as if it had been inflicted with a sharp instrument.(p) In another case reported by Dr. Ellis, and also of a pregnant woman, death by hemorrhage resulted from a lacerated wound of the vagina supposed to have been inflicted by her falling on the post of a crib.(q) In a third case, related by Dr. Morland, a woman five months advanced in pregnancy fell upon the roof of a wood-shed, by slipping upon one of the steps by which the roof was ascended. The hemorrhage was very profuse, and but for timely assistance, would probably have been fatal. The wound was an inch and a half long, by half an inch deep, upon the internal surface of the left nymphæ.(r) In these cases there was nothing in the character of the wound to distinguish it from those in which the absence of contusion has been supposed to indicate a homicidal origin. They also appear to show the peculiar danger from hemorrhage to which wounds of the genitals expose pregnant women. Dangerous hemorrhage may also occur from varicose veins in the leg. The orifice from which the blood escapes being very small, and situated immediately over the enlarged vein, can hardly be mistaken for an intentional wound. Casper relates a case in which a woman, raising a broken chamber vessel under her clothes, for the purpose of urinating, wounded herself therein in the vena saphena. The wound was one inch and three-quarters long, and three-quarters of an inch wide, and the vein was opened to the size of a pea.(s)

§ 706. That a serious injury may be produced by an apparently trifling cause, operating within a person, is shown by

(o) Am. Journ. Med. Sci., April, 1850, p. 535, from Edinburgh Monthly Journ., Feb.

(p) Edinb. Med. Journ., iv. 624.

(q) Boston Med. and Surg. Journ., Sept. 1857, p. 158.

(r) Ibid., Jan. 1859, p. 520.

(s) Ger. Leichenöff, 2 Hundert. Fall., 43.

the following case which is related by Dr. D. F. Castella, of Fribourg.^(t)

“A keeper of a public house, thirty-nine years of age, has a robust constitution, although he has suffered during his life from various maladies, apparently of a strumous nature. On the sixth of November, 1861, he was seated in his bar with several customers, one of whom offered him a pinch of snuff, which he accepted. Not being in the habit of snuffing, he was at once seized with a fit of sneezing, which he attempted to restrain by shutting the mouth and forcibly dilating the chest. In this, however, he failed, and a violent expiration having succeeded to the excessive and prolonged dilatation of the thorax, he felt at the same moment in the left hypochondriac region a sudden sharp pain, accompanied by a very distinct crack, difficulty of respiration, and a very painful cough. I was at once summoned.

“I discovered in the middle of the body of the ninth rib on the left side a very evident crepitation, and an oblique solution of continuity. It was then a fracture of the second false rib on the left side. I was able to confirm this diagnosis, as the same symptom persisted during four or five days, with slight tumefaction of the surrounding soft parts. No complication in the part of the pleura or lungs supervened.”

§ 707. 3d. *Gunshot wounds*.—Gunshot wounds present striking differences in their appearance, according to the distance at which the piece was fired, and the number and character of the projectiles. If exploded in immediate contact with the body, the wound is large and circular, the skin denuded, blackened, and burned, and the point at which the ball entered is livid and depressed. The blackened and burned appearance of the skin is due to the imperfect combustion of the grains of powder, and the point of entrance of the ball is larger than that of its exit. The hair, clothes, or other organic substance in the line of the shot, exhibit traces of burning. When, however, the weapon is fired at a greater distance, the appearance due to the imperfectly burned powder and the flame are

(t) Am. Journ. Med. Sci., vol. 44, p. 249, from Glasgow Med. Journ., April, 1862, and Gazette des Hôpitaux.

no longer seen, the ball itself being then the only cause of the wound. In the celebrated case of Peytel, tried in 1839, for the murder of his wife, it was found that she had been killed by two balls which entered near the nose. The eyebrows, lashes, and lids were completely burned, and a large number of grains of powder had imbedded themselves in the cheek. Experiments being made in order to determine the distance required to produce these effects, it was found that the weapon must have been held within a foot's distance. As already stated, the point of entrance is here smaller than that of exit. M. Matthysens has shown this by experiments upon the dead body. A pistol fired at twelve paces distance, with a ball fifteen millimetres (*u*) in diameter, made a wound in the breast of 8.5 millimetres in diameter; and at its point of exit on the back, one of ten millimetres. In two experiments, at the same distance, upon the forearm, the entrance wound was four millimetres less in diameter than that of exit; and when a larger ball, with a diameter of seventeen millimetres, was used, the same relations were preserved, both in the entrance wound being less in size than the ball with which it was made, and also three millimetres less in diameter than the wound of exit. (*v*) Dr. Taylor, speaking of the present class of cases, in which the weapon is fired from a certain distance, says that the orifice of exit is generally three or four times as large as the entrance aperture, which, it will be observed, is a much greater difference than is stated by M. Matthysens. But, strange as it may appear, in regard to a question apparently so simple, the very opposite statement is made by some writers. Of these may be mentioned Ollivier (d'Angers), cited by M. Malle, (*w*) who himself, after numerous experiments, concludes that in gunshot wounds the orifice of entrance, far from being constantly smaller than the orifice of exit, is, on the contrary, usually larger; and also Casper, who goes further, and declares that the former is *always* larger, adding that "all the more recent original observers very properly unite in this conclusion,

(*u*) A *millimètre* is equal to 0.03937 inch.

(*v*) *Quest. méd. lég. sur les plaies par les armes à feu*, Gaz. des Hôpitaux, No. 145.

(*w*) *Ann. d'Hygiène*, xxiii. 462.

which is the opposite of that which was formerly maintained.”(x)

§ 708. According to M. Nélaton, when the wound is recent, the orifice which the ball has made on entering the body is depressed and contused, while that made by its exit is lacerated and prominent. In the former there is an actual loss of substance; in the latter merely a solution of continuity, and its edges, if brought together, would almost completely close the wound. Still, the irregularity of its flaps render it the larger, notwithstanding the loss of substance in the entrance wound. After some days the case, however, is different. The contused margins of the wound of entrance slough away, while those of the other become partly united, and its size is thus diminished. while that of the former is enlarged.(y)

§ 709. It is important, however, to observe that the relative size of the wounds depends not only upon the distance at which the weapon is held, but also upon other causes affecting the velocity of the ball. Thus the quality and amount of powder, the length and calibre of the weapon, the compression of the wadding, and the form of the projectile, all require attention. Hence, the relative size of the wounds of entrance and exit varies continually; and unless the velocity of the ball can be approximately ascertained, from a knowledge of the weapon used, and its proximity to the wounded person, it would be unsafe to draw a positive conclusion from this circumstance alone as to the position of the body and the direction of the line of shot, both of which are points occasionally of extreme importance. More reliance is to be placed upon the depressed and clean character of the entrance wound, and the bulging and lacerated aspect of that of exit. This fact has been substantiated by the experiments of M. Dévergie. When, however, the ball enters a portion of the body well covered with fat, this often protrudes between the edges of the wound, and will entirely mask its character.

§ 710. If the ball have traversed the clothing before attaining the body, it carries a portion of this with it; and should

(x) *Op. cit.*, i. 291.

(y) *Observations on Gunshot Wounds, made in Paris during the Summer of 1848*, by Edw. Waters, M.D., *Month. Journ.*, Sept. 1848.

it have lost much of its force before reaching the body, the clothing is merely pushed before it into the wound, and upon pulling this out, the ball will often come with it. The hole made by a bullet in the clothing is smaller than it is itself, owing to the elasticity of the material, and also is depressed like that in the skin. The wound is usually circular in shape, but is oval if the ball have entered the body obliquely. If caused by a rifle-ball, it is said that a large and ragged hole is made, which is attributed to the spiral groove of the barrel, and the tightness with which this kind of ball fits the bore of the weapon. The wound made by the Prussian needle-gun, which carries a conical ball, differs from that made by an ordinary bullet.^(z) It is quite insignificant in appearance, scarcely marked by sanguinations, presents a slight contusion of the surrounding soft parts, is not always circular, and not unfrequently triangular, and in these slight marks gives but little indication of the complete disorganization which exists within. The orifice of exit is in all respects like that of entrance. In a case communicated by Mr. Tuffnel to the Surgical Society of Ireland (March 11th, 1854), it was shown that the form of the wound made by the conical bullet of the Minié rifle was "a small semilunar split in the integument," about a quarter of an inch in length. There was no contusion nor inversion of the edges of the wound.

§ 711. Mr. A. Neill, Assistant-Surgeon 65th Regiment, in an article on gunshot wounds in the *Edinburgh Medical Journal*, 1863, says: "The characters of a gunshot wound are those of a contusion and laceration of all the tissues. Sometimes they are so simple as to bear resemblance to a punctured wound, particularly if a rifle ball (conoidal), revolving on its long axis, has passed through the soft parts at a great speed; but within a few hours it resembles a contusion. The wound of entrance, as it has been termed, bears no comparison in size or shape to that of exit when a rifle-ball has caused the injury. In the former you see the edges of the wound curving inwards, and the circumference small, with little or no hemorrhage. In the latter, the wound is large, with torn and irregular edges

(z) Casper, *Ger. Med.*, i. 293.

projecting outwards, and perhaps only slight oozing of blood. In a short time, averaging an hour, around the entrance wound slight redness begins, gradually extending to about two inches around its orifice. Again this color changes to a blue or greenish-black, and you see all the appearances of a severe bruise, with a small wound of the skin, its edges still curved inwards. In the exit wound the discoloration of the skin is not apparent."

§ 712. It is evident that one ball may produce several wounds upon the body; either, for example, by traversing a limb, and then entering the trunk or head, or, as has been witnessed in some instances, by the splitting of the bullet upon a projecting ridge of bone. At the same time, it should be remembered that the piece may have been charged with more than one bullet, and this circumstance may give rise to some perplexity, since, upon examination of the body, only one may be found, the other having passed out of the body, or been overlooked in the examination. Casper lays great stress upon the difficulty of finding balls in the body, even when there appears to be a certainty that they could not have traversed it, no aperture of exit being found.(a)

A ball, after entering the skin, is deflected from its straight course by very slight causes. Many examples of this fact are given by all authors on military surgery. The following is a singular illustration of it: In a duel with pistols between two students at Strasburg, one fell, apparently mortally wounded in the neck, but almost immediately got up, without feeling any inconvenience from his wound. It was found that the bullet had struck the larynx obliquely, and, glancing from the cartilage, had gone completely around the neck, and stopped on the opposite side of the larynx from where it had entered. It was taken out by making simply an incision over it. Other examples might be cited in which balls have made a circuit around the cavities of the body without entering them. In a wound of the head, thorax, or abdomen, the ball may make a half circuit of the body, and lodge or emerge at a point opposite that at which it entered, thus leading one to suppose

(a) Ger. Leichenöff., 2tes Hundert.

that it must have passed directly through. In the battle of Suddozam, a soldier was struck by a bullet just above the right haunch bone. The ball passed around the trunk, entered the abdominal parietes on the *left* side, then passed downward through the sciatic notch, and "at length contented itself with remaining in the left nates."^(b)

§ 713. *Wounds from small shot.*—These are too characteristic to be mistaken for any other injury. It is chiefly important to understand the character of the wound as affected by the *distance* at which the piece was fired. When this has happened sufficiently near to the person for the charge to enter the body in one mass before separating, the wound is of considerable extent and gravity. Its edges are ragged, contused, and blackened; and as the shot diverge after entering the body, great laceration and injury of the parts underneath take place. Dr. Lachèse, of Antwerp, found, upon experiment, that for the opening to be single, the distance should not exceed ten or twelve inches. At distances greater than this, the wound will no longer be perfectly regular, but more or less lacerated; and when the distance is so great that no central wound is made, each grain will make a distinct though trifling wound. Nevertheless, a single grain of shot may occasionally produce death. Thus, in a case related by Ollivier d'Angers, a thief, scaling a wall, received, at the distance of fifteen paces, a charge of shot from a fowling-piece. He fell dead immediately. The charge had struck him in the breast, scattering over an extent of three to four inches, but one grain had penetrated the aorta over the attachment of the sigmoid valves, and another had traversed the anterior wall of this vessel. The wounds had the form of linear incisions, two lines in extent, and such as would be made by a fine double-edged and pointed instrument. If the shot have had to penetrate the clothing, especially if this be loose and thick, before entering the body, the usual character of a near wound from this cause will be modified; the shot is spread out of its course by this obstacle to a certain degree, and does not enter the skin in a mass, causing a round, tolerably regular opening, but being

(b) Cole's Military Surgery.

somewhat scattered, will either produce a large, lacerated wound, or a number of small wounds, according to the position in which the weapon is held.

§ 714. 4th. *Wounds from wadding and gunpowder.*—According to some experiments made by Dr. Swift, it was found that a *pistol* loaded with powder and wadding alone, at twelve inches distance, tore the clothes and abraded the skin, without penetrating it; at half this distance, the wadding penetrated to the depth of half an inch; at two inches, a ragged and blackened wound was made, and the wadding was imbedded at the depth of two inches; at one inch and a half from the chest, the wadding passed between the ribs into the thorax, and in a second experiment, carried away a portion of the rib.^(c) M. Lachèse found in his experiment that the distance at which the wadding of a gun would enter the body in one mass, did not exceed six inches from the muzzle, but that even at this distance it only occurred when a double charge of fine powder was used, and with an army cartridge.^(d) Hence it is probable that an ordinary wadding, such as loosely wrapped paper, rag, or similar material, used in a fowling-piece, or in a musket by those not accustomed to the military use of the weapon, would not produce a rounded opening which would resemble that made by a bullet. Even if held at a less distance than six inches from the body, it is doubtful whether such a wound could be produced. Yet, although the opening may not be mistaken for that made by a bullet, it is certain that dangerous and fatal wounds are often made with wadding at short distances, by its penetrating the body and lacerating some important bloodvessel.

§ 715. A curious and interesting case, which led to experiments confirmatory of the above, occurred in Paris, in 1858. In the circus a cannon was fired in the direction of the boxes, at a distance of about 150 feet. The cannon was about four feet long, four inches in calibre, and loaded with three ounces of powder, retained by a wad made of old theatre bills torn from the street walls, loosely rolled together and rammed home

(c) Phil. Med. Exam., March, 1846.

(d) Orfila, Méd. Lég., 4me edition, 2, p. 464.

with moderate force. On one occasion a man was seated in a box opposite the muzzle of the gun, and at the distance already mentioned; he was leaning forward, with his arms crossed upon the handle of his umbrella, and, as the explosion took place, he fell violently backward, and was afterwards found to have his arm broken above the elbow. Several portions of wadding were found upon the ground underneath the place where the man had sat; but no marks existed upon his clothing, and none upon the anterior part of the arm, which, indeed, must have been inaccessible to any projectile that did not first strike the forearm. It was concluded that the fracture had been caused by the sudden and violent starting of the man backwards, which must have brought his arm against the hard edge of partition; and various experiments tried with the cannon proved that any wadding which could be made of paper was dispersed in pieces, or lost all power of mischief, at a much less distance than one hundred and twenty feet.(e)

§ 716. *Gunpowder* alone is capable of producing wounds which may prove fatal. When a pistol or gun charged with gunpowder alone is fired at an uncovered portion of the body at a distance of a few inches, a blackened, burned, and slightly lacerated wound will be produced, or if the grains of powder be large, the skin may present the appearance of having been struck with small shot. The burnt appearance of the skin, the singeing of the hair in the neighborhood, or the burning of a portion of the clothing, will all indicate that the charge has been fired close to the body.

III. *Homicidal, Suicidal, and Accidental Wounds.*

§ 717. The mode of obtaining a satisfactory solution of the question, whether a wound found upon a dead body was of accidental, suicidal, or homicidal origin, is by an examination of the wound itself, and of the circumstances under which it was produced. Under the first head, the considerations are purely of a medical nature; under the second they are so to a limited extent only, and will, therefore, be more appropriately examined in connection with the legal remarks upon

(e) *Annales d'Hyg.*, Avril, 1859, p. 420.

homicide. We shall allude to them, therefore, in this place only in a cursory manner.

1st. *Situation of the wound.*—*Suicidal* wounds are inflicted upon those parts of the body most accessible to the hand, such as the head, neck and anterior part of the trunk. They are usually either made by fire-arms, or by cutting instruments. If by the former, the wound will most frequently be found in the head, or over the heart ;(f) and if by the latter, the throat is usually selected. If, therefore, a wound is found in some part of the body which it was manifestly impossible for the suicide to reach, this circumstance, in connection with the direction of the wound, will make the intervention of another or the occurrence of accident evident. Yet, as, in the greater number of cases, wounds exist upon the front part of the body, or at least in such situations that they could have been self-inflicted, the locality of the wound alone affords merely a presumption at most of its mode of origin. Moreover, it must be remembered, that all suicidal wounds are not inflicted always by means of the hand, but sometimes by violently striking the body against some solid substance, by precipitation from a height, and by various other means, especially in persons of deranged intellect, who not unfrequently contrive to mortally wound themselves in such a manner as would hardly be thought of by another.

Orfila relates a case, in which an insane person killed himself with a pistol-shot, fired behind the right mastoid process; the ball was found in the cerebellum.

§ 718. A woman in this city endeavored to destroy herself by placing her head upon a block and dealing upon the back part of it numerous severe blows with a hatchet. A similar instance is reported by Mr. Tarleton, in which an insane gentleman was found lying insensible in his kitchen with the cleaver by his side. Upwards of thirty wounds were found over the occipital bone; they were horizontal, many of them

(f) M. Brierre de Boismont states that in 297 out of 368 cases of suicide by fire-arms, the head was the part injured, and that in 71 only were the chest or the abdomen attacked. In 234 of the first group of cases the weapon was fired into the mouth. Du Suicide, p. 531.

superficial, but one, however, had removed a portion of the skull from the middle of the lambdoidal suture, so that the brain had escaped. This person, who survived his injuries four days, admitted that he had inflicted them himself. (g) Suspicion of criminal violence would very naturally be entertained in such cases as these, provided the body was accidentally discovered in a deserted place.

§ 719. 2d. *Direction*.—The *direction* of the wound will more frequently serve to distinguish a homicidal from an accidental wound than from one which has been self-inflicted. Thus, on the trial of Mrs. Mackin, in Edinburgh, in 1823, for murder, it was stated in the evidence that the deceased died from a stab. The prisoner alleged in her defence that she merely held the knife in her hand sloping upwards, to deter the deceased from attacking her; but that he, being drunk, stumbled forwards upon it. This statement was disproved by the medical testimony, which showed that the *direction* of the stab was backwards, and very much downwards in the lungs, having penetrated the chest over the cartilage of the second rib. (h) A similar instance is given by Elvert, in which the downward direction of the wound, and its having been made in the manner of the German butchers, viz., a second internal wound after a partial withdrawal of the instrument, not only disproved the accidental origin of the wound, but indicated also the occupation of the murderer. (i) In England, a few years since, a murder was fixed upon a man, from the fact that the wound in the neck of the deceased had been evidently made by a knife cutting from within outwards, as is done in slaughtering sheep.

§ 720. The direction of suicidal wounds is subject to too much variety to be relied upon as a criterion, for although in many cases we may obtain from it a presumption that the wound was voluntary, yet it is evident that a wound inflicted by a murderer may assume any direction which could possibly be given to a suicidal wound. Besides, the deceased may have

(g) Taylor, Med. Jur., p. 191.

(h) Christison, Month. Journ., Nov. 1851, p. 401.

(i) Kopp's Jahrb., i. p. 143.

been left-handed, or ambidexter, a consideration of some importance in this relation. In short, but little information of value can be obtained from the direction of a wound, unless the circumstances under which it was received are known; hence, its chief importance is in corroboration of other evidence.

In any case in which a person is found lying dead or dying from wounds or other bodily injuries, an accurate inspection of the locality, and of the position of the body in respect of surrounding objects, is of the highest importance, and should be minutely noted before the body is removed.

§ 721. That part of the *circumstantial evidence* which requires medical knowledge for its elucidation, is often most curious and important, and as it has to deal with conditions incessantly varying, and is founded upon no familiar principles, nor any positive scientific basis, but rather upon loose and badly observed facts, must partake of the same nature, and often appear discordant and improbable. Each medical witness may put together in a different manner the materials with which he is required to reconstruct the scene immediately preceding death; and a successful result will most naturally reward him, who with the most acute perception unites the largest and most familiar acquaintance with similar facts. In estimating the probabilities in reference to the manner of death, the physician has need of all aid which a general observation of the workings of the human mind can afford him, his psychological knowledge and his medical experience must here go hand in hand, for it is his task and duty to offer an explanation of the mutual dependence of motives and results, and that, in the same disinterested and merely scientific manner, that would be required in the demonstration of any curious fact in physics.

That portion of the indicatory evidence upon which medical testimony may possibly throw some light, we may now cursorily allude to.

§ 722. 3d. *Position of body and of weapon.*—The *position of the body and that of the weapon* (if the latter be found) sometimes throw light upon the mode of death.

These two circumstances serve also generally to explain each

other; separately considered they are not of so much importance. In cases of suicide the weapon may be found grasped in the hand or not, according to the manner of death. Thus, if death ensue upon sudden and abundant hemorrhage, as in wounds of the throat, stabs in the heart or great vessels, the person dies by syncope, and hence, the hand being relaxed, the weapon falls from it. When, however, death is occasioned by a pistol-shot through the head, the weapon will, in most cases of suicide by this means, be found firmly grasped in the hand. In other cases where death has not been immediate, it is purely a matter of accident whether the weapon be still held by the deceased or not. In like manner, the position of the body will be affected by the suddenness and mode of death. Where death is sudden, the body will usually be found lying upon the back, but if it have not been immediate, the face and trunk will generally be turned to the ground. The position of the body alone cannot be considered as indicative of the voluntary, accidental, or homicidal character of the injury, but if it be found in a position indicating immediate death from hemorrhage or from the instantaneous loss of muscular power, and the weapon be found at a distance from it, the act may be considered in all probability as homicidal. Where, on the contrary, it is found in this position and the weapon by which death apparently was caused lies close to the body, it is impossible, of course, to determine whether it has been placed there by another after assassination or has fallen from the hands of the suicide. Should the weapon be found firmly grasped in the hand of the deceased, there can be little doubt that the act was suicidal. The only objection which can be made to the supposition is, that it might have been placed in the hands of the person before life was extinct, and instinctively grasped by him. No case, however, is yet reported which would show that this has been done. Where after death by assassination a weapon is placed in the hand of the victim, it cannot be forcibly grasped, but will lie there loosely. Sometimes the fact of the razor being shut (when this has been the weapon used) has been considered as indicative of homicidal interference; but such an inference is not justifiable, unless it can be shown from the position of the body and the character

of the wounds, that death must have been instantaneous, and even here the question might naturally arise whether the fall of the razor to the ground might not sufficiently account for its being closed. Thus, for example, in a case of suicide related by Dr. Casper, the man, after having first inflicted with a razor, some superficial wounds at the bend of both elbows, stood before a mirror and, drawing down his cravat, cut his throat in an oblique direction from left to right, dividing the larynx and both external jugular veins. The razor was found bloody and *closed*, two feet distant from the body.(j) The same author reports another case of suicide by a pistol-shot in the breast, traversing the diaphragm and spleen, and subsequent drowning. In this case the pistol was found in the pocket of the deceased, and the fact of its having been fired against the naked chest was shown by the circumstance that his coat and shirt were not perforated, and the former was buttoned up to the chin.

§ 723. The following case illustrates the nature of the difficulties which sometimes environ the questions treated of in this chapter. At Paris, in 1858, an auctioneer and appraiser, thirty-one years of age, arrived at the Lyons railroad station, about six o'clock in the morning, and having engaged a *coupé* and placed his luggage upon it, entered the vehicle, carrying a double-barrelled fowling-piece in his hand. At some previous period he had been twice convicted of official misconduct, and his present position was not a prosperous one. But there was nothing to indicate his being humiliated or desperate; on the contrary, his habitual behavior was gay and even frivolous. On the way to its destination an explosion was heard in the carriage; it was stopped, and the body of the occupant was found seated in the left-hand corner, the legs crossed, and in the posture of a person seeking repose. The greater portion of the left side of the skull from the centre of the forehead was carried away; the legs were crossed, and between them lay a cane and a double-barrelled gun, the left barrel of which was still loaded and cocked. The thumb and index finger of the left hand were bloody, and the fingers clenched. Within

(j) Gericht. Leichenöff. 1 tes Hund. p. 17.

the skull were found numerous grains of shot. The deceased had, several months before, insured his life for about \$30,000, which sum the insurance company refused to pay to his family, on the ground that his death was suicidal. Hence a lawsuit, in which the facts of the case were investigated. It was evident that at the moment of the explosion the forehead must have been upon or very near the muzzle of the gun, which was also grasped by the left hand. From these facts, M. Tardieu concludes that the death was suicidal,^(k) and M. Brierre de Boismont draws the same inference, chiefly from the fact that there was *no* evidence of a previous inclination to this crime!^(l) The court, however, condemned the insurance company to pay the amount of its policy. To us it seems perfectly natural that a sportsman, weary with a night's ride in a railroad car, should, when seated in a hackney-coach, have leaned his head upon the muzzle of his gun, embracing but not covering the end of the barrel with his hand, and that a jolt of the vehicle should have caused the trigger to catch in his pantaloons and explode the charge. Too many accidents of a similar nature have occurred, displaying an almost inconceivable negligence of the simplest precautions in handling firearms, for us not to adopt this conclusion in the present case as not only the most charitable, but also the most logical.

The inference to be drawn relative to the suicidal or involuntary cause of death, from the various other circumstances under which the body is found, do not belong to the physician, and require in general no medical knowledge for their explanation. This portion of the indicatory evidence is treated of in the legal part of this subject.

IV. *Blood-stains.*

§ 724. 1st. *General appearance.*—The color of stains of blood is dependent upon their age and the material upon which they are found. Those of a recent origin are of a deep red color, which ultimately becomes brown. The period required to effect this change is not determined; it occurs, however, most rapidly in warm weather. The recent stains of menstrual

(k) Ann. d'Hyg., Avril, 1860, p. 443.

(l) Ibid., Juill. 1859, p. 138.

blood are also of a brown color. The depth of the color depends also upon the porosity of the substance. Thus marks of blood upon white stuffs and upon light wood are paler and duller than those on articles of greater density, as varnished wood, iron, and stone. Where it has coagulated, this will usually be shown by one portion of the spot being thicker and darker than the other.

§ 725. On colored stuffs, especially on those which are brown, blue, or black, the spot is more easily recognized by candle-light than by day. This important fact was discovered by Ollivier d'Angers. He had been directed to re-examine the room of a person accused of murder; having already visited it in the daytime, his second examination was conducted at night, and he now discovered by holding a lighted candle near to the paper hangings, which were of a pale-blue color, a number of drops of an obscure dirty-red, which by day had the aspect of small black specks, and were lost in the general pattern of the paper. On a further examination, other spots of the same kind were found on the furniture. On the chimney jamb, which was painted blue, there was a large stain of blood, which appeared red by the light of the candle. The next day by day-light Barruel and Lesueur could not find these spots, and were obliged to make use of artificial light to discover them.^(m) The same remarks will of course apply to spots of blood upon dark woollen cloth, in which they can also be detected by the stiffening of the material. If the stain be upon a weapon, such as the steel blade of a knife or poniard, the color will be of a pale-red where the layer is thin, and of a dark-brown color where it is of greater thickness.

§ 726. 2d. *Chemical examination of suspected stains.*—If the stain be upon linen or other similar stuff, it should be cut out and suspended by a thread in a small test-tube containing an amount of distilled water sufficient fully to dissolve the stain; the coloring matter of the blood soon begins to detach itself and seek the bottom of the vessel, the supernatant liquid remaining tolerably clear. The coloring matter will be dissolved in the course of a few hours; the fibrin, if any were contained

(m) Briand, Méd. Légale, p. 782.

in the spot, remaining attached to the stuff as a soft grayish or rosy-white substance. The colored liquid in the test-tube may now be subjected to various tests; but one or two very simple ones are all that is necessary to establish the certainty of the presence of blood. Supposing the liquid to hold in solution the coloring matter of the blood and albumen, the effect of heat carried gradually to the boiling point is to coagulate it and destroy its color. According to the amount of albumen, will be the degree of coagulation, if the liquid contain merely a trace of it, boiling merely renders it opalescent. But the alteration of color is peculiar to blood. It changes from its more or less red color to a grayish-green without a trace of red, the upper portion of the liquid acquiring also an indistinct yellow tinge. The grayish coagulated portion may be redissolved with potassa, and acquires thereby a brownish-red color by refracted, and green by reflected light. Another important test for blood is the absence of any change of color by the addition of ammonia, except when very concentrated or added in large quantity.(n)

§ 727. These tests will suffice to distinguish the colored serum of the blood from any stains resembling it. Thus the red soluble dyes or stains from the juices of fruits are not coagulated by heat, nor do they lose their color on exposure to it, but the red color is changed either to a crimson or to a green, sometimes passing through a violet shade by the ad-

(n) Rose's method is thus given by Casper (op. cit., i. 160) : The dried blood is thoroughly treated with cold distilled water, which is from time to time poured off from the undissolved fibrin until all the coloring matter is removed. The residual fibrin can then be examined with the microscope. If the coloring matter in solution is now treated with chlorine water in excess, it becomes decolorized, and white flakes separate and float upon the liquid. Three parts of nitric acid to one part of the solution give a grayish-white precipitate, and four parts of tincture of galls to one of the solution give a pale violet precipitate. If a portion of the solution is boiled it is coagulated in a greater or less degree. The clot is of a dirty-red color, dissolves readily in a heated caustic solution of potassa, to which it gives a greenish tint by transmitted light, and, as before stated, appears brownish-red by refracted light. When a very small quantity, as a single spot of blood, is examined, all of these reactions cannot be observed. In this case it is advised to boil the solution and treat it with caustic potassa, afterwards adding an excess of chlorine water or of nitric acid.

dition of ammonia. M. Raspail's statement, that a stain possessing similar chemical characters with that of blood, could be formed by exposing to heat a mixture of madder and white of egg, has been corrected by Orfila,^(o) who, in fact, denies its accuracy. He found that a solution of this artificial stain, although coagulated by heat, preserved its orange-red color, and the coagulum was of a pale red. In its further reactions, also, it was quite dissimilar to blood. Dr. Taylor says: "Having for some years performed numerous experiments on this subject, by making artificial mixtures of human serum or animal albumen, with the red coloring matters of cochineal, lac, and madder, and neutralizing the effects of the alkali contained in the serum by the addition of a small quantity of acetic acid, I feel justified in stating that in no respect whatever, except in regard to color, can such mixtures be confounded with blood. The objection is, therefore, more theoretical than practical. These red liquids may easily deceive those who trust to a *red color* alone; and herein we see the necessity for placing the investigation of such subjects in the hands of professional persons only."

§ 728. *The guaiacum process for the detection of blood.*—The application of a solution of guaiacum for the detection of blood-stains is not a recent discovery. Van Deen, a Dutch chemist, first suggested it as a test for blood several years ago; but scarcely any attention was attracted to it until 1863, when Dr. Leman, of Berlin, made an investigation into the subject. The results he obtained, however, led him to give a rather unfavorable report of the process.

Van Deen used an alcoholic solution of guaiacum and oil of turpentine, which contained what he supposed to be ozone. Dr. John Day, of Geelong, Australia, experimented fully with tincture of guaiacum and ozonized ether with most satisfactory results, and in 1867 he forwarded to Dr. Taylor the report of a case in which he had used these substances for the detection of blood-stains. This induced the latter to repeat some experiments made by Van Deen's method, in 1864, and he fully confirms Dr. Day's results. Dr. Taylor states, in an elaborate

(o) Méd. Lég., ii. 618.

article on the subject,^(p) that his experiments have satisfied him that oil of turpentine is not a favorable liquid for producing the results. Some of his formerly unsatisfactory results he refers to an impure alcoholic solution of guaiacum, and to a non-ozonized or imperfectly ozonized oil of turpentine used in his experiments. According to this author, "The guaiacum process for the detection of the red coloring matter of the blood, depends on the use of two liquids: 1. A solution of that portion of guaiacum resin which is dissolved by alcohol (.830); and 2. A liquid containing, not ozone, as Van Deen supposed, but antozone or peroxide of hydrogen, as demonstrated by the experiments of Schönbein and Dr. Day. A saturated solution of guaiacum should be made, the inner portions of the resin which have not been changed in color by air or light being selected for this purpose. The solution should be preserved from light by being kept in a bottle covered with black paper or in a dark closet. When a few drops of this solution are added to water, there is a milky-white precipitate of the resinous principle in a fit state for oxidation. The precipitated resin exposed to air very slowly acquires a blue color, as a result of absorbing oxygen. Light alone appears to have no effect upon it. * * * When the precipitated resin is added to a jar of oxygen gas, and well shaken, it becomes more rapidly blued than in air, but the most remarkable change is produced by adding the precipitated resin to a jar containing ozone or an ozonized atmosphere. The resin acquires almost immediately an intensely blue color. These facts show that the bluing of the resin depends on a change of color produced by oxidation."

§ 729. This bluing may take place by the contact of many mineral and organic bodies with the precipitated resin; but a large number of substances are without any action on it. Starch, albumen, and fibrin do not change the color of the red to blue, and among animal liquids the red coloring matter of the blood does not in any way affect it.

"It is further remarkable that those mineral compounds which, according to Schönbein, contain oxygen in the form of

(p) Guy's Hospital Reports, vol. xiii. 1867, p. 131.

antozone, as the peroxide of hydrogen, peroxide of barium, and the peroxides of the alkaline metals generally, exert no oxidizing action on guaiacum resin, and do not blue it. The guaiacum resin, therefore, as Schönbein pointed out some years since, is well adapted to distinguish an ozonide from an antozonide. Both oxidize the iodide of potassium and set free iodine, but it is only the ozonide containing negative oxygen which renders the guaiacum blue. The antozonide containing positive oxygen has no such effect.

§ 730. "Peroxide of hydrogen added to the precipitated resin produces no change of color in it. Peroxide of barium (an antozonide) produces at first a yellowish color (owing to the presence of some baryta), but on adding a drop of acetic acid to correct this, the liquid is colorless and white. Liquids containing oxygen in the state of antozone, act in a similar manner. Thus the varieties of ether sold as 'ozonized' ether, whether a product of ethylic or methylic alcohol, 'ozonized' essential oils, as turpentine or lavender, do not change the color of the resin, and it is, therefore, clear that they contain no ozone. Other facts show that they contain oxygen as antozone. The name given to these ethers is, therefore, based on a mistake."

The condition in which the blood is makes no difference in its action on guaiacum resin. Blood dissolved in water or alcohol, whether recent or old, or whether from man, the lower animals, or fish, does not oxidize or render blue freshly-precipitated resin of guaiacum.

§ 731. This test for the coloring matter of blood depends on the fact that the coloring matter of red-blooded animals does not oxidize nor render blue the guaiacum resin; but when associated with another body containing antozone, which itself has no oxidizing action on the resin, the guaiacum is oxidized by the blood, and a blue color, of greater or less intensity, according to the quantity of blood present, is developed.

§ 732. Dr. Taylor gives the following directions for the examination of blood by this process: "Precipitate the resin by adding a few drops of the tincture to four drachms of water. Divide this liquid into two portions. Add to one a small

quantity of an aqueous solution of the coloring matter of blood, enough to give the faintest red tint, and to the other add a few drops of a solution of peroxide of hydrogen. There will be no change of color in the resin in either glass, *i. e.*, neither the blood nor the peroxide (antozone) will oxidize the guaiacum or turn it blue. If to the first glass containing blood and resin, a few drops of peroxide are added, a blue color begins to show itself in a minute or two, just as if a liquid containing ozone (a solution of permanganate of potash) had been added to it. If the quantity of resin precipitated is larger compared with the quantity of red coloring matter of blood which is present, the blue color may be so concealed as not to show itself distinctly until several minutes have elapsed. On the other hand, when the red coloring matter of blood is in excess, the color produced will be of a dingy indigo or dirty violet. In all these cases, however, there is an easy method of bringing out the color. The oxidized resin is soluble in alcohol, retaining its blue color. On adding sufficient alcohol to dissolve the precipitated resin, which renders the liquid turbid, it will become clear, and the alcoholic solution will acquire a deep sapphire-blue color. If there is much albumen associated with the red coloring matter, this will, of course, remain undissolved. If to the second glass, containing a mixture of resin and peroxide, a solution of blood is added, the same result takes place, and the intensity of the blue tint according to the quantity of blood added, may be accurately observed. It is of little importance, therefore, so far as mere results are concerned, which of the two liquids is first added; but as the guaiacum resin is liable to be colored from oxidation by the direct contact of many substances in the absence of peroxide of hydrogen, it is always desirable, in order to avoid any fallacy, to add the suspected liquid to the resin before the peroxide. If a blue or greenish color is thereby produced, although blood may still be present, there is some oxidizing substance in addition to blood which may conceal its presence. If the aqueous solution of blood has been boiled so as to coagulate and entirely destroy the red coloring matter, this process will not detect it. The guaiacum

resin and peroxide will undergo no change of color when placed in contact with it."

§ 733. Hæmine crystals also acquire a blue color when treated with tincture of guaiacum and peroxide of hydrogen. This process does not enable us to discover to what class of animals the blood belongs, neither does it show the presence of the blood-corpuseles. It is only applicable to the coloring matter from the blood-cells.

§ 734. The red coloring matter of other substances, such as red paint, cochineal, kino, or other red coloring principles, which might be mistaken for blood, give no trouble in this test. The guaiacum resin is merely reddened on the addition of these substances, and the addition of ozonized ether produces no further change.

§ 735. It is most desirable to obtain the coloring matter for examination in solution, and for this purpose the stains on cloth or weapons should be scraped off, if possible, or the article of clothing cut in pieces and macerated in water until the coloring matter is dissolved. Even a faint trace of color is sufficient for the test. "The small quantity which may be detected by this process is beyond the ordinary chemical tests, namely, ammonia and the effects of heat. The microscope shows nothing, for all the capsules or cells have been destroyed by water, and the coloring matter simply is diffused through the stuff in solution. There is only one other process which can compare with it for delicacy, and that is Mr. Sorby's method of examining the liquid by the spectroscopic eyepiece attached to the microscope, and noting the two dark absorption bands in the green portion of the spectrum." However, some substances, such as cochineal or ammonia, might give absorption bands by the spectroscopic process resembling those of blood; but these are distinguished from blood by the guaiacum test, for they give no blue color.

§ 736. Dr. Day sent Dr. Taylor the following account of a case in which he had detected blood under unusual difficulties, together with some portions of the suspected clothing for examination. "On the 19th October, 1866, a murder was committed at a place named Scarsdale, and a Chinaman was taken up by the police on suspicion. The trousers he wore at the

time he was apprehended had recently been washed, but there were some slight stains on a part of them, and a small piece was cut out and sent to Mr. Johnson, the government analytical chemist, for examination. In his evidence he stated he had failed by chemical tests to recognize blood on the cloth sent to him by the police, in consequence of the quantity being so minute, but that he had discovered a slight trace of blood by the aid of a microscope. At my request he very kindly sent me the identical piece of cloth on which to try my test. On the day I received the piece of cloth, the blood-stains, if from the murdered man, would have been thirty-eight days old. It was rather dirty, but there was no blood to be seen on it by the naked eye. I succeeded, however, in the course of a few minutes, in striking off sixty impressions from the cloth, each impression showing bright-blue spots wherever blood-globules were present; after the sixtieth impression, the blue spots were difficult to produce and almost invisible, and before I got to the seventieth impression, the blood-globules seemed to have been all destroyed and the reaction ceased.

“The mode of using this blood-test must, of course, depend on the nature of the material on which blood-stains are supposed to be present. The plan I adopted in applying it to the case of the Chinaman’s trousers was as follows: I first poured a few drops of tincture of guaiacum over the cloth, and then a drop or two of ozonized ether. The blue color did not show on the cloth, but on putting a slip of white blotting-paper on it, and gently pressing it with an ivory paper knife, I got a perfect impression, and then another, and so on until all the blood-globules were destroyed. All that was necessary was to add a little more ether, or perhaps a little more guaiacum. In testing for blood on white materials there is, of course, no necessity for striking off impressions on white paper.”

§ 737. For the examination of blood-stains on clothing, Dr. Taylor considers the plan suggested by Dr. Day “admirably adapted to detect blood. The spot is first wetted with a little water; a drop of tincture of guaiacum is then allowed to fall on it. It should now be pressed firmly on white blotting-paper, and if no blue stain is produced, there is nothing in

the dye or material or in the blotting-paper to affect the application of the test. Another drop of tincture of guaiacum is then added to the stain, and this is followed by two or three drops of a solution of peroxide of hydrogen. No change of color may be observed, but in a minute or two a blue impression of the blood-stain may be procured by firmly pressing the wetted portion of the cloth on white blotting-paper. Blood may thus be readily detected on dark articles of clothing in which the color of the woollen renders it difficult to see any stain, and the shape and form of the spot are sometimes pretty clearly indicated by the form of the blue stain produced. This remark applies also to stains of blood on woollen which have been sponged or washed for the purpose of obliterating them. Unless all the red coloring matter has been removed, which is an extremely difficult process, blood may be detected by the direct application of guaiacum and peroxide of hydrogen. If the woollen is gray or light-colored, the production of a blue color is at once seen on the stuff. If it is thick woollen, it is probable that the red coloring matter has been washed to the inside, and has spread by imbibition. It may be then detected, and the boundary of the washed portion determined by repeated applications of the guaiacum and peroxide at different parts. Before any conclusion is drawn, however, a portion of the clothing should be similarly treated on which there is no suspicion of blood having fallen, and which presents no appearance of staining. The result should, of course, be negative. As a rule, this experiment should be first performed, because it furnishes good negative evidence that the guaiacum process may be safely applied directly to the stained article of dress. It is not probable that all parts of a woollen garment should be stained with blood, hence this comparative experiment may be performed without difficulty. To articles of woollen, silk, cotton, or linen which are not colored, the guaiacum test admits of an easy application. In November, 1857, a towel was stained with a number of spots of blood, and in some parts with bloody water. In the present month, December, 1867, *i. e.*, after the lapse of ten years, these stains were examined and tested. They had a dark red-brown color, no lustre and no distinct appearance of coagula

or dried clot to the naked eye. A small spot of undiluted blood was wetted with water and tincture of guaiacum then dropped on it. No change of color was observed; the peroxide of hydrogen was then added, and a deep-blue stain made its appearance in the situation of the stain. The intensity of the blue color was increased by the addition of a few drops of alcohol. A similar experiment was performed on a well-washed stain of blood in which the red coloring matter was so diluted as scarcely to tinge the towel. A light-blue color was produced by the test in one or two minutes, and this was intensified by the addition of alcohol. The tint under these circumstances varies from a deep indigo-blue, when the red coloring matter is abundant, to a pale azure-blue, when it is at a minimum and scarcely visible to the naked eye. The blue color thus produced, if moderately strong, will remain for weeks or months without material change. Neither light nor air appears to have any decomposing effect on it. A corner of the same towel was now selected as being quite free from any stains of blood or bloody water, and the stuff was then treated in the same manner as the stained portions. The guaiacum and peroxide became dry without producing any visible change of color. There was no blood on this part of the towel. The affirmative and negative results obtained in these experiments showed conclusively that dry blood in its ordinary state, and washed blood in a most diluted state, may be easily detected by this process after the lapse of *ten years*. The towel in this case had been lying loosely exposed in a drawer which was frequently open.

§ 738. "*Fruit-stains*.—These create no difficulty. On colorless articles of clothing, they present, either to the naked eye or when seen through a lens, an equal and superficial staining, wholly unlike blood in color. There is no stiffening of the fibre, no appearance of a clot, and the addition of a weak solution of ammonia may impart to them either a greenish, an olive color, or a crimson tint. The coloring matter of a blood-stain undergoes no change by the addition of weak ammonia. The guaiacum and peroxide applied to fruit-stains produce no blue color; hence, if no change of color took place, the inference would be that the stain was not owing to blood. If,

however, a blue color was produced, it should be noted whether this is caused by guaiacum only, and, further, whether an unstained portion of the colorless stuff does or does not produce a similar color with the test.

§ 739. "*Iron-stains ; Iron-moulds.*—These, when old, have an ochrous or ruddy-brown color. On cotton and linen they are commonly observed to penetrate equally both sides of the stuff. When examined with the naked eye, and still better with a lens or a low power of the microscope, they are quite different from stains caused by blood either in a diluted or undiluted state. There is no appearance of fibrin or a coagulum, no glossiness of surface, no stiffening of the stained fibre, and an absence of anything approaching to crimson or red tint of blood. Water will not dissolve or diffuse the stain ; but a mixture of equal parts of water and hydrochloric acid will speedily dissolve it, especially by the aid of heat—the iron-mould, as it is called, disappears, and the acid liquid now holds a salt of iron, which may be discovered by all the usual tests. If tincture of guaiacum is added to an iron-mould on cotton or linen, it undergoes no change. The peroxide of iron is in a perfectly insoluble form, and it has no action on the guaiacum resin. The iron-mould remains equally unchanged by the addition of the peroxide of hydrogen to the guaiacum. There can, therefore, be no difficulty in distinguishing stains of blood from iron-moulds ; but it may be desirable to demonstrate that the stain is really caused by peroxide of iron. The iron-stain, wetted with tincture of galls, undergoes no change, owing to the insolubility of the oxide. It should be first wetted with glacial acetic acid and dried by a gentle heat. The stain is not thereby removed, but the iron is converted into an acetate, and if, when dry, a drop of the tincture of galls is added, the stain at once acquires a dark purple color. Its ferruginous character is thus indicated.

§ 740. "*Ink-stains.*—Stains caused by ink, owing to their peculiar color, are not likely to be mistaken for stains of blood so long as they are on colorless articles of clothing ; but if such stains are upon black cloth, silk, or woollen, and the guaiacum test is applied directly to the stuff, a fallacious result might be obtained. Ink contains a persalt as well as a protosalt of

iron. Tincture of guaiacum added to very dilute ink produces a mixture which becomes rapidly blue by oxidation. All the salts of iron, including the sulpho-cyanate, operate in a similar manner, and at once render the guaiacum blue. A very minute quantity of perchloride of iron will also cause this change in guaiacum. The addition of any form of antozone is not necessary to produce this change of color with the salts of iron, and it does not in any way increase it. Herein, then, lies the distinction. If the stain is on black cloth the guaiacum solution should be added, with a little water to dissolve the ink, and the wetted stuff firmly pressed on white blotting-paper. If ink is present, there will be a blue spot produced, showing that the stain is probably owing to a salt of iron. The cloth cut into fragments and macerated in distilled water, will yield a dark-purple or bluish-black liquid, having the usual appearance of diluted ink, and wholly unlike blood. The guaiacum solution added to this aqueous liquid is precipitated, and the precipitated resin rapidly acquires a blue color without the addition of peroxide of hydrogen.

§ 741. "But iron may, in some instances, be present without being indicated by a stain or discoloration in the substance. Thus, white or tawed leather produces a blue color with guaiacum and peroxide of hydrogen, very like that caused by blood: it also produces a blue color, but more slowly with guaiacum alone. Alum and salt are used in the manufacture of this leather, and, as, when sold for manufacturing purposes, these substances frequently contain a notable quantity of iron, the bluing effect on the guaiacum may be owing to the presence of this metal thus transferred to the skin. Some kinds of white kid leather are open to the same observation; hence, blood-stains on white kid gloves should, if possible, be removed by water, and the red aqueous liquid separately tested. Some kinds of writing-paper sized with sulphate of alumina containing iron, produce spots of a blue color with the guaiacum. When flour paste has been used in the dressing of the paper, the guaiacum may be rendered blue by the gluten, which is incorporated with the pulp. Filtering paper and calico are occasionally charged with flour paste, and in this

case the guaiacum might be colored by coming in contact with the gluten."

§ 742. *Stains on weapons.*—These should be scraped off and dissolved in water. If any blood be present it will slowly acquire a blue color on the addition of tincture of guaiacum and peroxide of hydrogen. Should the stain be due solely to iron-rust, the guaiacum will produce no blue color, since common rust is insoluble in water. However, the rust produced on iron by certain vegetable acids, citric or acetic acid, is soluble in water, as it contains a soluble persalt of iron. This blues guaiacum without the addition of the peroxide of hydrogen and has all the usual reactions of iron, so this need give no trouble.

§ 743. In conclusion, Dr. Taylor remarks, that "the use of guaiacum adds another and valuable chemical test to those hitherto employed for the detection of blood. It enables a chemist to speak with reasonable certainty as to the presence of blood when in very small quantities; and to trace it in those cases in which an attempt has been made to remove the marks by washing. On the other hand, when the results are negative, it enables him to say that a suspected stain was not caused by blood—a fact of considerable importance in some medico-legal inquiries."

§ 744. In a later paper,^(q) Dr. Taylor states, that further experience has shown him that the aqueous solution of peroxide of hydrogen which he has advised to be used above, is difficult to obtain in a state of purity. It is liable to contain some acid, sulphuric or hydrochloric, and which acts on the precipitated resin. He therefore recommends, with Dr. Day, the use of "the ethereal solution of the peroxide, sold as ozonized ether." This is perfectly pure, and does not change on keeping, so long as it is in a well-stoppered bottle and in a cool place.

§ 745. Other tests have been proposed, but none of them are as distinctive and reliable as those mentioned. Thus, nitric acid coagulates the albumen and changes the color to a gray or dirty brown, according to the amount of hematin; the

(q) Guy's Hospital Reports, 1869-70, p. 273.

tincture of galls occasions a precipitate without altering the color, and hypochlorous acid changes it to a greenish-brown color.

§ 746. When the spot of blood is upon a hard substance, it may, in most cases, be removed by careful scraping. If upon the point of a weapon, it may be macerated for a short time in a narrow vessel containing water, but if on any other part, if not easily removable by scraping, as when the blood has dried in a film or in streaks, the stained part should be laid upon a clean plate of glass, after having been previously moistened with distilled water. The two surfaces should be in immediate contact with each other, but care should be used that the metal be not left too long exposed to the action of the water. Blood-stains upon iron and steel may sometimes be mistaken for *rust* or salts of the oxide of iron made by some of the *organic acids*. In the case of rust the color is different, being more or less yellow, but occasionally this distinction is not sufficiently evident. If, however, the spot be detached and placed in distilled water, it does not dissolve, although part of it may remain suspended in the water. By filtration, however, the rust is entirely separated, the filtered liquid remaining colorless. The residue upon the filter will give the proper reactions with the ferrocyanide of potassium or the alkalies, after having been first digested with dilute hydrochloric acid. If, however, the stain be due to lemon-juice or other organic acid, it will be observed in the first instance that the color is darker than that of blood, being often nearly black; it is also very soluble, and although slightly coagulable, the solution yields at once to the tests for iron, giving an intense blue color with the ferrocyanide, and a deep red with the sulphocyanide of potassium.(r)

(r) Dr. Carl Schmidt, Diagnostik der verdächtigen Flecke in criminal Fällen. Leipzig, 1849.

The detection of blood-stains upon iron is difficult, but important. Vauquelin was the first to remark that iron rust upon domestic utensils and instruments contains ammonia, hence, if on being heated it yields ammonia, this is no proof of the presence of blood. If this experiment is performed with a gentle heat upon iron rust in a glass tube, and if after the ammonia is driven off the heat is increased, a peculiar odor, such as always attends the

§ 747. There is a number of insoluble stains which present a certain similarity to those of blood. Such are, madder and logwood dyes, iron moulds, and red paint. The insolubility of these stains ought to be a sufficient indication of their being due to some other cause than the presence of blood. The coloring principle in madder is, however, rendered yellow by acids and violet by alkalies, a change which of course will not be produced in a spot of blood.

§ 748. Still, the spot may be *soluble*, and yet not be due to blood. In some cases stains, somewhat similar to blood-stains, are made by the juices of fruits, or by soluble coloring matters. Dr. Albert found, on the clothes of a young man accused of attempted assassination, a large number of red spots which had the appearance of blood. On examination, however, he found that a portion of them only were caused by blood, and the rest by red chalk, the prisoner's trade being that of a wall-colorer. All the stains were soluble, but those which were really due to blood were distinguished from the others by their more shining appearance, the appearance of fibrin in the solution, which sank to the bottom, the want of change upon the addition of caustic ammonia, and their appropriate reaction with nitric acid and with tincture of galls. The spots made by the red chalk disappeared in a fine powder on being rubbed, communicated their color uniformly to the water, and the solution was changed to a violet-brown color by caustic ammonia, dark brown by nitric acid, and remained unchanged upon the addition of tincture of galls.(s)

§ 749. If the suspected stain on the clothing be caused by *iron rust*, it will be readily dissolved out by hydrochloric acid,

carbonization of albuminous substances, is exhaled, and a brown, offensive, empyreumatic oil is deposited on the less heated portions of the tube. Still stronger evidence is afforded by the following test: Melt a small quantity of the slightly heated rust with an equal volume of potassium or sodium in a very small glass tube closed at one end; when cool, mix with water, filter, and decompose the liquid with a very small quantity of a solution which contains both the protoxide and the peroxide of iron, and saturate the whole with an excess of hydrochloric acid. If blood be present, a greater or less quantity of prussian blue will be developed, but if the ferruginous solution is in too great quantity, the color will be green. (Casper, loc. cit.)

(s) Henke's Zeitschrift, 1855. H. ii. p. 392.

and then may be subjected to the appropriate tests. Dévergie reports an instance in which iron mould awakened considerable suspicion of violent means having been used. The body of a young man, bearing the marks of many injuries upon it, was taken out of the Seine, where it was supposed to have lain for three weeks. Red stains were found on the shirt, which were supposed to be of blood, but, upon examination, they were satisfactorily proved to have been due to the rusting of a steel guard-chain and a bunch of keys on the person of the deceased. Dr. Taylor gives an instance in which spots of *red paint* upon the dress of an individual, were the occasion of his being arrested on suspicion of being concerned in a murder which had been perpetrated shortly before. The color in this instance was due to the peroxide of iron, which was readily detected.

§ 750. The distinction of *arterial* from *venous blood*, except when recently effused, is manifestly impracticable. Their chemical reactions are very nearly alike, and the only ground of distinction is in the more florid color of the former when recently poured out, and occasionally also in the form of the spots; those made by arterial blood being generally of an oval or elongated shape, in consequence of the blood having been thrown in a jet from the divided vessel. Moreover, in practice the two kinds of blood will almost always be mingled together, as it is difficult to conceive a wound being made which shall not involve both sets of vessels. Dr. Taylor makes some interesting observations on the form and direction of spots of blood, suggested by the case of *Reg. v. Spicer*:^(t) "At the top of the stair, and at the height of four or five feet above the level, several spots of blood were observed upon the brick wall, which was whitewashed. The spots took an oblique direction from above downwards, were of a pale-red color at the upper part, but dark-red below, terminating in a point consisting of the fibrin, and the greater part of the red coloring matter. Their form and regularity proved that they had proceeded from a small artery, and that the wounded individual could not have been very distant from the wall, while

(t) Berk's Lent. Assizes, 1846.

their shining lustre rendered it probable that they were of recent origin, and their well-defined termination in a firm coagulum showed that they had proceeded from a living blood-vessel. The deceased had died from fracture of the skull and vertebral column, by a fall from the top stair; one branch of the right temporal artery was found divided, and this wound could not have been produced by the fall. It was, therefore, evident that a murderous assault had been made upon her at the top of the stairs; this had led to the spirting of the arterial blood on the brick. The height at which the spots existed, and their appearance, proved that the jet of blood had been from above downwards; thereby rendering it probable that the deceased was standing up, or that her head was raised at the time the wound was inflicted. Further, as the brick with the spots was on the left hand in the descent, and the wounded artery was on the right side, it is probable that the deceased was face to face with her assailant in the act of ascending the stairs, and that she was killed by being precipitated to the bottom.”(u) It has been supposed that *menstrual* blood could be distinguished from other kinds by the absence of fibrin; but, although this discharge does not usually coagulate, it nevertheless contains fibrin, and sometimes in very appreciable quantity. Dr. Franz Simon says: “There can be little doubt that there is fibrin in the menstrual secretion; its determination is, however, usually rendered impossible by the presence of a large amount of mucus, which seems to deprive the blood of its power of coagulating.”(v) M. Robin has given as characteristic qualities of menstrual blood, that it contains, besides blood-disks, epithelial cells and globules of mucus (leucocytes);(w) but the latter elements are wanting whenever the menstrual flow is excessive, and in such cases, therefore, the liquid presents no distinctive characters.

§ 751. The presence of fibrin in a blood-stain is merely corroborative proof of the origin of the spot, but does not indicate with any certainty that the stain was derived from

(u) Med. Jur., p. 203. See also case of *Drory*, by the same author. Guy's Hospital Rep., vol. vii. 1851.

(v) Animal Chemistry, Syd. Soc. ed., p. 338.

(w) Ann. d'Hyg., 2ème sér., x. 421.

the blood of a living person; nor, on the other hand, does its absence give any support to the opinion that it was derived from a body already dead, since, if the stain be superficial, it may yield no traces of fibrin, even though it came from a living vessel, and coagulation in a dead body is not complete immediately upon the extinction of life. Hence, if the physician be able clearly to discover the traces of blood by the reactions of the colored serum before indicated, it is superfluous to inquire for the presence of fibrin; and, on the other hand, this element of the blood could hardly be detected without ample proof of the nature of the fluid having been already obtained from other sources, since the quantity required would be considerable.

§ 752. The discrimination of the *blood of animals* from that of *man* by chemical means, is too uncertain to be used as evidence. M. Barruel has stated that, if one-third or one-half its volume of pure sulphuric acid be added to blood and agitated, a peculiar odorous principle is evolved, resembling that of the animal from which the blood was derived. Thus, human blood is said to give off an odor of perspiration; that of the cow, horse, sheep, pig, etc., a smell recognized as peculiar to the animal. M. Barruel claims to have discovered this property even in blood which had been dried. According to Schmidt, the experiment succeeds only with the blood of the ram, sheep, and cat. But more recently, an experiment was made by MM. Tardieu, Barruel, and Chevalier, which shows how little confidence can be placed in this test. These experts were charged with the duty of determining whether some blood found in the cellar of a woman accused of murder was human, or, as she alleged, that of a sheep. Being undecided in opinion, they procured the blood of sheep, oxen, and of the living and dead human subject, and these, with the blood from the cellar, and that upon the clothes of the accused, were placed in separate test-tubes by an assistant, and numbered. Sulphuric acid was then added to each, and the mixture stirred. Each expert was required to write secretly his opinion as to the source of the blood in each glass. The result was the greatest confusion, the human blood being constantly mistaken

for that of the animal, and a correct opinion seemed only to be obtained by chance.(x)

§ 753. 3d. *Microscopical evidence*.—An additional and valuable means of detecting the presence of blood in suspected stains, is by the microscope. If the spots are recent (a week old, for example), three to six hours are sufficient to disaggregate the mass of globules, but a solution of the sulphate of soda penetrates very slowly those which are old, and several days may be required for this purpose. When the tissue has been well soaked, the stains may be carefully detached with a scalpel, and the liquid thus removed should be placed upon a glass slide, and immediately covered with another one. Upon examining a blood-stain thus prepared, many other objects will be seen besides the blood-globules, such as filaments of tissue, etc., but the observer should abstract his attention from these, unless there is reason to suppose that they may indicate the locality from which the blood came, as in the case of mucus, etc., in attempts at rape. A portion of the globules will be found free, while others will be attached to the fibres of the stuff, but they will preserve their natural color, volume, and, more or less, their shape also, to such an extent, however, as to be readily recognized.(y) The microscopical characters of spots upon woollen cloth are less easily recognized than those on linen, hemp, or cotton. The investigation should, of course, be conducted only by one familiar with the use of the microscope. If this be done, there can be no hesitation in saying that the results will be fully as valuable as, and open to fewer objections than, the chemical tests.

§ 754. The stain to be examined should be treated with a solution of sulphate of soda or of white sugar, in order to preserve the natural shape of the blood-corpuscles. If the stain have been previously washed, it is very possible that the microscope will afford only negative results; but whenever it is possible to recognize distinctly even a single blood-disk in the liquid examined, this is quite sufficient to attest the pre-

(x) Casper's Vierteljahrschrift, 1854, H. i. p. 120. See also Henke's Zeitschrift, 1855, H. ii. p. 392, for a number of experiments made with a similar result, by Dr. Albert, of Euerdorf.

(y) Robin. Briand, Méd. Lég., p. 790.

sence of blood. Dr. Taylor says he has obtained "clear evidence of their existence in, and separation from, a minute fragment of dry blood, which had been kept in a dried state for a period of three years." M. Robin detected them in spots from eight to twelve years old. But such certainty cannot be expected if the spots have been washed, or if, while fresh, they have undergone putrefaction. Sometimes, when the red corpuscles cannot be detected, it may be possible to distinguish the *lymph-globules*, which are larger than these, but few in number, and colorless. Professor Wyman says that when blood is allowed to dry in masses, he has failed to detect the presence of the blood-disks. "The lymph-globules, on the contrary," he says, "may be softened out after they have been dried for months, and their characteristic marks readily obtained." He found it easy to detect them in blood which had been dried six months.(z) Virchow also states that they resist being dried and moistened anew better than any other constituent of the blood.(a) Still, they are much fewer in number than the red corpuscles, and, according to the best authorities, not in greater proportion than 1:400.(b) Virchow lays great stress upon their presence in blood subjected to medico-legal examination, on account of their power of resisting the influence of desiccation and subsequent moistening, and further, because their presence may confirm a doubtful opinion regarding the existence of red corpuscles in the spot examined. Much will depend, however, upon their number, for, if it should equal that of the red corpuscles, or nearly so, they must be regarded as belonging to pus rather than to blood. The possibility of their number being explicable by leukæmia, or leucocythemia, a disease in which they may become one-third as numerous as the red corpuscles, is also to be borne in mind.

§ 755. The red corpuscles of man have an average diameter of $\frac{1}{33000}$ of an inch, and this size is not affected by age, being the same in the young and the old. They have a flattened

(z) Statement by Prof. Wyman in Bemis' Webster Case, p. 90.

(a) Archiv, xii. 335.

(b) See Kölliker, Mikroskopische Anatomie, Bd. ii. p. 576.

shape, depressed centre, and circular outline. These characters suffice to distinguish them from those of birds, fish, and reptiles, in which creatures they are of an oval or elliptical form, and have a distinct central nucleus. They have the same shape also in the camel tribe. But the globules in all the mammalia (with this exception of the *camelidæ*) are so nearly alike in size and other characters to those of man, that, practically, no distinction can be made. Thus, the blood of an ox or of a sheep cannot by the microscope be, for medico-legal application, distinguished from that of a human being, for although the globules are somewhat smaller than those of human blood, yet the size of the globule of human blood varies according to whether it is fresh or dried, and the difference between its size in man and animals is too slight to be made a point of evidence in cases where such momentous consequences may depend upon the decision.(c)

(c) For the comparative size of the blood-globules in man and animals, the reader may consult with advantage Kölliker's *Mikroskopische Anatomie*, Bd. ii. p. 580; Briand, *Manuel Pratique de Méd. Lég.*, 781; Todd and Bowman's *Physiological Anatomy*, part iv. p. 299; C. Gulliver on the size of the red corpuscles of the blood in the vertebrata, in the *Proceedings of the Zoolog. Soc.*, ciii. 1842; R. Wagner, *Beiträge zur vergl. Physiologie des Blutes*, i. 1833, ii. 1838; *Partium Elementarum Mensiones Micrometricæ*, 1834. Carl Schmidt has also conducted such measurements with great industry (see an excellent paper upon blood-stains, by Dr. Fleming, *Am. Med. Sci.*, Jan. 1859, p. 110), but his results, while they show a considerable average difference between the size of the human blood-globule and that of various domestic animals, are still insufficient to be brought in evidence in the decision of medico-legal questions. This also is the emphatically expressed opinion of Virchow and of Brücke. (*Virchow's Archiv*, xii. 336.)

In the following case of presumed infanticide, in which a medical expert was required to determine the nature of some spots found upon a towel (described as having served to envelop the child) which was found concealed under a threshing-floor, the reader will perceive the nature of the investigation sometimes required :—

(1) The towel was of coarse huckaback, quite rotten, as a year had elapsed since it was concealed in the locality in which it was discovered, and the letters J. E. A., 20, were marked in red cotton upon one corner. It was very much torn, and full of holes.

(2) In one corner *three spots* of a dark-red color, resembling blood, were found.

(3) On another portion of the towel numerous large spots of a *dark-green* color were seen, resembling dried meconium. The texture of the cloth was

§ 756. The application of the higher powers of the microscope, and especially the use of immersion lenses, has of late years enabled observers to widely extend the field of medical jurisprudence in regard to the examination of blood-corpuscles in dried stains.

Dr. J. G. Richardson, of Philadelphia, microscopist to the Pennsylvania Hospital, has recently pointed out (*d*) that with suitable precautions the outlines of the red corpuscles can be recognized in a fragment of dried blood when magnified 1000 diameters, and that the material left when a coagulum is acted on by water hitherto considered (as taught by Virchow and Robin) to be fibrin, is made up of the membrane-like external portions of the red cells, with a very few delicate fibrin filaments interspersed among them.

§ 757. Dr. Richardson's method of examination is as follows: a minute particle of the suspected blood clot, about the size of a grain of writing sand or less, is scraped from the surface of a button, stud, glazed collar, cuff, etc., or from among the

so penetrated with this matter that even upon the opposite side it was slightly tinged with green.

(4) Spots of various sizes, of a *grayish-yellow* color, were found on other parts of the towel. These spots were dry, and could be detached in scales.

(a) The red spots were cut out and softened in some fresh liquor amnii, and revealed, upon examination by the microscope, all the characteristics of human blood.

(b) The portions discolored by the green material were also cut out and placed in distilled water, others in alcohol. These solutions, when treated with concentrated sulphuric acid, and a few drops of a solution of sugar (according to Pettenkofer), gave traces of a *violet* color, which was considered to indicate the presence of bile.

(c) Some of the same spots, dissolved in liq. amnii, and examined by the microscope, were found to consist of biliary cells, cylindrical epithelium, and fatty crystals.

(d) The *grayish-yellow* stains, being prepared in a similar manner, exhibited epidermic cells, and cells from the sebaceous follicles. Hence it was inferred that the various discolorations upon the towel arose—1. From blood; 2. From the secretions of the liver and intestines; and 3. From the cutaneous secretion; and that they could all be explained on the supposition of a new-born child having been wrapped in it. It was further supposed, from the ragged condition in which the cloth was found, that it had been torn by some animal which had carried away and devoured the body of the child.—*Wistrand, Hygiea*, Bd. xiv. p. 220.

(d) Hand-book of Medical Microscopy, Phila. 1871.

fibres of muslin, linen, or cloth, with the point of a cataract needle, letting it fall upon a microscopic slide which has been carefully cleaned. A thin glass cover should then be laid upon the minute fragment, pressed down firmly so as to crush the particle into powder, and the whole transferred to the stage of the microscope.

§ 758. After finding a suitable portion of clot with a thin bevelled edge, such as frequently splits off under pressure, pure water should be introduced at the margin of the cover and allowed to flow very slowly toward the chosen specimen; when this is reached by the wave of fluid, a remarkable appearance of boiling up from the centre is presented for a few moments and then as the tinged liquid is replaced by clear water an aggregation of compressed corpuscles, (d¹) very faint and colorless, but yet of unquestionable distinctness, come into view. A few straight interlaced filaments of fibrin are often visible, and at intervals the well-defined, granular, spherical lymph globules occur among the other elements. The decolorized red corpuscles may be rendered more obvious by introducing at the margin of the cover a minute portion of iodine or red aniline solution. Great care must be taken to avoid any movement of the cover upon the slide, which, when it occurs, often rolls the interposed disks into an apparently homogeneous mass, and it is advisable to keep up a current of fresh water beneath the cover until all tinge of color is removed from the clot, otherwise none but the granular lymph corpuscles may be visible.

From experiments made for the purpose, this observer concludes, that the corpuscles of blood-stains upon muslin, dried with various degrees of rapidity, do not vary in their average diameter more than $\frac{1}{140,000}$ th of an inch; and, in regard to the detection of different kinds of blood, he therefore concludes, "although it must be admitted that the blood-corpuscles of a few mammals approach so nearly in size to those of man as to render their distinction doubtful, yet for the practical testing of blood-stains in criminal trials we will rarely find such a decision necessary, since, as a rule, justice only requires that a

(d¹) *Vide* Fig. 27, Hand-book of Medical Microscopy, p. 284.

positive diagnosis shall be made between human blood and that of animals which are commonly slaughtered for food, such as the ox, the sheep, or the pig; and of birds, as, for example, chickens, ducks, etc.;" and adds that in all such cases a careful observer with our present improved microscopes may give a positive opinion. The smallest amount of blood in which Dr. Richardson claims to have distinguished human red corpuscles from those of the ox, sheep, or pig is the $\frac{1}{12,500}$ th of a grain of the dried clot.(d²)

(d²) In the trial of Leavitt Alley, in Boston, in February, 1873, it became a material question whether certain dried blood was human, as the prosecution alleged, or was that of a horse. The blood was not subjected to examination until it had dried. As part of the evidence in chief, Dr. S. Dana Hayes and Dr. Horace Chase testified to the effect that the blood was human. This was met by the defence by the evidence of Dr. Chas. T. Jackson, Prof. J. F. Babcock, and Prof. G. B. Harrison, to the effect that it is impossible to distinguish dried blood of men from dried blood of horses.

The following is the report of the testimony as published in the Boston Daily Advertiser:—

"Dr. S. Dana Hayes testified: Have examined many stains of blood and supposed blood-stains; I examined a vest that was stained on the inside; the buttons were gone from the vest, having apparently been torn off violently quite recently; examined an undershirt and drawers, and found certain spots upon them both; I cut out the pieces and carried them to my laboratory; the stain on the sleeve of the undershirt is pure blood; it is different from horse blood and menstrual blood; have compared it with the human blood of Mr. Ellis and found no difference between the two; I do not wish to be understood that the blood was identical, for science will not allow of that decision; science can only say that it is blood; science cannot say that it is human blood, but it can say that it is not horse blood or menstrual blood; the blood upon the right knee of the drawers was rather a doubtful stain, because there were more of the white corpuscles of the blood than in any other; it was the stain of blood, but cannot say of what kind; the blood removed from the crotch of the drawers resembled menstrual blood; the blood upon the right knee of the pants was pure blood; it was a large stain, about one-third as large as my hand, having the appearance of being recently washed; it corresponded to the stain on the right knee of the drawers; all the stains on the clothing and the boards were alike, and all pure blood except the blood on the crotch of the drawers; there was a clot of blood on the lining of the coat tail; it was not horse's nor menstrual blood; I divided my specimens of these spots with Dr. Chase; it was on the 13th of January; the chief of police handed me a small piece of skin which I found to be human flesh; I live in Longwood, in Brookline; know where Parker Street is and am familiar with the locality; the Brookline bell rings in the morning at seven o'clock; can hear it distinctly.

§ 759. An additional and still more certain proof of the presence of blood is derived from certain microscopical crystals

“Cross-examined : I began the examination on November 9, and have continued at intervals up to the present time ; the fact that a substance is blood or not is determined by analysis and by microscopic examination ; if it stands both of these tests it is blood, and there can be no mistake ; the difference between horse’s and human blood is this—that in horse’s blood the corpuscles are about one-third smaller than in human blood ; the differences in human blood are very minute, hardly perceptible.

“Dr. Horace Chace testified : Have been in practice as a physician about eight years ; am also a chemist ; have examined many stains of supposed and real blood ; had six specimens of the blood found upon Mr. Alley’s clothes and on boards in his stable ; the blood upon them was the same ; compared it with horse blood and found that there was a difference ; should judge it was human blood.”

For the defence the following testimony was introduced :—

“Dr. Charles T. Jackson sworn : Have lived in Boston forty years, and am an analytical and consulting chemist and State Assayer for the Commonwealth ; have taken a regular medical degree at Harvard College ; have frequently had occasion to examine blood in reference to trials ; it is not a difficult thing to ascertain whether stains are blood ; the drying up of blood depends on the weather ; I think it would dry entirely in twenty-four or thirty-six hours ; there is no way to tell how long blood has been in a place after it has dried ; if blood was scraped off with a knife after it had dried there would be no way of telling how long it had been on any place it was found ; blood is a liquid, the fluid part of which is yellow, containing fibrine and red corpuscles ; some 79 per cent. of blood is water ; corpuscles are circular disks having a central point, and are the same in all mammalia ; if corpuscles were thrown on a board the serum would sink into the wood and be absorbed, leaving the corpuscles shrunk up in all manners of shape ; when warm and fresh the corpuscles of a man are much larger than those of a horse ; there are different-sized corpuscles in man in the same blood, varying from one three hundred and twenty thousandths to one three hundred and seventy-five thousandths ; there are also in the blood colorless globules which are very irregular ; assuming that dry human blood was brought to me, the corpuscles can be swelled out again, but there is no method known to science which can determine whether the corpuscles after being swelled are of their original size ; I know of no means, and none are recorded in scientific authorities, of determining the difference between the dried blood of man and that of mammalia ; this is settled by the highest authorities ; the measurements of Dumas and Prevost are used all over the continent of Europe ; in the best authority of England, a work by Wm. A. Guy, it is stated that there is no means of knowing the difference between the corpuscles of the different mammalia.

“The citation of authorities by the doctor was objected to by the Attorney General, and excluded by the defence.

which this liquid contains. They were discovered in 1853 by Teichmann, and the method of detecting them has subse-

“Cross-examined by Mr. May : The last time I made a personal examination of blood in reference to the size of corpuscles was within two years ; have never made an examination of the blood of different mammalia with reference to their relative size ; a corpuscle can best be compared to a biscuit, the disks being rounded up and the highest in the middle ; the highest authorities known maintain this ; in their normal condition I know that corpuscles are not depressed in the centre ; Lehrmann is a high authority on this question ; there is a difference of a third in the size of a particle of human blood and horse’s blood ; if you took particles of human and horse’s blood, dry, by putting those two into an artificial serum, it is altogether an uncertain experiment to bring them back to their normal shape ; do not believe that with a powerful microscope a man could tell when a dry corpuscle was brought back into its original shape, and in my opinion they could never be restored with any certainty ; in one drop of blood a single corpuscle might possibly be restored to its original shape, but it is hardly within the range of probabilities ; it requires the most powerful microscope to even distinguish corpuscles ; the blood of reptiles and birds is contained in elliptical or oval-shaped vessels, which are much easier examined than the corpuscles of mammalia ; never have examined the blood of birds or reptiles, but in my opinion if it once became dry it would be impossible to restore the vessels to their original condition ; if a globule of blood was magnified 800 times, it would be about as large as the point of a sharp pencil ; if the blood of two different mammalia was taken in a fresh shape, under certain conditions, and then placed under a magnifying glass, I think a different size in the globules might be observed, but it would be a very difficult and delicate task to observe the difference ; it would be very slight, however ; dog’s blood would be the same size as man’s blood, and sheep’s blood the same as horse’s ; I know that Dumas was engaged on his work thirty years ago, for I was one of his pupils in Paris.

“Dr. James F. Babcock sworn : Reside in Boston and am an analytical chemist and professor for five years in Massachusetts College of Pharmacy ; was previously with Professor Horsford at Cambridge ; have frequently been called upon to examine blood and stains ; have examined stains perhaps a dozen times and blood many times ; it is a delicate matter to determine blood, but by a proper method it is an easy thing to recognize it ; blood chemically is a fluid, consisting of the clear portion called the serum, fibrine, corpuscles, and other constituents of small qualities ; the time of the drying up of blood would vary according to circumstances ; blood spattered upon wood in ordinary weather would dry in a day ; in a building blood would dry up in twenty-four or thirty-six hours ; after blood has once dried up it is impossible to tell how long it has been there ; could tell whether blood had been upon a surface two or three weeks, but could not tell whether it had been there four or five weeks ; if blood was scraped from a surface with a knife you could

quently been perfected by Brücke, Virchow, Büchner and Simon, and Bryk. Blood-crystals most frequently are seen as

not tell how long it had been there; take warm blood, and the only way to measure the disks is by a micrometer screw; the difference in the size of mammalia corpuscles vary within certain limits; the corpuscles of the same animal are not of the same size, though perhaps ninety per cent. are; the average size of the human corpuscle is one thirty-two hundredth of an inch in diameter; the extremes are from one two thousandth of an inch to one four thousandth of an inch; the blood coagulates and becomes solid, the corpuscles previously floating in the fluid contract, the edges shrink together, the mineral salts crystallizing, and the shape of the corpuscles when dry, before scraping off or after, cannot be told; they shrink up like a sponge; from my experience you cannot tell whether it is human or horse blood; the average size of a human corpuscle is a little larger than a horse's, one twenty thousandth of an inch; corpuscles are shaped like cheeses, and after dried blood had gone through a chemical process it would be impossible to restore the corpuscles to their normal condition; I do not know of any authority which tells the way to distinguish between the dried blood of man and that of mammalia; there is no standard of measure to tell the difference between the dried blood of a human person and that of a mammalia; authorities on this point are not doubtful, but are all unanimous in saying that the difference between the dry blood of man and mammalia cannot be distinguished.

“(Witness produced a copy of Guy's Forensic Medicine, and read therefrom a passage in support of his statements); the best authorities are Lehmann's Physiology, Watt's Chemical Dictionary, and Horswell's Toxicologists' Guide.

“Cross-examined by Mr. May: The size of corpuscles in human blood varies within certain limits; taking the average at one thirty-two hundredth of an inch, they would vary from one thirty-one hundredth to one thirty-three hundredth of an inch; the difference between the size of corpuscles in human blood and those of horses is about one-third; have examined human blood with reference to the related size.

“The best illustration of a corpuscle would be a cent; in so speaking I do not mean its exact shape, because no object is quite like a corpuscle; the shape of a corpuscle is slightly concave toward the centre; I have seen a particle of human blood magnified from a diameter of 50 to 500. (Witness then drew the size of a corpuscle as it appeared to him under a diameter of 600.) Had seen a photograph of the blood of an animal under 1500 diameters.

“Re-direct examination: There is no certainty in pointing out on paper the size of an object as it appears under a microscope.

“Re-cross-examination: Lehrmann in his work says that the moist blood of different vertebræ can be distinguished, but the statement is qualified; I think the most improved micrometer is in the eye-piece.

“Prof. Babcock then read other passages in the work at the request of Mr.

rhomboidal plates, but sometimes as rhomboidal columns, and, when less perfectly developed, have the form of a shuttle, or

Somerby, and claimed that it substantiated his statements; the experiments made by Schmidt were by drying fresh blood in thin layers on a glass plate.

“George B. Harriman sworn: Live in Boston; am a dentist and professor of microscopic anatomy in the Boston Dental College; my experiments lead me to examine the tissues of the human body; blood consists of fluid in which float red and white corpuscles; its other substances perhaps chemistry alone can decide; blood drawn from a body will coagulate: the corpuscles in a human body will vary from 2000th of an inch to 3800th; 400 diameters is as small as corpuscles can be examined, but can be magnified to 5000 or 10,000 diameters; I have a microscope which will magnify 10,000 diameters, and do not know of another instrument of that size in this country; have examined sheep’s, cats’, dogs’, and horses’ blood with this microscope; the corpuscles in a horse’s blood will vary; the moment blood is exposed to the air it coagulates and dries up, and the corpuscles shrink and assume such a shape that it would be impossible to determine whether it was human blood or horse’s blood; in a dried condition the corpuscles in human blood and horse’s blood resemble each other; it would be impossible to tell the difference between the corpuscles of human and horse’s blood, in a dry state, by a chemical test; have made this a specialty, and the highest authorities agree with my statement; microscopes varied, as the lenses were different, and in determining the size of corpuscles it was a matter of judgment.

“Cross-examination: Have been a dentist sixteen or seventeen years ago; was educated at the New Hampshire Literary and Biblical Institute; I then studied dentistry with Dr. Clough eight or nine years, and was in company with him; entered the Boston Dental School five years ago, and graduated there; attended nine months’ lectures there, and made a specialty of the examination of the tissues in the human body; the size of the corpuscles of a frog would be from 1500th to 2500th of an inch in diameter, or about twice as large as human corpuscles; this could be determined by a microscopic examination; with my microscope I have compared human blood and that of sheep, horses, and cats; there is no particular difference between the blood of these I have enumerated; have made such an examination since the great fire; I know white corpuscles are the largest by comparison with my microscope; out of a hundred corpuscles I do not think from ninety to ninety-five would be of the same size; the same would hold true of man or horse; upon the authority of Dr. Beal the difference between dry human blood and that of mammalia cannot be distinguished; do not think that science could determine the difference between a fresh drop of human blood and horse’s blood.

“Emmanuel Samuels sworn: Live in Quincy, and my business is preparing microscopic specimens; have been engaged in that work twenty years, and think that there is hardly a medical man in the United States but what has some of my specimens; without mechanical arrangements microscopes are not alike; I have never seen two people who saw an object the same through

that of a §. Like other microscopical crystals, they tend to intersect one another, and often form a St. Andrew's cross, a

a microscope; do not remember of ever having examined horse's blood, but have that of animals; have had no experience in examining blood.

“No cross-examination.”

We give below a letter which appeared in the *Advertiser*, Feb. 20, 1873:—

“*To the Editors of the Boston Daily Advertiser:—*

“In your paper for February 17, under the above heading, appears an editorial article, possibly based upon the closing argument of the defendant's counsel in the recent trial for murder in this city, which certainly reflects unjustly upon me and my evidence. The official records of this case will show that I did not make such broad statements as have been attributed to me, although I admit and can substantiate all that I did say on the witness stand.

“First, with regard to my microscopic examinations, without reference to the chemical analysis. There were nineteen specimens of blood and soft flesh taken from the stable and suspected clothing; these were repeatedly and carefully compared, upon several instruments, in different lights and with different powers, with the blood obtained from two horses, and also with that on Mr. Ellis's clothing. These comparisons were made at different times—when the specimens were first received and when they were apparently quite recent, again at the end of a month, and again just before the trial. New portions of the materials were taken for each of these examinations, and they were always placed ‘side by side,’ the horse's blood being that obtained personally from the animals at as nearly the time of Mr. Ellis's death as possible, one of them shortly before and the other soon after this event; and instead of taking other human blood I preferred to compare with that taken from the contents of the barrels found in Charles River.

“In all these comparisons there was no apparent difference between the suspected blood and that of Mr. Ellis, but in every instance the difference between these and the horse's blood was positive, and so distinguishable that the horse's blood could be selected from the others when it was not known upon which part of the slides it had been placed. These specimens were developed in the same vehicle, and, every condition necessary for exact comparison having been carefully preserved, the differences were then found to be very distinct, the horse's corpuscles being alike, and about one-third smaller than the others, when I viewed them with the micrometer.

“Secondly, referring to my evidence—when called by the government, and knowing the responsibility that rested upon me, I testified in the direct examination only to the results of my investigation, that it was impossible to determine whether the suspected blood was human; that it was not like any horse's blood that I had ever examined, and spoke of my comparisons. In the cross-examination, when adroitly asked about *fresh warm* blood, I stated in reply that the corpuscles of human and horse's blood, being of different sizes, could be readily distinguished under the microscope.

“I expressly stated that the accepted authorities gave the measurements of

stellate figure, or a rounded body studded with points like a stramonium apple. Their prevalent color is a dull brownish-red, but it may vary from a dirty yellow to deep black, according to the amount of coloring matter of the blood which is present in the solution. Their number is likewise subject to great variation. They are wholly insoluble in water, alcohol, ether, and chloroform, and in acetic, phosphoric, and muriatic acids; slightly soluble in ammonia, and in dilute sulphuric or nitric acids; but entirely so in solution of potassa, to which they give a dark-green color, also in English sulphuric acid, and in fuming nitric acid. To the last-named liquid they impart a brownish-red color. In chlorine-water they become disintegrated and corroded, and lose their color. (*d*³)

§ 760. These characteristic crystals have been obtained from

these corpuscles, not that they were my measurements; and, when asked to quote these authors, inadvertently said thousandths instead of hundredths, a mistake which I corrected before leaving the room.

“These are the parts of my evidence that you have taken the opportunity to criticize so severely, saying that ‘very small human corpuscles and very large horse corpuscles might be placed side by side and found equal.’ I think you have overlooked the fact, that, although there are differences between the maximum and minimum measurements that have been made of corpuscles, by the authors you quote, all authorities agree upon a constant difference, and that, when the observer of maximum dimensions gives the measurement of human corpuscles, he also gives the maximum measurement of horse’s corpuscles comparatively large, or, in other words, that the differences are those of different observers and not different corpuseles in the same kind of blood. And again these differences in the blood of mammalia have been sworn to by others, in capital cases previously tried in this country and in Europe, when the offenders have been convicted and made confession of their crimes.

“In scientific discussions of this kind it is dangerous to rely upon the statements made in books, as inferences may be nearly always drawn from them which are quite contradictory; and this, with the advantage taken by the counsel of professional jealousies, often throws discredit upon scientific testimony and perplexes a jury.

“In the present case, working as I did upon soft flesh and blood, I am very certain of my results, and they were fully confirmed by an able colleague who gave his evidence at the trial, and who has made practical proofs of these truths to many other observers; but I think that my connection with this case has been sadly misrepresented in your editorial already mentioned.

“S. DANA HAYES.

“No. 4 State Street, Feb. 19, 1873.”

(*d*³) Büchner and Simon, Virchow’s Archiv., xv. 52.

all kinds of blood—from that of man, quadruped, fowl, and fish; from fresh and putrid blood; from newly-drawn blood and from spots several years old; from arterial, venous, and menstrual blood; from pure blood and from that which was mingled with all sorts of impurities. It is to be observed that various coloring matters, mostly from the vegetable kingdom, form crystals which bear some analogy to those peculiar to the blood—as indigo, alkanet, logwood, madder, etc. But the blue color of the first of these, and the want of color in the rest, with the rhombic forms of their crystals, are sufficiently distinctive, to which, however, may be added their ready solubility in many liquids, and, for the most part, even in water. Purpurate of ammonia presents some difficulties. It forms, both with and without the addition of acetic acid, crystals very closely resembling those of hæmatin, in form and in color. Its acetic solution gives residue, after evaporation, of a clear brick-red color, but blood similarly treated is a dull brownish-red. The same residue becomes purplish-red on the addition of water; muriatic acid destroys its color, and solution of potassa gives it a blue tint; whereas blood-crystals are insoluble in the first liquid, and form a dark-green solution with the other.

§ 761. In making this examination, the suspected spots on soft substances—as clothing, etc.—should be cut out, and those on hard substances carefully removed by scraping, and liquids thought to contain blood should be concentrated by evaporation. Spots a few weeks or months old yield their coloring matter readily to water, but older and faded stains require maceration or boiling in acetic acid until the latter is reddened. Indeed, this is the speediest and most certain process for all blood-stains, except when they are upon a substance the coloring matter of which is extracted by the acid. The acetic solution thus obtained should be gradually evaporated in a watch-glass at a temperature of 100° to 140° F. If blood is present, a thin, reddish, transparent crust is left behind, in which the crystals of hæmatin lie firmly imbedded, and ready for examination by the microscope. It is not necessary, as was at one time supposed, to add common salt to the acetic solution. On the contrary, this addition tends to confuse the result where the blood-crystals are abundant. Still, it must

be admitted, as Büchner and Simon insist, that, if a first trial without salt gives a negative result, the experiment should be repeated with this addition; and, if enough only of the suspected material is preserved for a single experiment, the use of salt should not be omitted. It is essential that a very minute grain of salt should be added to the solution *before* it is heated.

§ 762. The following important details respecting the application of the above method to the examination of blood-stains under different circumstances are furnished by Prof. Bryk.^(e) Spots of blood left by fleas or bugs yield no crystals. Blood-stains on wood differ with the character of the wood. If smooth, dry, and hard, it does not interfere with the formation of crystals; but if it imbibes the blood, it will still, during the first six or eight days, yield by maceration a solution of the hæmatin which will furnish crystals. At the end of six or eight weeks this is no longer the case with soft wood, the tannin of which apparently renders the coloring matter insoluble. On clean iron the susceptibility to crystallization remains so long as rust does not form. On clay and chalk blood also remains indefinitely, unless it is in a very thin layer, or is exposed to the action of the weather.

§ 763. *Examination of blood by the spectrum-microscope.*—The following directions are given by Mr. Sorby for the detection of blood by the spectroscop.^(e¹)

“In applying the spectrum test to the detection of blood-stains, the method of examination must to some extent depend on the amount of material at command. If there be not too little, a small portion of the stained fabric should be soaked in a few drops of water in a watch-glass, the liquid squeezed out, allowed to stand a short time in the glass, so as to deposit any insoluble matter, and then poured into one of the small, deep cells used in examining the spectrum. These cells should be made from barometer tubing, having an internal diameter of one-eighth or one-tenth of an inch, and should be one-half or three-quarters of an inch long; one end being fastened to a

(e) Prager Vierteljahr., lxii. anal. p. 106.

(e¹) Guy's Hospital Reports, 1869-70, p. 274.

piece of plate glass, like an ordinary cell for mounting objects in liquids. If the stain had been recently made, the spectrum of fresh blood would then be seen, which has two well-defined absorption bands in the green. If, however, the blood had been exposed some time to the action of the air, these bands would be fainter, and another would be seen in the red. The relative distinctness of this shows the amount of change, and is some indication of the age of the stain; but in forming any such conclusions, it is necessary to know the circumstances of the case, since the sulphurous acid met with in towns or in rooms where gas is burned, produces more change in a day than purer air does in a week. If, however, little or no change had occurred in a town, it would be good evidence of the stain having been recently made. In order to make the detection of blood still more certain, it is well to observe the effects of reagents and examine other spectra. A piece of citric acid about one-fiftieth of an inch in diameter should therefore be dissolved in the liquid in the cell, when it will be seen that the absorption bands of the fresh blood gradually disappear, and are not restored by the subsequent addition of excess of ammonia. This is a most important fact, since it shows that the acid produces a permanent change, which is not the case in nearly all other red coloring matters. To remove all doubt about the presence of blood a very small piece of sulphate of protoxide of iron, not above $\frac{1}{100}$ th of an inch in diameter, should be added to the cell, care being taken to insure the presence of excess of ammonia, and to avoid, as much as possible, oxidization by exposure to the air. It is therefore well not to stir up the liquid, but, having previously rather more than filled the cell, to cover it with a small piece of thin glass, and, after removing excess of liquid by blotting-paper, to fasten down the glass by putting round it a little gold size. If enough citric acid, and not too much sulphate of iron, have been added, the protoxide of iron may be made to dissolve by turning the cell upside and downside over and over again; or by keeping it for a time upside down if the oxide has adhered to the bottom. By this means the hæmatin is slowly deoxidized, and the well-marked absorption band of deoxidized hæmatin gradually makes its appearance in the

green, with a second fainter band nearer the blue end. If the solution be at all turbid, the cell should be kept horizontal for a time, so that the insoluble matter may be deposited on the side. The production of such a remarkable and characteristic spectrum by the addition of sulphate of iron, as far as I am aware, only occurs in the case of blood, and therefore affords very conclusive evidence of the presence of that substance. With proper care these various results may be seen to perfection, with about $\frac{1}{100}$ th grain of blood, but I need scarcely say that before any one attempts to apply the test in any important case he should try the experiments with a little undoubted blood so that he may be made familiar with the various spectra, and quite certain that he understands all the requisite manipulations. In all cases the spectra of a suspected stain should be compared side by side with those of blood, in order to see that there is a perfect agreement; and, of course, in all these experiments the solutions must be diluted to such an extent as to show the spectra in a proper manner.

§ 764. "It may, however, often happen that the suspected stain may contain so little coloring matter that it would be essential to examine it without any loss. Since exposure to the air may make the stain only partially soluble in water—and if it had been previously washed nothing but such insoluble matter might be left—the stained fabric should be digested in a few drops of water in which the small piece of citric acid had been already dissolved, and the excess of ammonia afterwards added before the liquid is introduced into the cell. The spectrum should then be examined before and after the oxidization by sulphate of iron. With proper care good evidence of the presence of blood may thus be obtained from an extremely faint stain, since $\frac{1}{100}$ th of a grain of blood suffices to show a decidedly characteristic spectrum.

"The above methods apply to staining on cloth, silk, linen, and calico; and I need scarcely say that it is desirable to ascertain whether any important amount of color is dissolved from unstained portions. In the case of stains on leather or any substance containing tannic acid special precautions are requisite, since it precipitates the coloring matter of blood, which, therefore, might not be detected, even though present

in considerable quantity. If the stain be on leather, a thin shaving should be cut off from the surface, so as to have as much blood and as little leather as possible, and the blood should be dissolved off without exposing the solution to the action of the leather itself. This may be accomplished by taking one of the experiment-cells, nearly filled with water, bending the shaving, and inserting it into the upper part of the tube, so as to touch the water, being careful to arrange it so that the stain may be on the convex side of the leather and in contact with the water. When a drop of blood falls on leather, many of the red globules are filtered out from the serum, and left on the surface; and when thus treated they dissolve, and the colored solution sinks at once to the bottom of the cell without coming in contact with the leather. If, however, the stain had been previously sponged or washed, it might, perhaps, be impossible to detect blood by the spectrum method.

§ 765. "For detecting blood in urine, it is best to use a tube of thick glass, ten inches long, and a quarter of an inch in diameter, permanently closed at one end with a circular piece of glass, and, when filled, covered at the other end with another glass. If the urine be at all turbid, it should be filtered; but, since most of the red globules would also be separated, the precipitate on the filter should be washed with a little water, and the solution examined by itself, or added to the filtered urine. If the depth of the color in the ten-inch tube be so great that the yellow end of the green part of the spectrum is absorbed by the urine, it must be somewhat diluted, or examined in a shorter tube. In the case of urine of average depth of color, I find that as little as $\frac{1}{10,000}$ th part of blood can easily be detected, which is equivalent to about one drop in a pint.

§ 766. "In conclusion, I must say, that, in examining some thousands of spectra, I have been led more and more firmly to believe that with anything like reasonable care there then is no difficulty in obtaining satisfactory proof of the *presence or absence of blood*. I do not at present see any probability of deciding by the spectra from *what kind of animal* it came; but

of course the mere fact of its presence or absence may be of very great importance in connection with other evidence. (*f*)”

§ 767. For the modes of detecting *hair*, and also *dried cerebral matter*, under the microscope, we would refer the reader to the suggestions of Orfila and Robin, in Briand’s *Manual de Méd. Lég.*, pp. 810–816. For cases in which evidence from these sources was considered of importance, see the same work; also *Med. Gaz.*, vol. *xlviii.* p. 729, where it was necessary to distinguish between the hair of a human being and an animal; also Taylor’s *Med. Jur.*, p. 249, where some cotton-fibres detected by the microscope on the edge of a razor showed that the weapon had cut through the strings of a cotton night-cap, in giving a fatal wound upon the neck; and, finally, one in Henke’s *Zeitschrift*, 1853, p. 334, in which an assassin was detected and convicted partly upon the indicatory evidence furnished by a lock of hair remaining firmly grasped in the hand of the murdered man. The hair resembled, in all its physical character, that of the prisoner; the individual hairs were found to be some of them broken, others torn out by the root, and others cut, and a bare place was found on the prisoner’s head to which they corresponded.

§ 768. The value of microscopical evidence of the character of stains and of hair is well illustrated by the following case, (*f*¹) which occurred in Norwich, England. A female child, nine years old, was found lying on the ground, in a small plantation, quite dead, with a large and deep gash in the throat. Suspicion fell upon the mother of the murdered girl, who, upon being taken into custody, behaved with the utmost coolness, and admitted having taken her child to the plantation where the body was found, whence the child was lost by getting separated while in quest of flowers. Upon being searched, there was found in the woman’s possession a large and sharp knife, which was at once subjected to minute and careful examination. Nothing, however, was found upon

(*f*) “For general directions in using the spectrum-microscope, I beg to refer to my article in Dr. Lionel Beale’s ‘How to Work with the Microscope,’ 4th edition, 1868, p. 218.”

(*f*¹) Quoted by Dr. Fleming, *loc. cit.*, from Chambers’s *Journal*, part *xxxv.* Dec. 1856.

it, with the exception of a few pieces of hair adhering to the handle, so exceedingly small as scarcely to be visible. The examination being conducted in the presence of the prisoner, and the officer remarking: "Here is a bit of fur or hair upon the handle of your knife," the woman immediately replied: "Yes, I dare say there is, and very likely some stains of blood, for, as I came home, I found a rabbit caught in a snare, and cut its throat with the knife." The knife was sent to London, and, with the particles of hair, subjected to a microscopic examination. No trace of blood could at first be detected upon the weapon, which appeared to have been washed; but upon separating the horn handle from its iron lining, it was found that between the two a fluid had penetrated, which turned out to be blood—certainly not the blood of a rabbit, but bearing every resemblance to that of the human body. The hair was then submitted to examination. Without knowing anything of the facts of the case, the microscopist immediately declared the hair to be that of a *squirrel*. Now, around the neck of the child, at the time of the murder, there was a tippet or "victorine," over which the knife, by whomever held, must have glided; and this victorine was of squirrel's fur. The woman was convicted, and, while awaiting execution, fully confessed her crime.

V. Causes of Death in Wounds.

§ 769. Wounds become the cause of death either by direct or indirect influence. In the first case the tendency to death is necessary and immediate, or nearly so. In the second, the injury is the remote cause of death, other causes intervening by which the fatal result is accelerated or rendered inevitable. The mode in which a wound proves directly fatal is either by hemorrhage, shock, or great mechanical injury.

§ 770. 1st. *Hemorrhage*.—The rapidity of dissolution, when this is brought on by loss of blood, is proportionate to the amount and suddenness of the hemorrhage. These, in their turn, depend upon the size and nature of the vessel wounded. Thus a person may sustain the loss of an enormous quantity of blood, provided it ooze but slowly from the body; while a far smaller amount would produce fatal syncope, if rapidly

poured out from some large vessel. Blood escapes also from a wounded vein more slowly than from a divided artery, and venous hemorrhage is therefore less likely to prove fatal than arterial, as well as because the blood which is lost is not so essential to life. A third form of hemorrhage becomes, in some special cases, of serious importance. This is *capillary* hemorrhage, in which the blood effused upon the surface of the wound is extremely serous in its character, less dark than venous blood, and appears in the form of drops, which quickly run together and cover the wound. It occurs in persons of a hemorrhagic disposition upon the most trifling wound, and is exceedingly difficult and often impossible to control. In these persons a common epistaxis becomes a matter of grave importance, a scratch with a knife, the bite of a leech, or the extraction of a tooth, is followed by an oozing of blood which no hemostatics will arrest. This hemorrhagic disposition sometimes is hereditary, and, according to the large number of observations now on record, is generally confined to the males in a family. Most of these cases have been collected by Dr. Beck.(g)

§ 771. *Age and disease* have also their influence upon the fatality of hemorrhage. Children readily succumb from a trifling loss of blood, and those whose constitution has been impaired by chronic disease have, as might be expected, little power of recovering from hemorrhage. A number of small wounds may occasionally lead to as grave results as a single large one. A singular case is related in which a dealer in leeches

(g) Med. Jur., vol. ii. p. 595 et seq. *Vide* also Schneider—Die Blüter, erbliche Blutung oder so genannte Bluterkrankheit, etc. Henke's Zeitschrift, 1847, H. i. The following additional cases may also be consulted : Dunlap, N. York Journ. (N. S.), iv. 314 ; Strong, Am. Journ. of Med. Sci., July, 1854, p. 80 ; Miller, Edinb. Journ., Jan. 1856, p. 638 ; Townsend, Boston Med. and Surg. Journ., Jan. 1857, p. 447 ; Huss, Archives Gen., Aug. 1857, p. 165 ; and Heymann, Virchow's Archiv., xvi. 183. See also A Treatise on Hæmophilia, sometimes called The Hereditary Hæmorrhagic Diathesis, by J. Wiekham Legg, M.D., London, 1872 ; An Account of a Family Predisposition to Hemorrhage, by Drs. William and Samuel Buel, Transactions Physiomed. Soc. N. Y., 1817, p. 304 ; Observations on Hereditary Hemorrhage, by Reynell Coates, M.D., of Philadelphia, N. A. Med. and Surg. Journ., 1828, vol. vi. pp. 37-53.

was set upon by highwaymen, who, after having plundered him of his money, thrust his head into the sack containing the leeches and bound him fast. The unfortunate man, a short time afterwards, was discovered still alive, but notwithstanding medical aid was given him, he perished in consequence of the loss of blood from the multitude of leech-bites. (*g*¹)

§ 772. Where the hemorrhage is *internal*, besides the exhaustion attending it, death is accelerated by the mechanical action of the blood. Thus, if an intercostal artery have been wounded, the blood, being effused into the cavity of the chest, will compress the lungs and seriously embarrass respiration. In wounds of the pericardium the blood effused into this sac is most probably the immediate cause of death, owing to its interference with the functions of the heart. If the throat has been cut, the blood may flow into the trachea and lungs, and thus cause death by asphyxia. But the mechanical effects of hemorrhage are best seen in those injuries of the head in which any of the cerebral vessels have been wounded. Here the fatal result of compression from a clot is evident in the apoplectic state induced by it, when, perhaps, the actual loss of blood has been trifling.

§ 773. All of the above-mentioned circumstances must be taken into careful consideration, in the post-mortem inspection of persons who have died soon after receiving one or more wounds. Where death has resulted from hemorrhage alone, the fact is usually indicated by the pallor and waxy appearance of the skin, the absence of cadaveric blotches, and the paleness of the internal organs. Putrefaction occurs also later than usual. These appearances will be found more marked in those cases in which the hemorrhage has not been very rapid.

§ 774. 2d. *Shock*.—The possibility of a person dying from the shock attendant upon an injury, which by itself appears to be unimportant, is attested by experience. Many theoretical explanations have been offered to account for this fact, a consideration of which would here be out of place. The shock

(*g*¹) De Neufville. Henke's Zeitschrift. Erg. H. 1851, p. 40.

from an injury may prove fatal in two cases. 1st. When the blow leaves no trace behind it; and 2d. Where great violence has been done to some important organ without occasioning a sufficient amount of hemorrhage to produce death. If a person receive, for instance, a violent blow in the pit of the stomach, or behind the ear, he may be almost instantaneously deprived of life. On post-mortem examination, there may be found externally but slight marks of contusion, and internally neither laceration, fracture, nor hemorrhage by which the cause can be brought into any visible relation with the fatal result. "Mr. Lambert, a respectable individual of New York, received a blow on the stomach from some rioters, immediately after coming from a supper party. He died almost immediately. On dissection no mark of injury could be discovered, except some small red spots on the internal surface of the stomach, and there was no mark of external contusion. The brain was healthy. Dr. Post and other witnesses concurred in believing that the blow was the cause of death, and not sudden fright. The prisoners were convicted of manslaughter."^(h) A similar case is related by Sir Astley Cooper, and another by Mr. Wood.^(h')

§ 775. 3d. *Mechanical injury*.—If, again, some part of the body, especially any of the internal organs, have suffered any great mechanical injury, as from being crushed by a heavy weight or projectile, or by a fall from a height, there will very frequently be no external mark of violence and no internal hemorrhage sufficient to account for death. But the fatal result is no less evidently due to the powerful impression made upon the nervous system by the violent disruption or laceration thus produced. The following may serve as an example: An American Philhellene was struck by a cannon ball, in the batteries of Napoli di Romani, which carried off the right hand that had been resting on the haunch, a portion of the right half of the pelvis, and part of the thigh. The abdominal viscera were laid bare but not torn, and there was trifling hemorrhage from the wounds. He conversed calmly about

(h) Beek, Med. Jur., vol. ii. p. 337.

(h') Med. Gaz., vol. xliv. p. 213.

the Greek wars, in which he had taken an active part, asked if a man could live who had lost the half of his body, and died suddenly three hours after being injured.(i)

§ 776. Under this head might be properly introduced instances of death from ill-treatment or from a large number of trifling wounds, unattended with any serious hemorrhage. Death in such cases takes place rather from the exhaustion and terror of the sufferer than from the momentary shock of the injury, but it may also be due to inflammation of internal organs following upon extensive injury to the skin. Examples of this mode of death have been known to ensue from severe flogging ordered by military authorities.(j) Such is also probably the immediate cause of death in many cases of extensive burns or scalds, where the function of a large portion of the skin is at once destroyed.(j¹)

(i) Navy Medical Reports, by Sir John Liddell, M.D., etc., Med. Times, April, 1854.

(j) *Vide* Lancet, 1846, for an account of the case at Hounslow. A case of epilepsy and one of congestion of the brain produced by this brutal punishment are recorded by Dr. Davidson, Med. Times and Gaz., Dec. 1853, p. 623. Quite recently, April, 1860, a boy of fifteen died at Eastbourne, Eng., from the effect of blows upon his back and legs, inflicted by his tutor with a skipping-rope with wooden handles, and with a thick walking-stick. This punishment was resorted to as a means of conquering the boy's obstinate and perverse disposition, and obliging him to learn. *Ibid.*, May, 1860. It is evident that the boy was insane.

Dr. Taylor (Med. Jur., 6th Am. ed., p. 254) says: "In death from severe flagellation, blood may be effused in large quantity beneath the skin and among the muscles; this effusion will operate as fatally as if it had flowed from an open wound."

(j¹) A painfully interesting chapter on the cruelties and injuries inflicted upon children has been written by M. Tardieu. (Ann. d'Hyg., Avr. 1860, p. 361.) These are various in their character as the instruments which are employed; cuffs, blows, kicks, stripes, and bruises from rods, cords, thongs, whips, clubs, forks, shovels, tongs, and every variety of instruments. Sometimes children are dragged, pinched, or have their flesh torn; they are deprived of all means of cleanliness, coarsely fed or starved; hid away in dungeons, closets, or boxes; exposed to icy cold or tortured with hot coals, or iron, or corrosive liquids; their limbs are mutilated, the ears and nose lacerated, or the hair torn out; or they are suffocated with food; or obliged to swallow the most disgusting and loathsome substances.

The victims of these cruelties are generally very young. In seventeen out of thirty-two cases, they were under the age of five years, and in seven cases,

The causes now enumerated which render wounds directly fatal without the intervention of secondary causes, may be

from five to ten years old. In nearly all the instances the cruelties were inflicted by the parents; eleven times by both together, eight times by the mother and five times by the father only, four times by a stepmother, four times by a school-teacher, and once by a woman to whom the child was apprenticed.

Their aspect is generally peculiar; they are pale and thin, and sometimes wasted almost to the bones, with a dull, downcast, saddened look, and a timid manner. The marks of their cruel treatment generally consist of bruises, wheals, and excoriations. The bruises are usually upon the face, limbs, and back, and are peculiar in not generally occupying prominent parts, as they would do if produced by a fall. Their shape is often distinctive, and resembles that of the hand, nails, stick, shoe, etc., which inflicted them; or they are red, oval, and ecchymosed from pinching; present double parallel and bruised lines when produced by blows with a ruler, or the stripes occasioned by a whip-lash, etc. The wounds are contused, lacerated, accompanied with fracture of bones, or are produced by fire or by corrosive agents; or certain marks, such as deep furrows in the skin, or a permanent stiffness of the limbs, or a deformity of the bones, indicate the use of cords, or the confinement of the body in a constrained position.

In 18 of the 32 cases collected by M. Tardieu death was caused either directly or indirectly by blows or prolonged ill usage, and it is to be observed that the former may be fatal by their direct shock to the nervous system.

As illustrations of this painful subject, a brief notice of two cases contained in the paper above referred to may here be presented.

A father and mother were condemned to hard labor for life upon conviction for having cruelly maltreated their daughter from the age of eight to that of seventeen years. She was incessantly whipped, knocked down, beaten with all manner of instruments, and lashed upon the back with a cat-o'-nine-tails while hung up by the wrists. One night, while she was naked and firmly bound down, her father applied red-hot coals to her back and limbs, renewing them as fast as they ceased to burn; and on the following night, after she had been flogged with the cat, her mother applied a sponge soaked with nitric acid to the wounds. These abominable and unparalleled atrocities were several times repeated, with variations of intenser cruelty. The unhappy victim slept in a chest about six feet long by twenty inches high and twenty-four inches wide, upon a litter of stinking straw, with which, after her back had been made raw, they mingled nettles and brambles. In this she was confined by a lid secured by means of a padlock, and only raised enough to permit her to breathe. If it was possible to add anything to these cruelties, it was done by the father of the victim, who addressed her in filthy language, and attempted indecently to touch her person, and finally, after binding her firmly with her limbs asunder, he thrust a wooden plug into her

variously combined. Practically there are few fatal wounds in which they are not united. This fact should not be lost sight of by the medical witness in giving his opinion as to the immediate cause of death.

§ 777. 4th. *Diseased condition of body.*—Sometimes a wound which, under ordinary circumstances, would not be immediately fatal, becomes so, in consequence of the existence of some *abnormal* or *diseased condition* of the body. The cases which fall under this remark are exceedingly numerous. An undue thinness of the skull, a displacement of the viscera, an abnormal distribution of the arterial trunks, an aneurism, a hernia, and many other similar defects may prove the occasion of a wound being rapidly fatal, which otherwise would not necessarily have been so. Thus, if a person have an aneurism of the aorta in the chest or abdomen, and be struck with a certain degree of violence over these cavities, he may suddenly die from a rupture of the aneurismal sac caused by the blow. Or if he have at any time been subjected to the operation of trepanning, by which a portion of the skull is removed, which is not again reproduced, a blow or wound on this part will necessarily prove eminently dangerous. (*k*) A constitutional disposition to hemorrhage upon slight causes has often brought on a fatal termination in trifling wounds. (*l*) It is hardly necessary to state that old age, infirmity of any kind, or that even a highly excitable condition of the nervous system, may rapidly accelerate the approach of death.

§ 778. It is also of importance to remember that owing to internal disease death may occur during a quarrel although no blow shall have been given. Two women were engaged in a violent altercation, when one was seen suddenly to fall down dead. On examination she was found to have died of con-

genitals. It is remarkable that the girl attempted to explain all of the injuries found upon her person in such a manner as not to accuse her parents.

The remaining case is, briefly, the following. The stepmother of a fine, robust boy, four years of age, suffocated him by forcing food into his throat. The mouth and throat were distended by a compact mass of doughy bread, large quantities of which were also found in the stomach and œsophagus, and some portions of it even in the trachea.

(*k*) *Vide* Hinze, Hufeland's Journal, 1819, p. 79.

(*l*) *Vide* Beck, ii. 295.

gestion of the brain; yet, but for the witnesses of her mode of death, her adversary might have been suspected of dealing her a fatal blow.⁽¹⁾

§ 779. (1) *Wounds inflicted on pregnant women.*—Pregnancy obviously renders the prognosis of a wound more grave. The mere shock of the injury may bring on premature birth of the child, and hence endanger the life of the mother. But wounds which involve the abdomen, and especially those in which violence is done to the uterus, are necessarily of extreme gravity for the mother and her child. The injury may result in the death of either or both. The amount of external violence necessary to produce this result it is of course impossible to determine, since many instances are on record in which very severe injury has been inflicted under these circumstances without being followed by fatal results. On the other hand, contusion of the abdomen from kicks or similar violence, may produce death by shock or peritoneal inflammation, and wounds of the impregnated womb are always attended with severe bleeding and the danger of a premature delivery.

§ 780. (2) *Indirect complications.*—A wound may prove *indirectly fatal* in a vast number of ways. We shall only enumerate the more common and important of these, as it is, we conceive, of more consequence that the principle of the remote dependence of death upon a wound, perhaps not necessarily mortal, should be understood, than that all the circumstances which may possibly intervene between the period at which the wound was given and that of the fatal result, should be enumerated.

Should the person not die from the immediate effect of the wound, he may nevertheless succumb from some one of the chain of disturbing causes to which it has given rise, or from the wound itself, rendered fatal after a length of time, by extraneous causes. In many instances the fatal result can be traced to its origin in the wound, partly from the evidence derived from a post-mortem inspection, and partly from the history of the patient's condition from the time he received his injury. The length of time that may elapse after the in-

(1) Prager, Vierteljahrs., lxvi. 26.

fliction of violence, before death follows it, is of course indeterminate.

§ 781. Without the supervention of any of the complications to be presently enumerated, the wound may have interested parts not essential to life, and yet may render its protraction for any considerable period impossible, since the changes produced by it in the organism may go on gradually increasing in their gravity till death result. Thus injuries to the spine, producing paralysis of the lower limbs and of the sphincter muscles of the bladder and rectum, or blows on the head, giving rise to chronic disease of the brain, will gradually undermine the powers of life, and bring it to a deplorable end, after long confinement, suffering, and distress. Such is often, also, the result of gunshot wounds, where the ball remains in the body, and the patient is wasted away by suppuration and hectic.

The old division of wounds, into those which are necessarily and those which are conditionally mortal, gave rise to so many errors of prognostication, that it has now much less authority than formerly. It will, of course, always be necessary to discriminate concerning the gravity of wounds, but it will never be possible to draw a line of distinction, which will be universally recognized, between the absolutely and the conditionally mortal. The truth of this statement will, we think, be fully borne out, when the multitude of circumstances is considered which may influence the result favorably or the reverse.

§ 782. (3) *Tetanus*.—Among the most frequent and serious complications of wounds, is *tetanus*, or lockjaw. This disorder occurs most frequently after punctured or lacerated wounds, especially such as interest the nerves or tendons. It is said to be occasionally epidemic, and to be of more frequent occurrence in warm than in temperate climates. In fact, it may occur idiopathically; that is, without any wound having been received. The wound giving rise to it is often exceedingly unimportant. Thus, it has been caused by the sting of a bee, the stroke of a whip, or the irritation of a small splinter of bone. But it is “mostly connected with wounds of fibrous and ligamentous structures, accompanied with tearing, bruising

ing, partial injury, and exposure of the nerves; with wounds of the joints, of the face, neck, fingers, toes, and of the spermatic cord; it usually begins during the suppurative period, and even during or after the scarring of the wound. Foreign bodies in the wound, especially splinters of bone, ligatures of arteries, if a nerve be included in the ligature, are all to be considered as not unfrequent causes of tetanus. Likewise, hot seasons of the year, cold, frequent changes of the temperature, especially in low districts and in the neighborhood of rivers, and the influence of a moist, cold, foul air upon nerves after their exposure by the separation of sloughs.”(m) The time at which it may supervene after the injury is not precisely known. Occasionally it ensues upon recent wounds immediately, and in other cases does not occur for several days. Not unfrequently the wound is entirely healed before the attack. Brodie mentions the seventeenth day as the latest period after the accident in which he had known tetanus to come on.(n) Sir James McGrigor notices a case twenty-two days after,(o) and Blane speaks of it as happening within a month.(p) It is a very serious complication of a wound, proving fatal in the majority of cases. Dr. O’Beirne states, that of two hundred cases which he saw, not a single one recovered.(q) Hennen says: “I have never been fortunate to cure a case of acute symptomatic tetanus; in some instances of the chronic species I have effected or witnessed a cure.”(r)

§ 783. (4) *Erysipelas*.—This affection, which increases greatly the gravity of wounds, is a frequent accompaniment of those which are lacerated and contused, and especially if seated upon the scalp. It spreads rapidly in the wards of hospitals under certain conditions of the atmosphere, which are not well understood; and an important question will therefore arise, as to the degree of responsibility of the person who inflicts the wound, when the injured man dies from an attack

(m) *Chelius’s Surgery*, by South, Am. ed., vol. i. p. 417.

(n) *Lond. Med. Gaz.*, vol. ii. p. 344.

(o) *Med.-Chir. Trans.*, vol. vi. p. 453.

(p) *Diseases of Seamen*.

(q) *Dub. Hosp. Rep.*, vol. iii.

(r) *South’s Chelius’s Surgery*, vol. i. p. 419.

of erysipelas. This disease is, however, far less frequently fatal than traumatic tetanus.

§ 784. (5) *Hospital gangrene*.—Such is the name given to an ulcerative and gangrenous disorder which seizes upon the wounds of persons placed in close and crowded apartments. It is rarely seen except in military hospitals in time of war, or in other situations where fresh air and cleanliness are wanting.

§ 785. (6) *Nervous delirium, secondary hemorrhage, and purulent resorption*, may be mentioned as other causes rendering wounds fatal. All of these accidents may ensue upon surgical operations undertaken for the relief of the injured person, as well as be induced by the wound alone. Thus gangrene or erysipelas may attack the stump of an amputated limb, or the patient may die from secondary hemorrhage, or from any of the foregoing diseases notwithstanding the best care and foresight and most judicious treatment.

§ 786. 5th. *Surgical operations*.—Death, indeed, sometimes takes place during or immediately after surgical operations undertaken for the relief of the wounded person. The question of responsibility in this case, belongs to the legal portion of the subject. It may not, however, be out of place to remark that the surgeon can seldom foresee, with confidence, the issue of capital operations, for there are many individual peculiarities and causes beyond his control, which may make it unfavorable. The same may be said of any plan of treatment, whether it involves a serious operation or not. The question may arise, whether the surgical treatment employed was the best that could be devised, and whether, had some other course been pursued, a favorable result might not have been obtained. Or, it may be alleged that the treatment was so unskilful, or the patient so much neglected, as to be the occasion of the fatal termination of the injury. That these facts should be established beyond dispute, it ought to be shown that the treatment was marked by the omission of something universally recognized as of primary importance. But as every surgeon has some peculiarities in his practice, and as the mode of treatment of bodily injuries, from the progressive nature of the medical art, is various, this omis-

sion should be looked for only in those points which betray an ignorance of the fundamental principles of surgery. However much the opinions of competent persons may differ respecting the choice of remedial means, they will generally, we think, be found united upon the principles which should govern their application. Still, occasionally, the plan of treatment may be so singular, although apparently founded upon correct notions of the curative process, as to call for reprobation. Thus, in a case which occurred in Saxony, a surgeon was deprived of the liberty of practising his profession in that country for having attempted to promote bony union between the fragments of a fractured patella, by the novel expedient of firing a pistol between them. Although no permanent injury was done to the patient, who, indeed, a few months after the operation, declared that his leg was nearly as good as the other one, and that he was even able to dance and to walk long distances, yet the medical commission charged with the case very properly considered the operation as likely to prove a dangerous precedent if it were not condemned.^(s)

§ 787. The difficulty is not so great where the original wound has been trifling, chiefly because its comparatively innocuous character can be clearly shown. Thus, for instance, if the hand have been wounded and one of the arteries divided, compression may be necessary to arrest the hemorrhage. But if a surgeon, with this view, should apply a bandage so firmly, or, on the other hand, leave it on so long, as to cause mortification of the part, and death ensue in consequence, it is evident that the treatment has not only been unskilful, but that it has really been the cause of death, since the wound of the hand was neither, in itself, mortal, nor would it have produced death in the manner described. But, in severe injuries, in which various complications arise and require the exercise of the greatest skill that learning and experience can give, it cannot be expected that some will not terminate fatally, which, perhaps, under more favorable circumstances, or a better plan of treatment, might have had a fortunate issue. The most hum-

(s) Casper's Vierteljahrschrift, 1852, Bd. 1, H. 1.

ble surgeon may chance to receive the charge of an injury which calls for the enlightened tact and experience of a highly educated man; if his treatment should not prove successful, he should be prepared to show, if required, that his patient had the best care which he was able to afford him, and, if possible, that he consulted with one or more colleagues respecting the treatment. In the language of Judge Woodward, "The implied contract of a physician or surgeon is not to cure—to restore (*e. g.*) a fractured limb to its natural perfectness, but to treat the case with diligence and skill. * * * He deals not with insensate matter, like the stonemason or bricklayer, who can choose their materials and adjust them according to mathematical lines, but he has a suffering human being to treat, a nervous system to tranquillize, and a will to regulate and control."^(t)

§ 788. It is now a very general practice among surgeons, to administer ether or chloroform in surgical operations. In spite of every care and precaution the vapor of chloroform may destroy life in a sudden and unexpected manner during an operation. The facts of the case may leave no doubt that the person died from the effects of the chloroform and not from the wound. On post-mortem examination the heart is usually found in a diseased condition, and this is considered as sufficient to account for the fatal effects of the chloroform vapor. The question then arises as to the responsibility of the person who inflicted the original wound. Dr. Taylor^(t') says, "No decision, so far as I know, has ever been given on this point. Was the use of chloroform vapor in a professional view a *necessary* part of the treatment? Was it skilfully and *properly* administered? Could the diseased condition of the heart, which rendered the effects of the vapor more fatal than usual, have been detected by the operator so as to show the impropriety of administering it in this case? These questions should receive satisfactory answers before the aggressor is rendered responsible for death under such peculiar circumstances."

(t) *McCandless v. McWha*, Error to Common Pleas of Beaver County. *Am. Journ. Med. Sci.*, Jan. 1854, p. 273.

(t') *Med. Journ.* sixth Amer. from the eighth Lond. ed., 1866, p. 272.

§ 789. The voluntary and persevering *refusal* of surgical assistance, when this holds out the only probable means of safety, may be enumerated among the causes which indirectly increase the fatality of wounds. Thus, if the amputation of a limb, the tying of an artery, or the observance of a prescribed medical course, be resisted and refused by a patient, he may very often pay the penalty of his obstinacy or timidity with his life. Such instances are by no means rare among the ignorant, with whom often the most assiduous medical attention has to contend against every obstacle to success.

VI. *Wounds of Various Parts of the Body.*

§ 790. 1st. *Injuries of the head*, from their frequency and gravity, as well as from the various medico-legal questions they often give rise to, are deserving of particular attention.

§ 791. (1) *Concussion of the brain*.—This term is applied to those cases in which, either from direct or indirect violence to the head, the brain receives a shock which may prove fatal, without being revealed after death by any physical alteration. Thus, a blow upon the head, or a fall from a height upon the feet, knees, or buttocks, may, without producing any serious external lesion, be the cause of death by a commotion or concussion of the brain. Cases are also related, in which a blow, familiarly designated as a “box on the ear,” has resulted fatally in this manner. In Hennen’s *Military Surgery*, a curious example of concussion of the brain is quoted from an old German author, in which a cannon ball took away the queue from the nape of a soldier’s neck, without injuring the integuments in any sensible degree. He continued in a complete state of stupor for many days, during which he was bled at least twenty times.^(u) Sometimes, indeed, the immediate cause of death is found in a laceration of the brain, a rupture of a bloodvessel in the brain, causing a compression of this organ by extravasation of blood, or, again, inflammation is set up with a like fatal result. Such accidents are thus conjoined occasionally with concussion.

§ 792. The question has sometimes arisen as to the distinc-

(u) Hennen’s *Surgery*, p. 318.

tion between the symptoms presented by a person laboring under concussion of the brain, and one in a state of *intoxication*. Very often they are coincident in the same individual. Symptoms of slight concussion are, however, so similar to those produced by intoxication, that it is sometimes difficult to know which cause they should be attributed to. There are indeed few peculiarities by which a physician could, better than an unprofessional person, recognize the difference, and, practically, the history of the case and the odor of liquor upon the breath will be the only sources upon which a judgment can be founded. Mr. South says, "It is often very difficult to distinguish between drunkenness and either concussion or compression; especial care should therefore always be taken to ascertain, as far as possible, the condition of the patient previous to the accident, lest he should be lost by too slight consideration of his symptoms."(v)

Injuries of the head may prove fatal, whether they involve immediately the contents of the skull or not. Among the most serious of the external wounds are those affecting the tendinous aponeurosis of the occipito-frontalis muscle and the pericranium. Erysipelas is very apt to follow these injuries. Inflammation of these parts is, moreover, readily propagated to the membranes of the brain, and especially after contused wounds. The prognosis must therefore be always reserved, since wounds of these parts, in appearance trifling, may result fatally.

§ 793. (2) *Fractures of the skull* vary in their danger according to their situation, their extent, and the amount of depression. Fractures of the base of the skull are the most dangerous, both from the fact that they are not within the reach of surgical interference, and also because the effusion of blood resulting often from the laceration of the lateral sinuses, exercises a compression upon that portion of the encephalon most intimately connected with the functions of both organic and animal life. These fractures are often not recognized during life, in consequence of their position; and it should not be forgotten that the portion of the skull which is broken does

(v) Chelius's System of Surgery, vol. i. p. 451.

not always correspond in situation with the part where the blow was received, but may indeed be produced by *counter-stroke*, at a point directly opposite to it. The cranium is composed of two tables of bone, between which is a vasculo-cellular substance, called the *diploë*. The external table alone may be fractured, and although no compression be thereby exercised upon the brain, yet from the intimate vascular connection between the *diploë* and the *dura mater*, the inflammation resulting may be communicated from it to the latter. Or necrosis may follow the contusion, resulting fatally at a later period. The inner table, which from its great brittleness is called *vitreous*, may be fractured without fracture of the outer one, and by compression of the brain by fragments of bone, effused blood, or by subsequent disorganization from necrosis, a fatal result ensue. M. Bayard relates several cases of this kind. In one, a man received a blow from the fist upon the forehead; no mark was left, but he became dizzy and fell to the ground. He suffered afterwards from headache, nausea, and vomiting, and on the twenty-sixth day became paralyzed and died in convulsions. The inner table of the skull, under the right eyebrow, was found to be necrosed. Both hemispheres of the brain were covered with a purulent exudation, and the ventricles were filled with the same.^(w) When, however, as is generally the case, the whole thickness of the bone is broken, the danger is proportionably increased, and although the injury is by no means necessarily fatal, yet if the bone press upon the brain, and there be an extravasation of blood over the membranes or into its substance, death is the common result, unless the bone be elevated by surgical aid, and the compression removed. The cases in which it is proper to trepan, and the appropriate place for the application of the instrument, are fully discussed in surgical works. Questions arising out of the neglect of trepanning or its alleged unnecessary employment, have a bearing not unfrequently in charges of malpractice, as well as in homicide.^(x) Any abstract of surgical

(w) Ann. d'Hyg., vol. xxxv.

(x) Such questions are often difficult of decision, as may be learned from the following case, which is discussed at length in Henke's Zeitschrift, 1860. Bd. 79, s. 177. In Dresden, on the 21st June, 1856, a jealous husband in-

opinion on this subject must necessarily be extremely imperfect. The standard surgical authorities should be consulted in every case. Simple fissures of the skull, or separation of the natural sutures, are not without their gravity, for, though seldom rapidly fatal, they often give rise to a slow effusion of blood, which, having no external issue, extends over the surface of the brain and sinks between its lobes, thus causing a fatal compression of the organ.

§ 794. A very interesting case is related by Deutsbein, in Horn's *Vrtljrscr. f. Ger. Med.* xii. 1870, of abscess of the brain after, but not dependent on, an injury to the head.^(x¹) "A young man, as the immediate consequence of a slight blow upon the head, exhibited only a simple wound of the scalp; subsequently, however, he became attacked with convulsions and other symptoms of disease, which, after first abating, then increased very much in intensity, and in the course of several weeks terminated in death. An examination after death showed an abscess in the right of the cerebellum, in connection with the indications of a long preceding chronic otitis interna of the

inflicted repeated blows upon his wife's head with a hatchet, and left her for dead. The scalp was badly lacerated and the parietal bone was fractured and depressed. The woman's consciousness was, however, only momentarily suspended, and she was soon able to arise from the ground and enter the litter in which she was carried to the hospital. Here she improved rapidly, and on the 2d and 3d of July was able to make a full and clear deposition of all the circumstances of the assault. On the 4th of the month, however, she suddenly became worse, and died on the 5th. On examination, one of the fractures seated in the parietal bone was found to be depressed and to project a quarter of an inch upon the inner surface of the skull. The membranes of the brain were uninjured, but underneath them the brain itself was softened, and pus was found covering the whole hemisphere. The medical gentlemen commissioned as experts to examine the case reported that the original violence was really the cause of death, but not necessarily so, because a timely use of the trephine might have prevented the disorganization which proved fatal. It was objected to this criticism that it was a mere matter of opinion extraneous to the proper functions of medical experts, and so the court held, declaring that the only question for decision was whether the blows inflicted by the prisoner were or were not the cause of death. He was convicted, and sentenced to death, and the sentence was confirmed by the court of appeal, but it was afterwards commuted by the king to imprisonment for life.

(x¹) *Am. Journ. of the Med. Sci.*, July, 1871, from *Centralblatt f. d. Med. Wissenschaften*, 17 Dec. 1870.

right side, and carries of the petrous portion of the right temporal bone, so that it was evident that the blow on the head had only an accidental connection with the intracranial abscess."

§ 795. (3) *Wounds of the substance of the brain* are not in themselves necessarily fatal. Many instances are recorded in which a portion of the brain has been lost, others in which it has been traversed by a bullet,^(y) and others, again, in which a foreign body has remained in it for a considerable time, and the person has yet escaped with his life.

A man fired a gun, which burst and inflicted a large wound with fracture of the skull in the middle of the forehead. Consciousness and senses were unimpaired, and no pain was felt. After the discharge of several fragments of bone and a small piece of iron, the wound healed. A month or six weeks later the man was sent to jail and put to hard labor, at which he continued for three weeks, when he complained of headache, and died rather suddenly at the end of a week. There was an abscess of the right anterior lobe of the brain, and between the dura mater and the right orbital plate of the frontal bone was a piece of iron which weighed an ounce and a half.^(z) In another case a man had a knife-blade penetrating the brain to the depth of two inches without pain or characteristic symptoms, for twenty-four hours after he received the wound. He then became comatose, and so died.^(a)

§ 796. The following extraordinary case of recovery from the passage of an iron bar through the head, reported by Dr. Bigelow, Professor of Surgery in Harvard University, will illustrate the violence which the brain is capable of enduring. Phineas P. Gage was occupied in charging with powder a hole drilled in the rock, for the purpose of blasting. His assistant having neglected to cover the powder, as is usual, with sand, Mr. Gage, who was not aware of the omission, dropped the head of the iron upon the charge, to consolidate or "tamp it in." The iron struck fire upon the rock, and the charge exploded. The bar of iron was projected directly upwards in

(y) Med. Facts and Obs., vi. 91.

(z) Lancet, Sept. 1858, p. 307.

(a) Charleston Med. Journ., xv. 256.

the line of its axis, passing directly through his head and high into the air. It was picked up at some distance, smeared with brains and blood. "From this extraordinary lesion, the patient has quite recovered in his faculties of body and mind, with the loss only of the sight of the injured eye." The weight of the iron bar was thirteen and a quarter pounds, its length three feet seven inches, and its diameter one and a quarter inches. The end which entered first was pointed, the taper being seven inches long, and the diameter of the point one quarter of an inch. The track taken by the bar was the following, as ascertained by an experiment upon an ordinary skull—the entering hole was under the zygomatic arch, encroaching equally upon its walls. "In the orbit, the sphenoid bone, part of the superior maxillary below, and a large part of the frontal above, are cut away, and with these fragments, much of the speno-maxillary fissure; leaving, however, the optic foramen intact about a quarter of an inch to the inside of the track of the bar." The base of the skull upon the inside of the cranium presents a cylindrical hole of an inch and a quarter in diameter, and the calvarium is traversed by a hole, two-thirds of which is upon the left, and one-third upon the right of the median line, its posterior border being quite near the coronal suture. "It is obvious that a considerable portion of the brain must have been carried away; that, while a portion of its lateral substance may have remained intact, the whole central part of the left anterior lobe of the front of the sphenoidal or middle lobe must have been lacerated and destroyed. This loss of substance would also lay open the anterior extremity of the left lateral ventricle, and the iron, in emerging from above, must have largely impinged upon the right cerebral lobe, lacerating the falx and the longitudinal sinus."

§ 797. Immediately after the injury the patient was slightly convulsed, but spoke in a few minutes. He was carried to an ox-cart which stood at a short distance, and rode in it, sitting erect full three-quarters of a mile. He got out of the cart himself, and, with a little assistance, walked up a long flight of stairs, into the hall, where he was dressed. He retained his senses and memory perfectly, and gave an intelligent and con-

nected account of the accident.(b) Many other instances of surprising recoveries after wounds of the brain might be related, but the preceding case gives, we think, ample proof that, even in very extensive injuries of the cerebrum, with fracture, hemorrhage, and loss of substance, death is not the necessary termination.

§ 798. Wounds of the central portion and of the base of the brain are more uniformly and speedily fatal than those of the hemispheres. Wounds of the cerebellum are said to be constantly mortal. In whatever portion of the brain, however, the injury may be seated, or whether the organ be merely compressed by effused blood, the important fact is still applicable, that the individual may recover, apparently, from the immediate shock or consequence of the injury, and die unexpectedly from it afterwards. Thus a person has received a blow upon the head, causing extravasation of blood, and has been able to continue on his way apparently not much injured; he dies, nevertheless, a few hours afterwards, with symptoms of compression of the brain. The Prince of N—— was thrown from his horse, but felt himself quite well, and mounted his horse again a few hours afterwards. Before, however, he had proceeded far, he dismounted, complained of nausea, was seized with convulsions, and died comatose. No fracture was discovered, but under the dura mater, on the great falx and in the base of the cranium, there was found a considerable extravasation of blood.(c) In the *Lancet* for October, 1843, is related the case of a man who walked nearly a quarter of a mile after having been kicked on the head by a horse. Two or three fractures were found at the base of the skull. Months or even years occasionally elapse before the injury terminates fatally. A sailor received a blow upon the head, from which he soon recovered, and suffered no ill consequences, with the exception of a discharge from the ear. After a time, however, he suffered violent pain in the head, and had fever and convulsions. He was trepanned, and issue given to a large quantity of pus, with temporary relief. He died one year after the injury. The dura mater was covered with a purulent exuda-

(b) *Am. Journ. of Med. Sci.*, July, 1850.

(c) *Langenbeck.*

tion, which extended also into the spinal canal.(*d*) The great orator and statesman, Daniel Webster, was thrown from his wagon May 6, 1852, and for a few minutes was insensible. On the 24th of the same month he delivered a speech to the people, nor then nor subsequently, up to the time of his death, was any mental disorder to be observed. He died on the 24th of October following, and on examination his brain was found covered with a thick layer of fibrin extending over both hemispheres, and which must have been the remains of an effusion of blood occurring at the time of the fall.(*e*) Where bullets have penetrated and remained in the brain, they often give rise gradually to fatal disorganization. Morand relates the case of a soldier who was wounded at the battle of Parma, in 1784. He returned on foot to Paris, and died nine and a half months after his wound. The ball was found between the bone and the dura mater. One-half of the cerebrum was destroyed by suppuration. Reich found in a soldier who had received a gunshot wound at the battle of Leipsic, and died eleven months afterwards, a portion of the brain in a gangrenous condition, and the ball adherent to the tentorium. He had suffered only from headaches and occasional epileptiform attacks.(*f*)

§ 799. The physician may be required to determine whether an extravasation of blood in or upon the brain is the effect of violence or disease, and if being due to the former, it has not been favored by the excitement of passion. Extravasation of blood, ensuing upon violence to the head, is perhaps most generally found over the dura mater, or upon the surface of the brain; that which arises from disease, in the substance of the brain or in the ventricles. Apoplexy is comparatively rare in the young and healthy, and it is hardly probable that in such persons a diseased condition of the vessels would be found occasioning the effusion. If, however, the blow has been inflicted upon an old person, and the extravasation is found in the cerebral hemispheres, there may perhaps remain a doubt

(*d*) Denmark, Medico-Chir. Trans., vol. v. 1814.

(*e*) Jeffries, Am. Journ. of Med. Sci., Jan. 1853, p. 110.

(*f*) Henke's Lehrbuch, 19te. Auff. p. 246.

whether a predisposition to the effusion did not already exist, and was awakened by the violence inflicted. If, however, it can be shown that the blow was sufficiently violent to produce this result, there can be no doubt, medically speaking, that it was the cause of it. Passion has, moreover, by the excitement of the circulation, a direct influence in causing an already weakened vessel to give way, and when a blow comes opportunely in, it would certainly perplex the most learned casuist to say which of the three causes of death was the effective one. The legal responsibility will be elsewhere set forth.

§ 800. (4) *Wounds of the face* cannot in general be considered as dangerous to life. They are often followed by serious deformity and tedious sickness. The parts about the eye and this organ itself form the seat of more dangerous wounds. Blindness, without any apparent external alteration in the eye, has been produced by blows dividing or injuring the supra or infra-orbital nerve.^(a) Severe neuralgia may be produced by the same cause. Penetrating wounds of the orbit, it is evident, may reach the brain and cause fatal injury, and many instances of this form of injury are on record. Even where the orbital plate of the frontal bone has not been broken, serious consequences may ensue from the spreading of inflammation from the eye and its appendages to the membranes of the brain. In comminuted fractures of the *nose* from external violence, the blow may have been so severe as to injure the ethmoid bone, in which case, the brain may readily become involved.

§ 801. 2d. *Wounds of the neck*.—In this region there are numerous structures and organs, the wounding of some of which is generally attended with fatal results. The neck being traversed by important bloodvessels and nerves, by the œsophagus, larynx, and spinal marrow, injuries which involve any of these

(a) Hippocrates was aware of this fact. He says: “Visus obscuratur in vulneribus supercillii et paulo altius, prout autem vulnus recentius est, plus vident, cicatrice vero diutius persistente plus excæcantur.” *Anfangsgr. der Wundarzneik* ii. § 320. In a case where the amaurosis resulted both from concussion and from laceration of the eyebrow with a cricket-ball, the loss of sight was temporary, vision being gradually restored under the use of mercury. *Med. Times and Gaz.*, Sept. 4, 1852.

parts, must be looked upon, in general, as serious. Hemorrhage resulting from the division of any of the large arterial trunks, as the carotid, lingual, or vertebral, is most rapidly fatal, and life is usually extinct before the requisite surgical aid can be rendered. The loss of blood from the internal jugular veins is equally fatal with that from the arteries, and in addition, the entrance of air into these vessels is considered to be frequently the cause of instantaneous death. A division of the principal nerves of this region or of the œsophagus, is usually accompanied with a destruction of other parts more essential to life, hence it is but seldom, as, for example, in punctured wounds of the throat, that the dangers from such injuries need be separately estimated.

§ 802. Incised wounds of the larynx and trachea are not in themselves directly fatal, and more or less perfect recoveries are often made from them. But they may become fatal through the effusion of blood into the air-passages, or by subsequent inflammation. While in wounds of the carotids and jugulars death is often immediate, the fatal result in those wounds of the neck which do not implicate the bloodvessels is seldom so rapid. There are also many cases of wounds of the neck which may terminate fatally, although none of the above-named parts are wounded. Such are those in which the cellular tissue becomes inflamed, in consequence of which abundant and exhausting suppuration takes place.

§ 803. A case is related by Dr. Simeons, in which an old woman was struck on the neck with a pewter soup-ladle; she died in a few hours afterwards, asphyxiated. Upon examination after death, blood was found extravasated under the muscles of the neck, and into the anterior mediastinum from a rupture of the external jugular vein. The cricoid cartilage and some of the rings of the trachea were broken, by which injury the size of the respiratory tube was necessarily much diminished.(b) The skin was not broken.

§ 804. A case of fracture of the larynx is reported by Dr. Hunt, where a man was struck in the neck with great violence by a piece of wood, two feet long and four inches wide, which

(b) Henke's Zeitschrift, 1848, H. i.

flew from a circular saw he was superintending. The patient survived the injury about sixteen hours. There was great dyspnoea and tracheotomy was performed greatly to the relief of this symptom, six hours before death. It is not stated if there was any external injury, but there was extensive emphysema of the sides, front, and root of the neck.

At the *post-mortem* examination congestion of the posterior and lower lobes of the lungs was observed in a marked degree, and emphysema of the upper lobes. The anterior mediastinum was filled with air, and the connective tissue communicating with that of the neck was emphysematous. There was an oblique fracture of the thyroid and cricoid cartilages, involving posteriorly on the right side the arytenoid, which protruded through the lacerated mucous membrane. Œdema of the glottis was marked, and the aryteno-epiglottidean folds were swollen greatly with serum and blood.(c)

§ 805. A division of the *œsophagus* is not only in itself almost always fatal, if complete, but because also, being situated behind the trachea, it can hardly be incised without the important bloodvessels of the neck being injured. A case of recovery from a wound dividing the larynx and *œsophagus* to the posterior wall of the latter is given by Dieffenbach, and an example of complete restoration to health after an *entire* division of both of these passages with a pruning-knife is related by Boey.(d)

§ 806. Dr. Ryan related to the Medical Society of London a case of suicide, in which, after several ineffectual attempts to divide the thyroid cartilage, a man had succeeded in inflicting upon himself a wound five inches in length, between this cartilage and the *os hyoides*, dividing completely the pharynx to the *vertebræ*. The fourth *vertebra* was roughened by a cut, and there was another cut in the intervertebral cartilage. Some branches of the carotid arteries were divided, but neither these vessels, the jugular veins, nor the sterno-mastoid muscles were injured.(e)

(c) Amer. Journ. Med. Sci., April, 1866, p. 378.

(d) Reference to both of these cases may be found in Henke's *Lehrbuch*, p. 254.

(e) *Lancet*, Am. ed., 1852, p. 218.

§ 807. As Dr. Ryan properly remarks, "a person wonders at the possibility of a wound of this sort without cutting the larger vessels; and had the occurrence taken place in a lonely dwelling, where no third party was present, it might become a serious question, particularly under unhappy domestic discussions, whether the wound was self-inflicted, as its extent, the two incisions on the thyroid cartilage, the two on the vertebra, and that on the intervertebral cartilage would argue a determination of purpose and strength of wrist which fall to the lot of few."

§ 808. 3d. *Wounds and injuries of the spine.*—The danger to life in wounds that interest the spinal marrow is exceedingly great; indeed, they are almost uniformly fatal, either immediately or indirectly. These injuries are, however, more rare than those of other parts of the body, and are often the result of casualty, such as a fall from a height, or being crushed under a heavy weight. In many cases of death from falls upon the seat, the spinal marrow will not exhibit any material lesion. In such cases it is supposed to have suffered concussion, by which some elementary change in its structure has been produced inconsistent with the maintenance of life. In concussion of the spine, death may be almost immediate, but usually it approaches gradually.

§ 809. Any substance compressing the spinal marrow will interfere with or arrest its functions below the point of pressure. Hence the height at which the injury has been inflicted has an important bearing upon its gravity. If the compression be above the origin of the pneumogastric nerves, death is immediate, owing to the sudden suspension of respiration. Below this point a wound or injury is not inconsistent with the maintenance of life for a considerable period. A division of the spinal marrow at any part interrupts, of course, if complete, the functions of the part below it more effectually than compression. Dr. Staub gives an instance of immediate death from a wound of the spine by a knife, between the atlas and epistropheus; the spinal marrow was divided almost completely in the middle, between the corpora olivaria.(f)

(f) Henke, Zeitsch. Bd., xxxv. S. 406.

§ 810. Another rare instance of injury of the spine by criminal violence is related by Dr. Simeons, of Mayence. A robust young man, twenty-six years of age, quarrelled with three others, who fell upon him, threw him on the ground, and after having kicked and dragged him for some time, finally left him helpless. He was soon found, and carried into a neighboring house. He survived two days, completely paralyzed, but retaining his consciousness. The fifth cervical vertebra was found to be completely separated from the sixth, all the ligaments being torn; the whole of the spinal canal was filled with partly coagulated blood, and the muscles in the vicinity of the injury much infiltrated. No other injury of importance was detected. (*g*)

§ 811. "A bone-setter, named Richard, famous in the neighborhood of Napoléon Vendée, but still more famous by having been fined five francs, which made him a martyr, and increased his practice fivefold, was consulted on June 4th, 1853, by a farmer of the commune of St. Denis, named Lachavasse, who complained, after a heavy fall, of violent pain in the neck. The bone-setter, meeting him, made him enter a neighboring cottage, and said that he would soon put his neck right. With both hands he seized the patient's head, and by a rapid motion from left to right he three times turned the head over the shoulder. At the third time a crack was heard, and the bone-setter exultingly exclaimed, 'It is done; the neck is reduced.' But at this very instant the patient was seized with paralysis of the arms and legs; his speech became very difficult; he complained of violent pain, and died the next day, firmly convinced of the skill of the operator, and asserting to the last that his neck was properly set. Examination of the body showed an effusion of blood at the level of the second and third vertebræ, the ligaments between which were stretched and torn; there was another effusion between the cerebellum and the base of the skull, evidently arising from lesion of the cord and its membranes." (*g*¹)

§ 812. In cases where the *vertebræ are fractured*, the injury done to the spinal marrow may be due to the constriction it

(*g*) Ibid., Bd. lvi. H. 3, p. 131.

(*g*¹) Rév. Thérap. du Midi.

undergoes from pressure, its irritation by a spicula of bone, or to the effusion of blood upon it. To whichever cause it may be attributed, the ultimate effect is, in the majority of cases, fatal. It is not unimportant to observe that sudden death may take place from the spontaneous luxation of the second cervical vertebra; the odontoid process, which maintains it in its place, being liable to caries and consequent sudden fracture. This circumstance, as well as the existence of caries of the spine in any other and more usual position, may, in some cases of death after ill usage, explain the facility with which death has come on. Hence it is of great moment that, in case of death from supposed injury to the spine, the absence of this disease should be carefully ascertained. Sir Astley Cooper mentions the case of a woman in the venereal wards of St. Thomas's Hospital, who, while sitting in bed, eating her dinner, was observed to fall suddenly forward. The patients, on hastening to her assistance, found that she was dead. At the autopsy it was ascertained that the dentiform process was broken off, and the head, in falling forwards, had forced the root of the process back upon the spinal marrow, which occasioned her instant death.(*h*)

Another case of extensive disease of the cervical vertebræ, with death from fracture of the odontoid process, is admirably reported by Dr. Buckminster Brown, of Boston.(*h'*)

§ 813. Dr. Stephen Smith in a valuable paper on "Fractures of the Odontoid Process,"(*i*) quotes six cases of spontaneous fracture of this process. One of these is Sir Astley Cooper's case, referred to above. Another striking instance is reported by Dr. A. G. Faywell.(*i'*) "A man, æt. 30, scrofulous habit, on May 12th, 1871, suddenly threw his head backwards to avoid a ball; felt something give way; swelling occurred at upper and posterior part of neck; had pain in deglutition; on fifth day his head was bent forward and there was such numbness of the legs as to prevent walking; on sixth day was completely paralyzed, and suddenly died on raising him in bed.

(*h*) Dislocations and Fractures of the Joints, p. 463.

(*h'*) Am. Journ. of Med. Sci., Jan. 1853.

(*i*) Am. Journ. Med. Sci., Oct. 1871, p. 378.

(*i'*) Ed. Med. and Surg. Journ., vol. viii. p. 132.

“*Autopsy.* Odontoid process was fractured at its base and undergoing caries; body of axis carious; internal and external common ligament was destroyed; spinal cord uninjured.”

This accident is not necessarily immediately fatal. In one instance, in which the fracture was caused by the person turning in bed, death did not occur for sixteen months.^(j) In another case^(j¹) a man had fallen from a building and received a blow on his head. At first he experienced no inconvenience, and continued his work for six weeks; but finally, a swelling made its appearance on the back of his neck, which was painful. Three months after the injury he was taken to Bellevue Hospital, New York. By this time the deformity of the neck had increased, the head had become fixed with the chin carried to the left side and upward. Complete paralysis of the left arm and leg existed, and weakness of the right arm. As the case progressed there were marked evidences of defective aëration of the blood in purpleness of the face and left arm, general duskiness of the skin, and severe attacks of dyspnœa. The patient died 160 days after the receipt of the injury. At the *autopsy* “the odontoid process was found to be fractured and carried forward so as to lie in a nearly horizontal position in contact with the anterior ring of the atlas; the atlas was dislocated forwards and slightly to the left side; the articular facets resting anterior to the body of the axis; the spinal canal was diminished to three-eighths of an inch; there was no rupture of ligaments or other fracture.”

§ 814. Three well-authenticated cases of recovery after fracture of the odontoid process are given by Dr. Smith. One is a case reported by Dr. Bayard,^(k) where a child of six years fell five feet, striking on the head and neck. She was unable to move her head without great pain, but there was no swelling or irregularity of the neck. Two months after she had convulsive movements of the arms and legs, followed by paralysis of the body below the neck. After remaining in this condition for three months, the patient gradually recovered the

(j) Copeland, Dict. Pract. Med., art. Paralysis.

(j¹) Smith, op. cit., p. 352.

(k) Canada Med. Journ., Dec. 1869.

power of walking. About two and a half years after the accident, a post-pharyngeal abscess formed, from which a bone escaped, which was decided to be the odontoid process.

These fractures have an important bearing in certain medico-legal cases. Dr. Taylor (*k*¹) states that on several criminal trials this injury was proved to have been the cause of death.

§ 815. 4th. *Wounds of the chest.*—Wounds which do not penetrate the cavity of the chest, or which are not accompanied with very great violence, offer but little gravity. In the latter case, however, one or more of the ribs or the sternum may be fractured, a complication which at once enhances the importance of the injury. The same force which has produced the fracture may also cause serious disturbance of the subjacent organs and their rupture. The broken ends of the bones frequently also cause hemorrhage, a disorganization of the lungs, or wound of the heart. The danger of penetrating wounds of this cavity cannot, of course, be too highly estimated, although it is, perhaps, less than in similar wounds in the abdomen. From the great vascularity of the organs contained in the chest, and from the fact of their functions being the aëration and the propulsion of the blood, the immediate danger of any injury to them lies in the sudden and abundant arterial hemorrhage, by which the heart and the system generally are deprived of their necessary vital stimulus, and the natural play of the apparatus of respiration and circulation is mechanically obstructed. The hemorrhage in wounds of the chest is almost entirely internal.

§ 816. 5th. *Wounds of the lungs* cannot receive any detailed consideration. The chief point of interest in this connection is the fact that they may not prove fatal until a considerable period after their infliction. This is especially the case with gunshot wounds of these organs, in which, if the larger vessels have escaped laceration, the foreign substances introduced into the wound may continue for many months and years to be a constant source of distress, and be the source of an ultimately fatal disease.

(*k*¹) Med. Journ., sixth Am. ed., p. 286.

§ 817. A question may sometimes arise as to the ability for motion after severe wounds of the chest. No general rules can be laid down upon this point, but in illustration of the possibility of locomotion after severe injuries to the chest, and the fortunate issue of some which are of apparently the most formidable character, we adduce the following case, reported by Mr. Galloway, Surgeon in the Royal Artillery. (*l*)

“A gunner and driver of the royal artillery had made a murderous attack upon his sergeant with a bayonet, whereby he inflicted two wounds, happily superficial only, upon one leg and arm. Foiled in his efforts of greater success by the seasonable arrival of some other soldiers, the culprit rushed through the barrack-square to escape his pursuers, when the sentry on duty at the gate interposed himself with his carbine, in the attitude of ‘charge bayonets’ to obstruct him. The consequences of this movement to the other were that as he was rushing through a narrow passage with an impetus which he could not at the time control, he threw himself (not premeditatedly, it will be understood) with great force upon the bayonet of the sentry, which entered his body an inch to the left of the ensiform cartilage, and, passing through the abdomen, emerged by its point on the left of and close to the spinal column, some inches lower down. When I reached the scene of action, within two minutes after, I found the subject of this wound sitting upon a form in the guard-room, as insensible to any effects from the injury as he was unconcerned at his crime. I could not, therefore, at first believe the statement of his comrades, who told me what had happened, although the bayonet was handed to me *bent* by the violence to which it had been exposed; but on stripping the wounded man, I discovered the two openings of entrance and exit of the bayonet, corresponding, in form and diameter, to those which the different parts of the weapon would have occasioned. Added to this, the bayonet was withdrawn from his body by a non-commissioned officer, upon whose testimony I could rely; and what is more, this withdrawal was witnessed by a crowd of other soldiers around. Now this desperate character marched,

(*l*) Med. Times and Gaz., May 6, 1854.

in a quarter of an hour afterwards, to the hospital, *three-quarters of a mile* distant; and at the end of a fortnight was discharged from the same, to be placed upon trial for his life. The day after his admission his urine was a little bloody; and subsequently there was a general anæsthesia of the walls of the thorax and abdomen, which lasted but for awhile. With these exceptions, the injury was not followed by a symptom, nor did the subject of it require a dose of medicine for his recovery. To the circumstances of this affray having been enacted *before* dinner, I am disposed to attribute much of the immunity from evil which this ruffian enjoyed. Had the stomach been full, it is not easy to conceive that a bayonet could have travelled through such a track of vital organs, without endangering one or more. The reader may be interested to know that the life of this soldier was spared, transportation for the rest of his days being the sentence of his court-martial."

§ 818. One of the most extraordinary instances of recovery from a wound traversing the whole thorax, is related in the *Abeille Médicale*, 15 Jan. 1855, from the *Journ. de Méd. de Bordeaux*. A young soldier fell from a cherry-tree upon an upright stake, such as is used in the vineyards. It entered the left side between the seventh and eight ribs, and the pointed extremity projected on the other side between the fourth and fifth ribs, at the posterior part of the axilla, and to the length of a foot and a half. The young man retained his consciousness and intelligence, did not appear to suffer much, and after one end of the stick had been sawn off, was conveyed to the hospital. There the stake was extracted without difficulty, and it was found that it had carried part of the shirt with it. A few bleedings and an antiphlogistic treatment sufficed to remove some inflammatory symptoms which arose, and in three weeks the patient was entirely convalescent.

§ 819. In 1831, a sailor named John Taylor, aged twenty, was guiding the iron pivot of the trysail mast into the main boom, when the tackle broke, and the mast, which was thirty-nine feet long, and weighed 600 lbs., descended upon him, tearing off half his scalp, knocking him down, piercing his chest obliquely, and fixing him to the deck. While thus transfixed he felt no pain. He recovered entirely, returned

to his duties as a sailor, and for twenty-seven years enjoyed, without interruption, the most excellent health.(*m*)

§ 820. 6th. *Wounds of the heart.*—When the cavities of the heart have been opened death is generally the immediate, as it always is, sooner or later, the certain result. When the cavities of the heart have not been penetrated, but their walls alone injured, the danger is still very great, not so much from the loss of blood as from its compression of the organ and the subsequent inflammation. This is particularly to be dreaded when the coronary arteries have been wounded. No case has yet been recorded in which a person has recovered from a wound penetrating the cavities of the heart. One of the most singular instances of apparent recovery from a gunshot wound of the heart (if it can be properly so called), is contained in the “Notes of Observation at the Field Hospital of Rangoon.” Here a soldier survived his wound two and a half months, emaciating, however, rapidly, although he was able to walk about. On dissection, the course taken by the ball was traced through the pleura and lung, by a cartilaginous canal of condensed tissue, to the root of the lung, where all trace of it was lost. On opening the pericardium, however, a hard body was felt in the apex of the heart which, when the cavity was laid open, proved to be a *musket ball* lying at the apex of the left ventricle, partly covered by a thin coating of white lymph. There was no injury to the heart nor evidence of diseased action. The heart was preserved in spirits and sent to Calcutta. The only manner in which the ball could have found its way to the situation in which it was found, must have been through one of the pulmonary veins, as there was no trace of its passage through the substance of the heart. A case which would seem to confirm this idea is mentioned in Schmidt’s *Jahrbuch*, vol. lxxii. p. 328. A man was struck in the back by a bullet which entered his thorax, and caused his death in twenty minutes. On dissection it was found that the ball had entered over the sixth rib behind, grazed the lung, and wounded the pulmonary artery. But it could not at first be discovered. It was

(*m*) *Lancet*, Jan. 1859, p. 45.

soon found, however, in the right ventricle of the heart, where it had fallen by its own weight after penetrating the pulmonary artery. (*m*¹)

§ 821. The period at which wounds of the heart prove fatal varies in different cases. The reason of this variation is found not only in the extent and locality of the wound, but in the fact that the point of the weapon or the bullet may have remained in the walls of the heart, and thus the sudden loss of blood have been mechanically prevented. A coagulum of blood may, in some cases where the wound is not extensive, cause the prolongation of life for a similar reason. Should the patient escape the fatal results of inflammation ensuing upon such a wound, he is nevertheless exposed to sudden death by the removal of this mechanical obstacle to hemorrhage. Ollivier d'Angers found, out of twenty-nine cases collected by himself, that only two proved fatal within forty-eight hours, and the others in from four to twenty-eight days.

§ 822. Dr. Trugien, of Portsmouth, Va., observed a case in which a young negro man was stabbed in the chest on Monday night and continued to do well until Saturday morning, at which time, contrary to orders, he went out, and used other improper exertion, in consequence of which he died.

(*m*¹) An instance of long survivance after an injury of the heart of an extraordinary character may be found in the Transactions of the Provincial Med. and Surg. Association, vol. ii. p. 357: A boy ten years old, in discharging a wooden gun, was wounded in the thorax by a plug of wood about three inches long, which he had used to form the breech of this apparatus. It could not be found. He walked about for a fortnight and said he was well, but finally wasted away and died in five weeks and two days after the accident. On dissection the stick was found in the right ventricle, forcing itself between the columnæ carneæ and the internal surface of the heart, and incrustated with a thick coagulum. No wound could be discovered in the heart or pericardium. Hence it is supposed that the stick first entered the lung, and afterwards passed into the vena cava and thence was carried by the stream of blood first into the right auricle, and then into the right ventricle.

A man, whose case is related by Prof. Malle, received a gunshot wound near the left nipple; he fell instantly in syncope, but afterwards revived, and lived 42 days, when he died of erysipelas of the leg. A piece of wood, "as large as a full-sized writing quill, was found transfixing the left ventricle and the septum, and projecting into the cavity of the right ventricle."—*Brit. and For. Med. Chir. Rev.*, vol. x. p. 46.

The wound, which had healed externally, perforated the cartilage of the fourth rib, passed through a part of the anterior wall of the right ventricle, without opening it, and thence into the left ventricle. About a pint and a half of blood, partly fluid and partly coagulated, was found in the pericardium. The wound in this membrane had completely cicatrized, and *two-thirds* of that in the heart.(*n*)

§ 823. In a case reported by Dr. Bowen, the right ventricle was perforated a half an inch to the right of the septum, and through the septum the wound extended into the left ventricle, at the orifice of the aortic valves; the wound was lined with coagulable lymph. The patient had survived his injuries eleven days and walked about; he died suddenly from hemorrhage into the pericardial and pleural sacs.(*n'*) Muschner reports a case of penetrating wound of the heart which proved fatal on the fourteenth day.(*o*)

§ 824. Stadelmayer gives a case in which not only the heart was penetrated, but the stomach also, and an intercostal artery wounded, when death ensued on the 5th day.(*p*) These cases might readily be multiplied, but enough has been said to show that wounds of the heart, even when the left ventricle has been penetrated, are not of necessity immediately fatal.(*q*)

(*n*) Am. Jour. Med. Sci., July, 1850. See also Am. Jour. Med. Sci. for May, 1829, p. 263, in which there is a notice of a case of gunshot wound of the chest, in which the patient, a negro boy aged 15, lived 67 days after the accident, and, on *post-mortem* examination, three shot were found lying loose in the cavity of the right ventricle, and two in the right auricle.

For the case of Wm. Poole (pugilist), see N. York Med. Times, April, 1855. In the same Journal for May, 1855, will be found "Statistical Observations on Wounds of the Heart and on their Relations to Forensic Medicine, with a Table of Forty-two Recorded Cases." By Samuel S. Purple, M.D.

(*n'*) Am. Jour. Med. Sci., October, 1849.

(*o*) Ver. Deutsche Zeitschrift. III. 1. 1848.

(*p*) Med. Correspond. Bl. Bayer. Aertze. No. 318.

(*q*) A case of some interest in reference to the power of surviving a severe wound of the cavities of the heart occurred at Guy's Hospital in February, 1854. An Italian, æt. 38, discharged a brace of pistols into his chest on the left side. The man was brought to the hospital, was able to converse on his condition, and lived one hour and fifteen minutes after the infliction of the wound. After death it was found that one bullet had perforated the pericardium, entered the right ventricle, and after traversing the septum of the ventricles, made its exit from the heart at the junction of the left auricle

§ 825. Death is usually sudden, but does not always follow immediately upon the receipt of the wound, although the first effects are exceedingly alarming. In nearly all the cases, where the wound seriously implicates the heart, the individual staggers a few paces, or falls instantly in a state of syncope. Exceptional cases have, however, been reported in which, even where the wound has been found subsequently to have penetrated the cavity of the heart, the person has nevertheless retained his consciousness and power of locomotion for a short period after receiving it. Thus in the case of Mrs. Hamilton, murdered by Clough in 1833, at Bordentown, by repeated stabs with a dirk, three entered the left ventricle, and seven the lung. She walked some distance down stairs after this, and held some conversation, but soon fell, and died in fifteen minutes.(*r*) In a case related by M. Boyer, a young man, who received a knife wound in the left ventricle, walked about for ten minutes and did not die until six days afterwards.(*s*) In another, where the *right* ventricle was wounded, the man ran up stairs, but died in half an hour.(*t*) Mr. Baird relates a case in which a man continued fighting and ran 150 yards after receiving two penetrating wounds of the chest, and one of them penetrating the left ventricle.(*u*) In an instance given by Dr. Babington, a man walked twenty-five feet after a bayonet-wound which pierced the peritoneum, colon, stomach, left lobe of liver, diaphragm, pericardium, right ventricle in two places, and the lungs.(*v*)

with the ventricle. It traversed the upper lobe of the left lung, and was found fixed in one of the dorsal vertebræ. The second bullet perforated the left ventricle, and then traversed the left lung. The wound was of such a nature that at every contraction of the ventricle, the opening must have been closed so as to arrest the flow of blood. This man, owing to severe suffering, rolled about the floor and was with difficulty kept quiet. It will be seen that in this case there were bullet wounds traversing completely the cavities of the heart, yet the man could talk and exert himself, and he actually survived their infliction one hour and a quarter.'—*Taylor's Med. Jur.*, 5th ed., p. 308.

(*r*) Beck's *Med. Jur.*, vol. ii. p. 331.

(*s*) *Bost. Med. and Surg. Journ.*, vol. ii. p. 209.

(*t*) *Am. Journ. Med. Sci.*, N. S., vol. xxvi. p. 85.

(*u*) *Edinb. Month. Journ.*, vol. iii. 1843.

(*v*) *Med. Records and Researches*. Lond. 1798.

§ 826. *Rupture of the heart.*—This occasionally results from external violence, generally of an accidental nature, as from the falling of a heavy body upon the chest. The cause of the occurrence is usually too obvious to require any explanation here. The only case in which rupture of the heart may become the subject of medico-legal investigation, is when a person engaged in a quarrel dies suddenly after receiving a blow upon the chest, and this lesion is found after death. The case is one which evidently admits of discussion, belonging to that category of cases in which death already impending is apparently anticipated by external violence. The fact of the heart being in a diseased condition favoring its rupture, such as fatty degeneration, ulceration, aneurismal dilatation, must be ascertained, as well as the force of the blow inflicted. It must be remembered, however, that the rupture may occur spontaneously in these morbid conditions, even when the person is in a tranquil state, but that a fit of anger greatly increases the probability of its occurrence. Hence a blow upon the chest may really have had nothing to do with causing the rupture, this having been due entirely to the strong excitation of a weakened heart. Rupture of the heart from disease usually takes place in the left ventricle, except where the disease is ulceration, when of course it may take place at any portion. The heart is also ruptured sometimes by great physical exertion, in which case the left auricle is apt to give way. Violent emotions of any kind are enumerated among the causes of this accident, but it is probable that they are only effective when the heart is already weakened by disease. The same may be said of rupture of the *aorta*. Wounds of this and the other great vessels of the chest are inevitably mortal, if the opening is not very slight.

§ 827. 7th. *Wounds of the abdomen.* (1) *Superficial wounds.*—A severe blow in the epigastric region has in several instances sufficed to produce immediate death, and this may result without any external or internal mark of violence. Death in these cases has been generally attributed to the violent impression made upon the solar plexus of nerves. Blows upon other parts of the abdomen not accompanied by any solution of continuity in the integuments may prove

serious or fatal by causing peritoneal inflammation or the rupture of some organ in this cavity;(v¹) but contused and lacerated wounds which are not attended with these effects may still give rise to serious consequences from the formation of fistulous communications. Incised wounds, also, which do not penetrate the cavity, may nevertheless prove fatal from a wound of the epigastric artery.

§ 828. (2) *Penetrating wounds of the abdomen* usually prove fatal by causing inflammation of the peritoneum, either as a direct effect of its division or indirectly from the effusion of blood and the entrance of air. When the omentum or mesentery is wounded, death usually takes place by hemorrhage, but sometimes from inflammation and gangrene. Wounds of the *stomach* and *intestines* prove fatal by hemorrhage, or by inflammation resulting from the effusion of the contents of these organs into the peritoneal cavity. The natural tendency of these injuries is to death, although by timely and skilful surgical treatment many cures may be accomplished.(w) A most remarkable case is reported by Dr. Nicholls, of a man sixty-nine years old, who attempted suicide by thrusting a red-hot poker into his abdomen about an inch and a half above the navel. There was no hemorrhage, and a partial protrusion only of omentum, which sloughed off. In three weeks the wound had nearly healed, when the patient tore away the dressings, enlarged the wound, and cut or tore away a portion of the omentum, and a piece of the colon thirty-two inches long. He survived these horrible injuries eight days.(w¹)

(v¹) Numerous examples exist of fatal rupture of the spleen from comparatively slight causes. The reader is referred to the following recent cases: Archives Gén., July, 1854, p. 85; Barth, *ibid.*, Feb. 1855, p. 235; Lancet, March, 1859, p. 329; *ibid.*, July, 1859, p. 8; Lopez, N. Amer. Med.-Chir. Rev., iv. 286; Adams, *ibid.*, p. 756; and Charcot, Gaz. des Hôpitaux, 1858, reports that a rupture of the spleen was found in a new-born child produced by a fall of the mother some weeks before.

(w) *Vide* South's Chelius's Surgery, vol. i. p. 522, for several cases. For a case of speedy recovery after a penetrating wound of the stomach made by a bowie knife, see The Stethoscope, June, 1855. (Richmond.) From Charleston Med. Journ. and Review.

(w¹) Dublin Med. Press, Oct. 4, 1854.

§ 829. 8th. *Wounds of the liver* vary in importance according to their extent and situation. Superficial wounds of this organ have much less gravity than those which penetrate its substance deeply, and interest the large arterial and venous trunks which traverse its lower surface. If the gall-bladder is wounded, violent peritonitis usually results from the effusion of bile into the peritoneum. Incised and punctured wounds of the *spleen* may produce death by hemorrhage, and this is the more likely to be the case when this organ is abnormally enlarged. Wounds of the *kidneys* usually prove fatal by the effusion of urine and consecutive inflammation. It is hardly necessary to mention that wounds of the great abdominal vessels are unavoidably fatal.

§ 830. 9th. *Wounds of the diaphragm*.—Mr. Guthrie says that wounds of the diaphragm rarely if ever close, but remain open during the rest of the life of the sufferer, ready at all times to give rise to a hernia, which may become strangulated, and thus destroy life. Among other cases given by him, the following is interesting. On the day preceding the battle of Fuentes d'Onor, in 1811, Sergeant Barry was wounded in the chest. The ball entered close to the nipple of the left breast, and passed out at the back, between the eighth and ninth ribs. The anterior opening of the wound soon healed, but the posterior did not for a considerable period, when he became affected with such a severe cough, with expectoration, that his medical attendant deemed it proper to reopen it. The symptoms were relieved, and portions of his shirt and jacket were discharged. After this his health improved so rapidly as to enable him soon to rejoin his corps; the wound in the back repeatedly opened and healed again, generally at intervals of twelve or fourteen months, but for five or six years it ceased to do so. He died of another disease, twenty-two years after the receipt of this wound. On examination, the whole of the stomach and the greater part of the transverse arch of the colon were found in the left cavity of the chest, having passed through an opening in the diaphragm about three inches long in a transverse direction near the centre. The wound in this instance was through the muscular and not through the tendi-

nous part.(x) Slight penetrating wounds of the diaphragm, Dr. Taylor says, will heal, instances of the fact being upon record.

§ 831. 10th. *Wounds and rupture of the bladder.*—The consideration of these has considerable practical importance, from the fact that the bladder is occasionally ruptured spontaneously from over-distension. If a person have received a violent blow or kick upon the lower part of the abdomen, and the bladder after death is found ruptured, the defence may deny that this was caused by the blow. To the medical mind this line of defence cannot but appear very precarious. Spontaneous rupture of the bladder is extremely rare. A case is reported of this accident to a man, which could only be attributed to his suddenly jumping from a table on which he had been sitting.(x¹) In another case the same accident resulted from a violent fall upon the buttocks while the bladder was distended.(y) The well-marked symptoms of distension can hardly be concealed,(y¹) and the cause of it would certainly be found after death; hence, if rupture has followed a blow, the dependence of one upon the other is, in the absence of undoubted evidence of the pre-existence of over-distension from natural causes, as satisfactory and conclusive as possible. In the words of Dr. Taylor: “If a man were in good health prior to being struck—if he suddenly felt intense pain, could not pass his urine afterwards, and died from an attack of peritonitis in five or six days—if after death the bladder was found lacerated, but this organ and the urethra were otherwise in a healthy condition, there can be no doubt that the blow was the sole cause of rupture and death. In such a case, to attribute the rupture to spontaneous causes would be equal to

(x) *Lancet*, April 16, 1853. *Vide* also *Lancet*, April, 1852.

(x¹) *Edinb. Med. Journ.*, ii. 847.

(y) *Ibid.*, iv. 811, 844.

(y¹) Nevertheless, Mr. Hird related an interesting case at the Medical Society of London, which is quoted by Mr. Coulson, to show that the patient may walk several miles after complete rupture, and for a time exhibit no symptoms which attract more than ordinary attention. (*Brit. and For. Med.-Chir. Rev.*, July, 1852.) An analysis of seventy-eight cases of rupture of the bladder is published by Dr. S. Smith in the *New York Journal of Medicine*, new series, vi. 336.

denying all kind of causation.” Rupture of the bladder is usually a fatal injury, producing death by peritonitis; but if it occur in the anterior portion, which is not wholly covered by the peritoneum, recovery will sometimes occur. Thus, in a case reported by Mr. Syme,^(z) a boy ruptured the bladder by falling upon two upright stakes of wood, in jumping over a fence. Under an appropriate and skilful treatment he finally got well.

§ 832. A case is related by Dr. Mason^(z¹) of a man who fell down a flight of stairs, thereby causing rupture of the bladder. About thirty-six hours after the injury, the symptoms being urgent, it was determined to lay open the bladder through the perineum, as in the lateral operation for stone. Dr. M. thought he detected, on passing his finger into the bladder, a rent in the posterior wall of that viscus. The patient did well after the operation, and was discharged well on the thirty-ninth day after the accident.

§ 833. There is rarely any external injury to correspond with the violent internal disorganization. In a case where the urethra was completely torn across by external violence, there was no external wound—not even an abrasion of the skin.^(a)

A case is reported^(a¹) of a woman who was admitted into King’s College Hospital, London, under the care of Sir Wm. Fergusson, having been knocked down while drunk by a blow on the head, which caused a small scalp wound. She is stated to have fallen on her back. When brought into the hospital she was in a state of semi-collapse, but afterwards recovered sufficiently to give some account of the accident. She died of peritonitis two days after the injury. At the autopsy there was no sign of external wound, but the bladder was found ruptured at the upper and back part, there being a clean longitudinal rent of two inches in length. There was a considerable amount of urine in the abdominal cavity, and

(z) Edinb. Month. Journ., p. 332.

(z¹) New York Med. Journ., Aug. 1872.

(a) Neill, Hospital Cases. Med. Examiner, Aug. 1854.

(a¹) Medical Times, 1866, vol. ii. p. 253.

a great deposit of lymph gluing the intestines together. The other viscera were healthy.

§ 834. The occasional immunity from serious effects in wounds of the abdomen of apparently the most dangerous character, is well illustrated by two cases, very similar to one another, which have occurred in this country. Dr. Sargent, of Worcester, Mass., reported to the Boston Society for Medical Improvement, a case which occurred in his practice. A woman, about 37 years of age, in sliding down from a hayloft, impaled herself upon the handle of a pitchfork, which passed in at her vagina to the length of *twenty-two* inches, when her feet struck the ground. The handle was immediately withdrawn. Dr. S. saw the handle of the fork, which was rounded a little larger at the end than elsewhere, perfectly smooth, two inches in diameter, and showed distinctly the stain of blood up to an abrupt line, twenty-two inches from the end. It was supposed that the instrument perforated the upper end of the vagina on the left side, passed between the uterus and rectum, in front of the kidney, behind the spleen, and between the diaphragm and false ribs, peeling up the costal pleura till it reached the scapular muscles. The subsequent history of the case, which showed a fracture of the first rib, proved this diagnosis correct. The woman recovered in a few weeks entirely.^(b) Another case is reported by Dr. Bryant, of Mississippi, of a negro woman who leaped from the height of ten feet and alighted upon a tobacco stick, which had been driven firmly in the ground, and was concealed by some loose fodder. The stick was four and a half feet long and one inch square. It entered the vagina, penetrated its upper part, and traversed the abdomen to the eleventh or twelfth rib. The stick was smeared with bloody mucus to the extent of twelve and a half inches, and its termination was abrupt and distinct. "It was quite clear that the stick was not stained by the fluid running down upon it." This woman also recovered, after losing a considerable quantity of blood.^(c)

(b) Am. Journ. Med. Sci., Oct. 1853, p. 355.

(c) Ibid., p. 399. The sequel of Dr. Sargent's case is given in the Boston Med. and Surg. Journ., Dec. 1856, p. 387, and several analogous ones are there referred to by Dr. Coale. Dr. Maynard has reported a fatal case in a

§ 835. 11th. *Wounds of the genitals.*—In the male these are usually self-inflicted, and instances of the kind most usually occur among the insane. The danger to life is great if the injury have been inflicted with a sharp instrument and is of considerable extent; the hemorrhage being profuse, and not easily controlled. Impotence may be the result of an imperfect mutilation.

M. Toulmouche(c¹) has contributed some interesting cases of wounds of the genitals. One of them, a case of castration of the right testicle, is specially interesting, inasmuch as M. Toulmouche was enabled to state, from the appearance of the wound and in spite of the obstinate silence of the patient, that the castration must necessarily have been performed by a second person. The recipient of the injury must have been forcibly held. The tunica vaginalis was neatly opened from above downwards, the testicle drawn out, and the cord divided above in an artistic manner.

§ 836. "*Fracture*" of the *penis.*—Although this accident is rare, a sufficient number of cases have been reported to make it worthy of notice. In the Cincinnati Journal of Medicine for July, 1866, Dr. J. P. Bing relates a case which was tried in the Court of Common Pleas, in Meigs County, Ohio, February, 1866. The indictment was substantially as follows:—

"That one Mary Broderick, of the county aforesaid, did, on the 29th day of July, 1865, purposely and maliciously, but without deliberation and premeditation, with her right hand, grasp and wrench the penis of Patrick Broderick, with intent to inflict a mortal wound; thus the urethra with the corpus spongiosum and corpus cavernosum were broken and severed; and that Patrick Broderick (her husband) died from the effects of the wound, on the eleventh day after the injury was inflicted."

The physicians who attended the case stated that there had been retention of urine with apparent extravasation; and it

woman who, in sliding down a hay-mow, fell upon a hay-hook. (Ibid., Aug. 1857, p. 29.)

(c¹) Ann. d'Hyg., xxx. p. 110. From Year-Book of Med. and Surg. 1867-8.

was not until after three days that they had succeeded in introducing a catheter and drawing off the urine.

At the *post-mortem* examination the "corpus cavernosum, left side, was found to be ruptured; corpus spongiosum mutilated, and urethra entirely severed; infiltration of urine into cellular tissue of penis, perineum, and into scrotum, with incipient gangrene."

The defence set up was that the injury was received by falling down stairs—the deceased having been in a state of intoxication at the time.

The verdict rendered was, "Guilty of manslaughter," and "not guilty of murder in the second degree."

Dr. Blackman refers, in the same journal, to several other cases of a similar injury. One of them is from the *Bulletin de la Société de Chirurgie*, of Paris, vol. iii. p. 514, and is reported by M. Huguier. There was "complete rupture of the canal of the urethra and partial rupture of the corpora cavernosa followed by death." "The patient, a vigorous man, æt. 37, had some affection of the ear, for which he applied a blister. Some days afterwards, while in bed with his wife, and having *des erections continuelles*, from the effect of the blister, had connection, the wife having the superincumbent position. The whole weight of her body was brought to bear upon the organ then in *violente érection*, and the latter was thrust against the thigh and perineum."

On account of retention of urine and failure to introduce a catheter, the bladder was tapped above the pubis. "Erysipelatous inflammation, with emphysema, showed itself at various points, and the patient died on the twelfth day after the accident. The *post-mortem* showed that the rupture of the canal was complete, and the corpora cavernosa were partially divided."

§ 837. Upon the female, wounds of the genitals are generally due to the violence of others. This appears to have been a favorite mode of committing murder in Scotland, probably from the facility with which it would be overlooked. Several cases of the kind have been recorded, in which criminal trials took place. The latest are the trials of Andrew Paterson and Wm. Hetherton, charged with the murder of their wives

by wounding them in the genital organs. In one case, the woman had been recently confined. A wound an inch and a half long was found in the vagina, supposed to have been inflicted with the iron hold-fast of a sign-board. In the other, the woman was in the eighth month of her pregnancy. There was found a lacerated wound of the genitals immediately on the left side of the urethral orifice. There were numerous contusions on both thighs and in the neighborhood of the vulva; the injuries were attributed to kicks.(d)

§ 838. Occasionally, as has before been mentioned, there may occur spontaneous hemorrhage from a ruptured vein at the root of the labia; hence the necessity of establishing the presence of marks of violence, such as contusions, abrasions, etc. In a case, however, related in the *Lancet*, a woman received a kick in the private parts from her husband, while she was stooping, and died within an hour, from hemorrhage. The left root of the clitoris was crushed, and there was a wound on the edge of the vulva about an inch long, but otherwise *no* contusion or marks of violence.(e) Examples of accidental wounds of this description have already been given (Chap. I. § 705). Lacerated wounds of the uterus, produced by the throes of parturition, are not necessarily fatal; and there are even cases of recovery after the complete avulsion of this organ and its appendages by an ignorant or brutal accoucheur.

(d) *Ed. Month. Journ.*, June and Sept. 1848. For other cases, see *Watson on Homicide*, p. 104, and *London Med. Gaz.*, xlv. p. 813.

(e) *Lancet*, Oct. 1846.

CHAPTER II.

BURNS AND SCALDS.

- I. How classified, § 839.
- II. Appearance of burns upon dead body, § 840.
- III. Wounds upon the burned, § 843.
- IV. Effects upon the system, § 846.
- V. Post-mortem appearances, § 847.

§ 839. I. *How classified.*—The effect produced upon the *living* person by a heated body, varies, according to the nature of the vehicle by which the heat is applied. Thus, boiling liquids produce scalds, which are serious in proportion to the density of the liquid; solids in a state of ignition, burns which are deep and extensive in proportion to the elevation of temperature and the duration of contact; while gases, in a state of combustion or flame, consume and destroy the living structure more completely than either of these other agents. The injuries produced by certain chemical substances of a caustic nature also receive the name of burns, in ordinary language, although an elevated temperature is not required for their effects. The ordinary division of burns, according to their gravity, is that made by Dupuytren:—

1st degree. Superficial inflammation of the skin, without the formation of blisters.

2d. Vesication. The serum contained in the blisters is sometimes clear, sometimes opaque and of a yellowish-white color, or, again, sanguinolent. If the cuticle have been removed, the true skin is found granulated, of a vivid red, or secreting pus.

3d. Destruction of the external surface of the true skin. That portion which has lost its vitality is seen in the form of eschars, which are soft and yellow if made by a liquid, but hard and brown, or black, if made by a heated solid or burnt with flame. The skin surrounding them presents the charac-

ter of burns of the first or second degree, being red and blistered. This form of burns leaves scars, which are on a level with the skin, or nearly so, and are white and shining.

4th. Disorganization of the whole thickness of the skin. These burns differ from the preceding only in the greater thickness of the sloughs. The scar which is left is characteristic, being sunk below the level of the skin, and irregular, radiated, and puckered.

5th. Not only the skin, but the subcutaneous cellular tissue, and a portion of the muscles underneath are destroyed. The injury is graver in its character than the last, although the external appearances are not strikingly different.

6th. Complete carbonization of the burned part.

§ 840. II. *Appearances of burns made upon the dead body.*—Orfila says that *vesication* manifestly denotes that the burn was made during life. According to Devergie, if boiling water or a red-hot iron be applied to the skin of a person, ten minutes after death, neither *redness* nor vesication will be produced, and it is not possible to mistake a burn made after death for one which was made before it. Dr. Christison made six experiments, with a view of satisfying himself as to the distinction. He says that it is evident from these that the application of heat, even a few minutes after death, causes no effects which can be mistaken for those induced by the vital reaction. In one case, in which a young man lay in a hopeless state of coma from poisoning with laudanum, a hot iron was held on the outside of the hip-joint, and half an hour after death, a red-hot poker was applied to three places on the inside of the arm. It is stated that vesications were formed in both instances, those made during life contained serum, and those formed after death *air*. Dr. Taylor says that he has performed many experiments on the bodies of infants, eighteen and twenty hours after death, both with boiling water and heated solids; but that in no case did he observe any kind of vesication to follow at that period. The skin became shrivelled, and was partly destroyed by the heat, but no blisters were produced. Dr. Casper made four experiments with the same result. It is stated, however, by MM. Leuret and Champouillon, and also by Dr. Wright, of Bir-

mingham, that serous blisters may be produced after death in anasarca subjects. In M. Leuret's experiment, the blister contained an abundance of reddish-colored serum. In those of the other two observers, the serum was not tinged with blood. In one of Casper's experiments, however, a flame was held close to the dropsical scrotum of a dead body; the skin nearest the flame shrivelled up and acquired a shining silver-gray surface, but no blister was raised. We think, however, it may be fairly objected to this and the preceding experiments of Casper, alluded to, that the degree of heat employed was much beyond that necessary to produce vesication. In two of the other three experiments, cotton wadding soaked in turpentine was placed in contact with the skin and lighted, in one case it was allowed to burn *four* minutes, in the other *three and a half*. In the third experiment, the flame of an oil lamp was held *three* minutes in contact with the back of the foot. In each case the skin was superficially roasted. The result might, perhaps, have been different had a less intense heat been employed. Casper also alludes to a fact of some importance in this connection. He says that it is a common practice to drop burning sealing-wax upon the pit of the stomach immediately after death, with the hope of reviving the defunct, but that in the large number of bodies he has seen, in which this unintentional experiment had been performed, not one presented a trace of vesication in consequence. It may therefore, we think, be fairly inferred that, with perhaps the exception of anasarca subjects, the presence of vesications upon the skin may be looked upon as a sure indication of the burn having been made during life, or immediately after, while the body is still possessed of a certain degree of organic vitality. Their absence, however, will be no evidence that the burns were not made upon the living person, since it is very possible that only the more serious results of burning may be found. There is, however, another sign of burning during life which cannot be simulated upon the dead body, viz., the congested and inflamed state of the skin around the blister or the burn, which is indicated by a red line which gradually merges into the color of the surrounding skin. This red border remains after death, and experiments made by Drs.

Christison and Taylor prove that it cannot be produced by the application of heat to the dead body. The same may be said also of the red and granulated appearance of the true skin under the blisters.^(e)

§ 841. The only experiments which appear to throw doubt upon the correctness of these conclusions are those of Dr. Maschka^(f) and Gräff.^(g) The first of these gentlemen found, in his experiments upon the dead body, that when the flame was brought in contact with the skin, blisters were formed of various sizes from that of a pea to that of an apple, within the space of *one* minute. These burst with a noise and discharged serum. No redness, however, was observed under or around these vesications, until the denuded surface had been some time in contact with the air. The application of boiling water produced the same result. When the heat was maintained, the further changes could not be distinguished from such as would have been caused upon a living person. Dr. Gräff, whose object in his experiments was to ascertain the length of time required to consume a head to a degree similar to that in which this portion of the body of the murdered

(e) Prof. W. Hoffmann claims that by means of the microscope burns of the skin of the third order originating before death may be distinguished from those inflicted *post-mortem*.

A piece of the leathery skin is cut out and held up to the light; when, if the burning took place before death, the apparently uniform brownish-red color resolves itself into an exceedingly fine network of capillaries, of a rusty color, traversing the dried corium. This is made clearer by a pocket microscope. The injection is as complete as if produced artificially. This observation is confirmed by the microscope by showing the capillaries of the corium, through almost its entire extent, full of dried rusty-brown blood.

The existence of this condition here described proves that at the time of the burning or scalding the capillaries must have been full of blood; the body must, therefore, have been alive. In bodies in which the burns were of post-mortem origin, the author has never found a trace of injection of the dried corium, the capillaries of which under the microscope were seen to be empty; in the subcutaneous cellular tissue the vessels are almost empty, but a few larger branches contain a small amount of dried blood. (Journal of Psycholog. Medicine, vol. iv. p. 639, and Prager Vierteljahrschrift, in A. M. Centr. Ztg.)

(f) Canstatt's Jahresbericht, für 1852, Bd. vii. p. 46.

(g) Prager Vierteljahrschrift, 1850, 4 Bd. p. 123.

Countess of Görlitz was found, laid the emaciated body of a person aged about fifty years upon a table in such a manner that the head hung over one end of it. A vessel containing alcohol was placed between five and six inches below it, and the spirit set on fire. The integuments of the head were consumed in about half an hour, and, at the distance of from ten to fifteen inches from the burning parts, white vesications were formed, some of which had a moist and red base, and a pale-red areola around them. Accident furnished Dr. Taylor with evidence of the same nature. "A man was accidentally drowned; his body was immediately taken from the water, and soon afterwards placed in a warm bath"—within ten minutes after apparent death. The water was so hot that portions of the cuticle came off when his body was removed, for it was found impossible to resuscitate him. On an inspection of the body, over a considerable portion of the skin, especially of the extremities, there were several vesicles *filled with bloody serum*. There was no anasarca here to account for their production; and the fact of their occurrence appears to bear out the view of Dr. Wright, that the production of a serous blister on the dead body depends upon the amount of organic life remaining in the body. The man was pulseless and to all appearance dead when placed in the hot bath; hence the effects of hot liquids on the living and the recently dead body are proved by this case to be very similar.^(h)

§ 842. These experiments are directly in conflict with those before enumerated, and although the weight of authority and of facts is opposed to the possibility of the production of vesications after death, which can be mistaken for those which result from the application of heat during life; yet as these experiments seem to prove the contrary, the question still remains open, except, perhaps, when the comparison lies between the effects of burns upon the living body and upon one in which life has been extinct for a considerable length of time. In such a case we do not think it would be difficult to show important means of distinction depending upon the absence of vital reaction.

(h) Med. Jur., 5th ed., 1855.

§ 843. III. *Wounds upon the burned.*—From the frequency with which a criminal, after having robbed a dwelling and murdered one or more of the inmates, sets fire to it with a view of destroying the traces of his crime, it is often the province of the physician to seek for *wounds* upon the dead bodies there discovered, and determine their mode of origin. There are certain mechanical effects produced by fire upon the skin which should not be mistaken for wounds. Thus, in a case given by Casper, of an old man whose clothes caught fire as he was seated before his stove, the body was burned black, and on the right side, over the liver, was a gaping wound, through which the viscera could be seen. It was nothing more than a fissure caused by the intense heat.⁽ⁱ⁾ In another case, however, in which two old people were found burned in their house, the fact of their having been previously stunned, if not killed, by blows upon the head, was ascertained by the existence of fractures of the skull, under which coagulated blood was found effused upon the *dura mater*. The criminal was not discovered for a long time, but the circumstances of the murder were betrayed by an associate. A singular circumstance was observed in this case, viz., that, although the bodies were both almost destroyed by fire, the element had spared that portion of the head by which the murder was revealed.^(j) Dr. Wyman, in his evidence in the Webster case, stated that “some of the fragments of the bones of the skull (of Dr. Parkman) had the appearance of having been broken previous to calcination, or being burned with fire. Calcination,” he remarked, “removes the animal matter which gives to bone its tenacity; before this is removed, it breaks with sharp angles, and is more likely to splinter. Common surgical experience shows this. After calcination, the bone is more likely to crumble.”^(k)

§ 844. In a highly interesting case of assassination related by Casper, the presence of contused wounds and extravasated blood upon the forehead and face of an aged woman, and visi-

(i) Gericht. Leichenöff. ii. Hundert. Fall. 99.

(j) Henke's Zeitschrift, 1844, p. 284.

(k) Bemis's Report of the Webster case, Boston, 1850.

eations from burning, upon some portions of the body, gave indubitable evidence of violence during life. Here the criminal confessed that he had struck his victim in the face with his fist and a paving stone, by which she was rendered senseless; but with a strange refinement would not acknowledge that he had designedly set fire to the apartment in which the half-consumed body was found.^(l)

§ 845. A conflagration having taken place in Paris, which caused the death of numerous persons, M. Tardieu, to whom the examination of the human remains was officially intrusted, took the opportunity of minutely observing and recording the effects produced upon the human frame by fatal burning. The soft parts on the bodies examined were in various conditions; completely charred to cinder, partly carbonized, or reduced to fibrinous shreds. The bones were dried and brittle, and in the long bones, fractures with obliquely splintered and charred ends were observed, differing distinctly from the character of ordinary fractures. In the flat bones, which were thinned by the heat, the fractures caused by the heat assumed the form of fissures *confined to one surface, and not penetrating the substance of the bone*. The intervertebral disks were contracted in their diameters. Teeth and cartilage seemed to resist the action of fire more than other hard parts. The soft parts exhibited great diminution of volume; this was more especially observed upon the viscera, which had been more or less protected from the immediate action of the fire. Some of these were mummified. The blood in the heart, aorta, and other large vessels presented an extraordinary appearance, resembling wax or fatty matter, of a most beautiful carmine color. The cerebral substance was contracted to half its bulk, and in consistence resembled a half dressed sweetbread. To the preceding details, M. Tardieu has added the appearances discovered on the body of an infant that had been lying several years behind a stove, and had become completely mummified. The effects of slow, long-continued heat were much the same as the above-described,

(l) Gericht. Leichenöff. sup. 1stes Hundert. Fall. 96. On this subject see a paper by M. Tardieu, Ann. d'Hygiène, Jan. 1860, p. 124.

with the absence of the destructive agency of fire seen in the carbonization of the external soft parts.(*m*)

§ 846. IV. *Effects on the system.*—Burns and scalds are well known to be excessively dangerous, especially in children. The greater the superficial extent of the burn, the more apt is it to prove fatal with rapidity, especially when upon the chest or abdomen. When the burn is extensive, or the subject impressionable, the general irritation produced by the excessive pain is sufficient alone to cause death. This generally ensues upon a kind of stupor, characterized by inertness, somnolence, paleness of the face, slow and stertorous respiration, and small pulse.

§ 847. V. *Post-mortem appearances.*—These are often by no means well marked; the most constant being a capillary injection of the mucous membrane of the bronchia and alimentary canal and serous effusion into the ventricles of the brain. In a child 13 days old, which was scalded to death by being placed in a bath of boiling water, the official examination disclosed the fact that the mouth, throat, and œsophagus almost as far the stomach, were denuded of their epithelium, which lay upon the surface as a white and greasy substance. The only appearances that could be considered at all abnormal, were a slight injection of the meningeal vessels, rosy and apparently inflamed patches in the small intestine, and an unusual amount of thick dark blood in the lungs and liver.(*n*)

§ 848. Nearly the same appearances were found in two children who perished in a room which was set on fire. In them, however, the trachea was filled with a dark, frothy mucus, in which particles of soot could be easily recognized. It is probable, therefore, that the immediate cause of their death was suffocation.(*o*)

(*m*) Brit. and For. Med. Rev., from Ann. d'Hyg., April, 1854.

(*n*) Schmidt Müller. Henke's Zeitsch., 1848, p. 175.

(*o*) Casper, ger. Leich. 2 Hund. 97 and 99 Fälle.

CHAPTER III.

SPONTANEOUS COMBUSTION.

§ 849. IN approaching the examination of the question, whether such a phenomenon as the spontaneous combustion of the human body is really possible, we encounter the usual obstacle to discovery of truth, viz., a doubt of the authenticity of the facts upon which the belief reposes. From a very early period in the history of medical curiosities, instances of apparently spontaneous human combustion may be found on record; but the credulous superstition and love of the marvellous, which, at the period when some of these observations were made, science rather encouraged than restrained, weaken our reliance upon their authenticity. Not having adopted a theory with a desire to find those facts only which might be adjusted to it, but desirous of discovering the real extent of our knowledge relative to the phenomena of what is called spontaneous combustion, we have examined the subject, not without some care and earnestness. The result of this investigation has shown us that if there is not such a phenomenon as the actual spontaneous combustion of the human body, there is sufficient evidence to prove, that in some cases it may acquire a preternatural inflammability, and that this peculiarity can be recognized by the trifling source of combustion compared with the rapidity and extent of its progress. We do not hesitate also to affirm that a belief in the actual occurrence of the phenomena referred to may be entertained, without a satisfactory scientific explanation.

§ 850. We propose to refer only to such cases of spontaneous combustion as have been reported at a comparatively recent date, and by men of standing and authority. The first which we quote is reported by M. Devergie.(*p*) A washerwoman

(*p*) Ann d'Hyg., t. xlvi. pp. 383-431.

named Marie Jeanne Antoinette Bally, fifty years of age, and of intemperate habits, returned to her lodging one evening in December in a state of drunkenness. Her room was not more than ten feet long by six to seven feet wide, and was lighted by two little windows from a corridor. The only furniture consisted of a chair, a chest in the corner, and *muslin window curtains*. There was no bed. The next morning at eight o'clock, the neighbors, perceiving a strong smell of smoke, entered her room, and there found the unfortunate woman upon the floor almost completely burned, with her feet turned toward the chimney-place, in which, however, there was no fire. Under one of her arms there was still a portion of the chair upon which she had been seated, and underneath her an earthen pot such as is used by the poor to hold a few coals to warm their feet. The chair was almost entirely burned, the floor was covered with a black soot, and an exposed beam in the wall of the room was charred upon the surface. The chest was, however, untouched, as were *also the muslin curtains*, which were only three feet distant from the body. The body was sent to the Morgue, and examined by direction of the judicial authorities. The body was lean; the face and hair, the anterior portion of the neck and upper part of the shoulders were not injured. The skin and muscles of the back were, however, thoroughly burnt, as were also the sides and anterior portion of the trunk. The anus and vulva escaped. Nothing was left of the upper extremities but the bones; there was, however, a portion of the chemise in each armpit still intact. The upper portion of the lower limbs was also burnt. *The stockings were entire.*

§ 851. The following is abridged from a case reported by Dr. John Grigor:—

The body of John Anderson, a man aged fifty, and of spare habit, a carter of wood from the forest of Darnaway to the pier of Nairn, was found dead by the road-side, and so much blackened and charred by the action of fire that it was identified only from the fact of his horses and cart being known. A post-mortem examination was imperfectly made, the result of which was that the eyes, ears, and nose were burned away, as well as the hair and skin of the head; the skin and cellular

tissue of the trunk were much charred, the thighs not to the same extent, and the burning had ceased about midway between the knees and feet, where there was a reddish and slightly blistered line. The back was not so much destroyed. This man was a notorious dram-drinker, consuming daily at least a bottleful of ardent spirits, besides porter, beer, etc. He left Nairn on the day of his death intoxicated, and parted company with a brother carter within half a mile of the place where the body was found. "Before this, however, he wished his pipe to be lit and handed to him; but his friend, thinking he had no need of a smoke, merely put a little fire on the old tobacco ash, when he drew, and immediately said, 'She is not in.' The conversation went on for ten minutes, when the poor man turned his horses' heads homewards. All this time the pipe was in his hand. His dress was a woollen shirt, a canvas frock, corduroy trowsers, and a 'wide-awake.' The weather was very warm and dry. When a little further on his way homewards, smoke was seen rising up from the cart in which the man was, and which contained a good deal of hay, by a herd-boy on a neighboring rising ground, about one-fourth of a mile distant. The man was next seen to descend from the cart, to stand, then to stagger and fall. The horses stood still. In a few minutes smoke again appeared, from the ground, when the boy ran down and found the body lifeless, black, disfigured, and burning." With the aid of another person water was procured and the fire extinguished. The clothes were all consumed, except the lower part of the legs of the trowsers, and a small portion of the shirt, frock, and hat. The pipe was found lying below the body, *with the cap on*, apparently as it had been put into his hands. *None of the hay was burned.*(*q*)

§ 852. The following case was communicated to Dr. Beck by Wm. Dunlap, Esq., of New York:—

"Hannah Bradshaw, aged about thirty years, had lived about a dozen years in the city. She was a healthy, hearty-looking woman, remarkably industrious, and neat in her person and manner of living, but bore a bad character with

(*q*) Edinb. Monthly Journ. of Med. Sci., Dec. 1852, p. 555.

respect to chastity and sobriety. On account of her robust appearance and bold behavior she had obtained the name of *Man-of-War Nance*. She resided in an upper room, which had no connection with the rooms below, occupied by a family. On the evening of the 31st of December (1771) she desired a young woman who worked for her, and was going home, to come again early the next morning; and about seven o'clock the same evening another acquaintance parted from her, at which time she seemed to have drank a little too freely. She was neither heard of or seen again until the next morning, when the young woman returned to her work. After knocking and calling, and having waited until past eleven o'clock, this person, by the aid of a man who lived below, got in through a back window and opened the door. On looking within a screen, which went quite across the room, and was fitted to reach the ceiling, she discovered the mutilated remains of Hannah. The body, or rather the bones, were lying near the middle of the floor, wherein a hole of about four feet in diameter was burned away, and the bones were on its bottom, about a foot beneath that part of the floor. The flesh was entirely burnt off the bones of the whole body, except a small part on the skull, a little on one of the shoulders, the lower part of the right leg and foot, which was burnt off at the small, almost as even as if cut off, and left lying on the floor. The stocking was burnt off as far as the leg, and no further. The bones, some of which were black and others white, were so thoroughly burnt as to crumble to dust between the fingers. The bowels remained unconsumed. One of the sleepers, which lay under the shoulders, was burnt almost through. Part of the head lay on the planks at the edge of the hole, and near it was a candlestick, with part of a candle in it, thrown down, but it did not appear to have touched any part of the body, or to have set anything on fire. The tallow was melted off the wick, which remained unscorched by the fire, as also the screen, which almost touched the hole. The leg of a rush-bottomed chair, and about half the bottom, were burnt so far as they were within the compass of the hole in the floor, and no further. The ceiling of the room, which was whitewashed plaster, was as black as if covered with lampblack, as also

part of the walls and windows; and the heat had been so great as to extract the turpentine from the boards and the wainseot. After all these operations the fire went entirely out, so that when the body was found not a spark remained.(r)

§ 853. A well-known and privileged beggar, of 60 years of age, and quite corpulent, accustomed to hard drinking, came on a Christmas evening into a tavern, already intoxicated. There, for a wager, he drank four bottles of brandy, and, being entirely overcome by it, was carefully deposited on the floor behind the German stove, but some distance from the latter, with his head resting on his sack containing bread, in order that he might sleep away his debauch. The remaining guests soon retired. Early in the morning, the landlord was awakened by a penetrating, insupportable smell; he arose, and approaching the public room found the smell still more powerful. The room was cold, and the fire had long before died out. The unfortunate beggar was found nearly reduced to ashes, a portion of the face and occiput remained, and the legs below the knee were not burnt, the shoes and stockings being also untouched. His pouch of bread was not consumed, but was covered with a fetid soot. The whole room was filled with the same, and no cleansing afterwards availed to destroy the odor.

§ 854. An old lady of corpulent habit, and 70 years of age, was accustomed to have herself bathed with eologne water and alcohol, and every night before retiring took a so-called sleeping potion of spirituous liquor. Early one morning, as in the preceding case, the neighbors and servants were awakened by a fearful smell, proceeding from the old lady's room. On entering it, her body, completely carbonized, was found upon the floor by the bed; only the hands and feet remained. The floor was not burnt nor the furniture, but everything was covered by a fetid, black, and fatty soot.(s)

§ 855. A case of *partial* self-combustion is reported, in which it would appear that the burns produced upon the face were

(r) Beck's Med. Jur., vol. ii. p. 99.

(s) Beiträge zur gericht. Medicin (with two original observations), by Dr. Schneider, of Fulda. Henke's Zeitsch., E. H. 32.

made by the vomited contents of the stomach. The man was an incorrigible drunkard, and was left by his companions upon the floor of his room, stupid from drink. It is positively stated, that there was no light in the room nor means for procuring it.^(t)

Other cases might be cited of equal authenticity with the foregoing, but these, we think, depict with sufficient clearness the phenomena attending this peculiar mode of combustion.

§ 856. In striking contrast with them is the process of *ordinary combustion*, by the prolonged application of fire to the human body. The phenomena attending it are familiar to every one, and have been already described in the foregoing chapter. The effects are purely local, being confined in extent to that portion of the body exposed to the heat, and they cease with the withdrawal or extinction of the burning material, finding no self-sustaining combustible principle in the body itself. The cause is always evident, and the extent of injury is in proportion to the amount of the fire.

§ 857. If, again, this have been designedly kept up, the quantity of fuel required for such a destruction of the body as is related in the foregoing instances, is enormous. The history of the death-scene of those who have perished at the stake, and the widow-burning in India, sufficiently attest this fact. We might add here the evidence given in the Webster case upon this point. Dr. Strong said: "In the pursuit of my anatomical studies, I have had considerable experience in burning up or getting rid of human remains by fire. Where I had my office, at an early day, in Cornhill, I had poor accommodations for dissecting, and it was frequently necessary to burn up the remains of a subject. Once in particular, I had a pirate given me by the United States Marshal, for dissection; and, it being warm weather, I wanted to get rid of the flesh, and only preserve the bones. He was a muscular, stout man, and I began upon it one night, with a wood fire, in a large old-fashioned fireplace. I built a rousing fire and sat up all night, piling on the wood and the flesh, and had not got it consumed by morning. I was afraid of a visit from the

(t) Schmidtmüller, Henke's Zeitsch., 1842, p. 225.

police; and by eleven o'clock they gave me a call, to know what made such a smell in the street. I finished it up, somehow, that forenoon; but I look upon it as no small operation to burn up a body."^(u)

§ 858. Recently the case of Stauff, tried for the murder of the Countess of Goerlitz, gave rise to a discussion of the question of spontaneous combustion, in the course of which certain experiments were conducted by Dr. Gräff, for the purpose of ascertaining the amount of fuel necessary to effect an equal destruction with that observed in that case. The result of these trials was, that as much as one hundred pounds of wood was required to produce even a partial combustion of a human body. In the case of the Countess of Goerlitz, whose body was found in her apartment partly consumed by fire, the heat must have been intense. The secretary near which the body lay was half burned; several chairs further removed from it than was the body, took fire, and the floor underneath it was burned. A mirror on the opposite side of the room, nearly twenty feet distant, was cracked by the heat, and was still so hot when the room was broken open that the hand could not be borne upon it. The heat developed by the burning of the secretary was so great, that articles of gold and silver, and also of iron, had been melted by it. Yet with such a degree of heat as this, and the body only two feet distant from the burning secretary, the traces of fire did not extend below the chest; the head, neck, and upper extremities being the parts which were chiefly destroyed.^(v)

(u) Bemis's Report of the Webster case, p. 69.

(v) The following abstract of the trial of John Stauff, for the murder of the Countess of Goerlitz, we have condensed from an admirable report in the Prague Quarterly Journal of Practical Medicine (vol. xxviii. p. 108), from several accounts in Henke's Zeitschrift, and from a translation of Dr. Gräff's Memoir, in the London Medical Gazette (1850, vol. ii.).

On the 13th of June, 1847, the partially burned body of the Countess of Goerlitz was found at 11½ o'clock at night in her chamber. She was known as a person of active, industrious, and somewhat parsimonious habits, and enjoyed good health. She was frequently known to retire to her own apartments and shut herself up there for half a day at a time. She lived on good terms with the Count, but their apartments were on different floors. On the day of her death she was last seen by her servants at 4 o'clock in the

§ 859. Such cases as these are entirely unlike those well-authenticated cases of combustion, where the body has been

afternoon, in good health. Between 4 and 5 o'clock there was no one in the house but herself and the valet Stauff. On his return in the evening, the Count knocked at the door of the anteroom, but received no answer, when he went out again. This was about 7 o'clock; at 9 P. M. he returned. During his second absence a bright light, which speedily disappeared, had been noticed at the closet window of her apartment, which looked to the south, and also a thick smoke from a chimney, which corresponded with the stove in the parlor. (These rooms adjoined each other.) At 9 P. M. the servants who had returned were sent in search of their mistress by the Count, and Stauff himself was sent after the locksmith to open the door of her apartment. He returned and said that the locksmith was sick and could not come until morning. In the mean time smoke was seen issuing from the rooms, and finally doors and windows were broken open. On this being done flames burst out simultaneously from the hangings, and a writing-desk and the floor underneath it. The dead body of the Countess was found a foot distant from the writing-desk, with the feet towards the middle of the room, and the head towards the window.

After the fire had been extinguished, which was done without much difficulty, it was found that the writing-desk had burned from below upwards, the lower drawer being entirely burned, the two upper ones not so much, and the floor under it was burned through to the joists. Its contents of a combustible character were mostly destroyed, and in the ashes underneath were found keys, melted gold ornaments, pearls and diamonds much injured by the fire, and papers partly burned lay scattered about the room. A mirror on the opposite wall, fifteen feet distant from the desk, was cracked and covered with a brownish-yellow ammoniacal soot. The bell-rope on the left side of the door was broken. A divan in the adjoining closet or cabinet was burned in a large oval hole in the centre, and one of the slippers of the Countess was found on the floor near it. The remaining slipper was found on one of the feet of the corpse.

The dress on the upper part of the body was almost wholly consumed. The head exhibited the form of a nearly shapeless black mass, in which the mouth was imperfectly distinguishable, with the charred tongue protruding from it. The body lay on its left side, the head and chest retracted, the neck everywhere blackened and charred, as were the skin and muscles on the fore and upper parts of the chest, the former thus being affected to within an inch of the pit of the stomach. The marks of the action of fire did not extend quite so far along the back part of the trunk. The joints of both upper extremities were flexed and their surfaces charred, except at the hands. The left shoulder and the right elbow-joints were laid open. From the former of these the blackened humerus, and from the latter the heads of the radius and ulna, protruded. The skin in the vicinity of the left knee was slightly acted on. The body exhaled an empyreumatic odor. The further examination of it was objected to, and was not carried out at that time. After carefully

found destroyed in a greater or less degree by the action of fire, without any apparent external cause, or, at most, with one which has been entirely disproportioned to the effect produced. Could the phenomena in the two sets of cases be properly designated by the same name, it is difficult to conceive how in one the ashes of a pipe, a few smouldering coals, or the flame of a lamp, could cause a greater destruction of the human body, with an immunity of surrounding objects from the action of fire, than in the other the hottest fire was able to produce. Evidently there must be in one case some self-sustaining principle of combustion, a preternatural inflammability of the body, which does not exist in the other. When

cleansing the head, a fissure about half an inch long was found on the temporal bone.

The key of the apartment could nowhere be found. It was not, until the subsequent proceedings, remarked that Stauff was not present at the above examination of the body, while every one else gave all the assistance in their power. He was observed to be in an exceedingly tremulous and frightened condition until the body was buried, and his subsequent conduct was very suspicious. He was not, however, taken into custody until some months afterwards, when he was detected in an attempt to poison the Count.

The proceedings in this case unfortunately were complicated, by the suggestion that this lady had possibly met her death by spontaneous combustion. Naturally enough the facts of the case did not support this idea, and in consequence unmerited discredit, we think, was thrown by the eminent examiners, Liebig, Bischoff, and others, upon the possibility of this phenomenon under any circumstances. Nevertheless this suggestion gave rise to protracted debates and experiments by burning dead bodies, which do not appear to have resulted in the development of any important facts not before known. The conclusion, however, to which the medical commission to whom the case was referred, came at last, was, that the Countess had been assaulted in her room, that in her effort to call for help she had broken the bell-cord, and that the murderer had then dragged her into the cabinet, and here killed her by a blow upon the head, and by strangulation; and to conceal his crime set fire to the combustible materials in the room. At the diet of the assize, on the 11th of April, 1850, John Stauff was found guilty of the murder of the Countess of Goerlitz, and of the subsequent arson, and attempt to poison, and sentenced to imprisonment for life. He afterwards confessed his crime. He declared that he had entered the room of the Countess, to announce to her that he was going out, when, finding no one in the room, he was tempted by the articles of value he saw there to commit a robbery. When doing so the Countess came in, a struggle took place, and he seized her by the throat and strangled her. He afterwards placed the body on a chair, and putting round it a quantity of combustible articles set fire to them.

this has been said, we believe that all has been said which the present state of our knowledge permits.

§ 860. "The most prevalent theory," says a recent intelligent writer,^(w) "has been that held by the early writers, and supported by Orfila, Fodéré, Gordon Smith, Paris, Briand, etc., that, under certain circumstances, the body is capable of generating under the skin, and in the connective tissue and cavities of the body, hydrogen, or other gases similar to those formed in the intestines, and that the electrical condition of the body can sometimes ignite these gases. What these gases are has not been clearly stated; Gordon Smith being of the opinion that carburetted hydrogen is the chief compound; and others, such as Averardi and Apjohn, believing it to be phosphuretted hydrogen.

"Another theory, advocated by Lair, Ritter, Kühn, and Mitchell, and based on the fact that most of the victims of this occurrence have been drunkards, is, that alcohol is present in their blood to such an extent as to be combustible. Now, Liebig and Bischoff say that alcohol cannot be present in the blood and tissues without coagulating their albumen. But this is not true: the author himself has seen cases of death from alcoholic poisoning, or in people under the influence of alcohol, where the smell was strong in the blood, and sometimes so marked in the ventricles of the brain that it was possible to ascertain the nature of the beverage used. Chemistry, too, has frequently detected alcohol in the blood, and, in a case observed by the author's father, there existed so much alcohol in the body that the serum in the ventricles of the brain caught fire and burned on the approach of a lighted match. Marc and Scherf declare that the eructations and breath of drunkards are occasionally capable of taking fire, though this point seems rather doubtful. But even admitting the presence of large quantities of alcohol in the body does not make this theory tenable, as the experiments of Fontanelle, Liebig, and Bischoff, on flesh soaked in alcohol, sufficiently demonstrate.

§ 861. "Fifty-seven cases are recorded, some of them dating

(w) Ogston, Brit. and Foreign Med.-Chirurg. Review, Jan. 1870, p. 179.

back two centuries. They may be divided into two classes; in the first of which may be placed those manifestly false, or where the statements bear absurdity on their face, as well as those the truth of which may justly be suspected, until fresh and better evidence shall have been collected to prove or disprove them.

“In the second class may be placed those whose accuracy cannot be denied; and it will be seen from this division that the conclusions based on the authentic cases are very different from those which can be deduced where all the cases, true and doubtful, are admitted indiscriminately as evidence.”

§ 862. The cases of the first class, which the author cites, certainly justify him in calling them “worthless data,” although they furnish very entertaining reading. An hysterical girl feels a sudden burning in her fingers, and sees a blue flame hovering about them, “visible only in the dark,” which cannot be extinguished by water. A blacksmith has a similar experience. A man sees a flash of fire seize on his shirt, which is suddenly reduced to ashes, without his wristbands being touched at all; he cries out, and when help arrives he is found on the floor, surrounded by a light flame (of spirit, spilt over his clothes?) which disappears as his friends approach. A man lies down in bed with his clothes on, and burns spontaneously; his “whole trunk” and thighs are said to be badly burnt—yet, “remarkable to state, at the places where his clothes were completely burnt, the body was uninjured, and *vice versa*.”

§ 863. Most of these cases rest upon the authority of the person injured. It is upon this class alone that the doctrine of *spontaneous ignitability* rests; those to follow, whose veracity cannot be impeached, speak merely for *increased combustibility*.

§ 864. The second class of cases, too truthful in their narratives to be disbelieved, and attested by so many competent observers, present a character differing much from the fables cited above. In the first class, many of the patients recovered; in the second class, the subjects all died; and not only so, but were all *found dead*—their bodies, their clothes, and the articles in their neighborhood, being partially or entirely destroyed by fire, the only remarkable thing about them being that the bodies were burnt and charred out of all proportion to the

destruction of the neighboring objects, and to an extent which seems incapable of being accounted for by the heat of the burning clothes and objects in the vicinity. (For illustration, several specimens of cases are cited, from which only one is here presented, as follows):—

§ 865. “On the 14th March, 1869, my father and I were requested to examine the remains of Mrs. Warrack, or Ross, aged sixty-six, who resided alone in a house near the Bridge of Dee, Aberdeen. She was said to have been stout, of intemperate habits, and her son stated that he had left her at 10 A. M. on the 14th, in her usual health. She was found at 11 A. M. on the same day, lying burnt on the lower steps of the stair of her house, on her left side. The house was pervaded with a disagreeable smell, but liker that of burning straw than of burning animal matter. The room which she usually inhabited, the door of which was within two yards of the place where she lay, had the same smell; the chair in which she sat stood in the middle of the room, its back almost entirely consumed, and its arms wholly so. The seat of the chair showed mere traces of the action of fire. The bed, about two feet from her chair, had its straw mattress slightly burnt at its fore part. The wood-work of the bed and the curtains were uninjured. Her chair was about four feet from the fire-place, and about two feet from an uninjured mahogany table, on which stood an empty beer-bottle, smelling of whiskey. Nothing else in the room was touched by fire. The stairs were of wood, and underneath, and in the immediate vicinity of where she lay, they were charred to the depth of a quarter of an inch. The perpendicular bars of the hand-rails similarly charred beside her for a foot up, the top rail and the wall, which was half a foot from the hand-rail, blackened by smoke.

“The condition of the body, however, showed that the fire had caused the greatest alterations in it. The hair was burnt off; the soft parts of the face and front of the head burnt off, the bones exposed, blackened, and calcined. The back of the head, the neck, and the trunk everywhere converted into greasy charcoal to the depth of about an inch, the skin totally removed, and the bones of the trunk lying bare, blackened, and calcined.

“The front wall of the abdomen totally destroyed and wanting; the intestines burned into a hard and blackened mass; the liver converted into ashes for the depth of an inch, but retaining its shape, its left lobe projecting nine inches from the margins of the ribs.

“The upper limbs distorted; the elbows strongly flexed, and everywhere charred to a great depth, the bones, however, even of the fingers, preserving their position. The right thigh had its deeper muscles still uncharred, but of the appearance of roasted beef, and very dry; the skin and superficial muscles totally burnt away. The right leg only partially attached to the thigh, and entirely converted into a soft, black, greasy, and shapeless cinder, through which the finger could be pushed with ease. The left thigh and leg in a condition similar to that of the right extremity, but still attached to the foot, which was a charred and shrivelled mass similar to the right foot. Not a vestige of clothing remained anywhere.”

§ 866. Some authors have fallen into the error of attempting to explain by chemical theories the phenomena of spontaneous combustion, but they have hereby given their opponents the opportunity, not only of easily refuting these speculations, but furnished them with a plausible pretext for denying the correctness of the facts. MM. Liebig and Bischoff have, perhaps, disproved the accuracy of the doctrines which attribute the origin of spontaneous combustion to a saturation of the body with alcohol, unusual corpulence, and the development of inflammable gases. They allege that as the watery element of the body constitutes seventy-five per cent. of its bulk, it must first be dissipated before the latter can burn, that alcohol cannot be present in the tissues without coagulating their albumen, and that it may burn without communicating its flame to the flesh; and, finally, that the evolution of inflammable gases in the living body is either not a fact, or if it were so, could not explain the alleged process of spontaneous combustion.^(w¹)

(w¹) Henke's Zeitschrift. Bd. 60, p. 162. Ann. d'Hygiène, t. xvi. p. 383. See also an “Essay on the use of Alcoholic Liquors,” by John Chadwick, M. D., London, 1849, where proof is given of the presence of alcohol in the brain of drunkards after death.

§ 867. Yet, admitting that the phenomena of spontaneous combustion, so called, are incongruous with the laws of combustion so far as they are known, it does not follow that we should, with these chemists, reject as unworthy of belief the many curious and authentic facts on record. These may be true, although incorrectly accounted for. Indeed, there are many examples of the spontaneous combustion of organic and inorganic matter, which chemistry is yet unable satisfactorily to explain. But the number of cases now known, amounting to between forty and fifty (some of them, perhaps, indeed fictitious), the uniformity in the description of the phenomena, and of the age and habits of the persons attacked, require us to regard them as scientific facts yet unexplained. The following characters are those generally described:—

§ 868. 1st. The extent and gravity of the burns is altogether out of proportion to the apparent external cause.

2d. The persons have been inordinately addicted to the use of spirituous liquors.

3d. Women are more frequently attacked than men.

4th. The great majority were aged and corpulent.

5th. The combustion of the body has been nearly total, while the adjacent objects have been only slightly or not at all injured.

6th. The flame has been difficult to extinguish.

The deposit of a fatty and fetid soot upon surrounding objects cannot be considered as peculiar to this form of animal combustion.

CHAPTER IV.

HEAT AND SUNSTROKE.

I. Symptoms, § 869.

II. Post-mortem appearances, § 872.

§ 869. I. *Symptoms*.—The frequency with which, in this country, fatal results are observed from exposure to heat or the direct rays of the sun, renders necessary some notice of the prominent symptoms and post-mortem appearances characterizing sudden illness or death from these causes. The report of the City Inspector of the city of New York, alone, shows two hundred and sixty deaths from *coup de soleil* during the summer of 1853, without including many cases designated as “congestion of the brain,” and the “effects of cold water.” In the city of Philadelphia, during the months of June, July, and August, of the same year, the number of deaths reported under this head amounted to fifty-seven; a number which is also certainly much below the true mortality.

§ 870. Rapid or sudden insensibility, after exposure to the intense heat of the sun in summer, usually occurs in those who are engaged in some laborious out-door occupation, but the same condition may result after exposure to artificial as well as solar heat. Dr. Swift, of New York, in his “Observations on Exhaustion from the Effects of Heat,”^(x) states that eleven patients were admitted into his hospital from the laundry of one of the principal hotels in that city, and that several were brought from a sugar refinery, where, after working several hours in a close and overheated apartment, they fell down suddenly in a state of insensibility. Upon a comparison of the symptoms and lesions of these with those of the patients who had become exhausted after laboring in the sun, no distinction could be perceived.

(x) N. Y. Jour. of Med., July, 1854.

§ 871. The immediate cause of the symptoms or of the death of those who are said to be "struck" by the sun is not always the same. In the majority of cases the affection is one depending upon exhaustion from heat with, most probably, some molecular change in the blood, the character of which is not now understood, but which is ascribable to intense heat and prostration from fatigue. In other cases, however, which are comparatively few, inflammation of the brain or its membranes is the result of exposure to the sun's heat, and, occasionally, apoplexy is produced. The symptoms vary, therefore, but a neglected case of the first variety may pass into the second. For interesting details relative to the mode of distinction between exhaustion from heat and *insolation*, we would refer the reader to the paper already quoted, and to a discussion on the subject in the Philadelphia College of Physicians.(y)

§ 872. II. *Post-mortem appearances*.—In four cases (those of exhaustion) examined by Dr. Pepper, "the brain exhibited no indications of congestion, and nothing, in fact, of an unusual appearance." Dr. P. was, however, struck with the appearance of the heart. In all of the four subjects it was pallid, flaccid, and softened, while the other muscles of the body were florid and firm. The lining membrane of the heart and of the large bloodvessels was of a very dark, almost purple color. The cavities of the heart contained but little blood, and no coagulum. The examinations were made from six to eight hours after death.

§ 873. The following may serve as an example of death from the direct cerebral disturbance. Two women were washing clothes in the sun. One fell down in a state of insensibility, and remained so for twenty-four hours, but finally recovered under free depletion. On recovering, she described her sensa-

(y) Transactions Coll. Phys., vol. iii. p. 99 et seq.; also, Trans. of Med. Soc. of Pennsylvania, vol. iv. p. 112. For the most recent accounts of this affection see Times and Gaz., Dec. 1858, p. 638; Levick, Am. Journ. of Med. Sci., Oct. 1858, p. 404; *ibid.*, Jan. 1859, p. 40; Martin, Lancet, Jan. 1859, pp. 2, 28, 52; *ibid.*, March, p. 315; Pirric, Lancet, May, 1859, pp. 505 and 533; Merrill, Am. Journ. of Med. Sci., July, 1859, p. 118; Gordon, Edinb. Journ., v. 985; Longhurst, Lancet, Jan. 1860, p. 7.

tion, when attacked, as though she had been suddenly struck upon the head. In the other case the attack was precisely similar. The patient died in twelve hours. Upon examination after death, blood was found effused beneath the membranes of the brain.

§ 874. Dr. H. C. Wood, in a recent paper on sunstroke,^(y¹) considers that intense heat of the skin is one of the characteristic symptoms in this affection. In some instances the temperature of the patient reaches 110° F., and in one case, recorded by Dr. Dowler, of New Orleans, the temperature was 113°.

The breathing is always affected, sometimes stertorous, and sometimes deep and labored. In many instances, the face and often the whole surface is congested. The motor nervous system is almost always disordered; there are present subsultus tendinum, restlessness, and at times partial spasms or general convulsions. In some cases, before death, the patient appears to be completely paralyzed.

§ 875. Dr. Wood found, in all the autopsies made by him, the heart firmly contracted, especially the left ventricle. Some previous observers, for instance, Levick, Pennsylvania Hospital Reports, 1868, and Pepper, quoted above, had noted the heart as being soft and relaxed, while others did not report the condition of the organ. Dr. W. accounts for this difference in the fact that in none of his cases was the autopsy made later than two hours after death. In Dr. Levick's cases, the post-mortem examinations were made from thirteen to thirty hours after death; and in Prof. Pepper's cases six to eight hours after death, and besides, all his patients had been bled before he saw them.

"As the temperature of the body remains above 100° for hours, it is evident that putrefactive changes, often already entered upon before demise, must go on very rapidly, and that probably even three or four hours would afford sufficient time for the relaxation of commencing decomposition to follow the heat rigidity. Moreover, direct evidence of the truth of this

(y¹) Thermic Fever or Sunstroke. By H. C. Wood, Jr., M.D. Boyleston Prize Essay. Phila., J. B. Lippincott & Co., 1872.

is not wanting. It has been experimentally demonstrated (*y*²) that in animals rigidity of the heart is found directly after death from excessive heat, but that in a very few hours it disappears."

The other post-mortem appearances are mostly negative. Congestion of the brain or effusion into the ventricles is not of frequent occurrence. The lungs, however, and the right side of the heart are found gorged with dark fluid blood.

Dr. Wood has not observed any change in the blood microscopically, but the coagulability is always impaired to a greater or less degree.

§ 876. This author performed a number of experiments on the lower animals, exposing them to high temperatures, natural and artificial, and observing the effects and the changes immediately after death. From these it was shown that sunstroke can be readily produced in the lower animals by heat; the symptoms being the same as in man. After death the lesions observed are changes in the blood, with rigidity of the heart and general muscular system; "this rigidity of the heart comes on in most cases after, not before, death, and is a result, not cause, of death; that post-mortem rigidity is dependent upon coagulation of myosin, and that the rigidity of the heart is of similar origin, coagulation of the muscle plasma occurring almost instantaneously at 115° F., a degree almost attained in sunstroke; that, when a muscle has been in great activity immediately before death, the myosin coagulates at a much lower temperature, and that cases of sudden cardiac death occurring in battle among the East Indian English troops, were no doubt due to the coagulation of the heart's myosin; that heating the brain of a mammal produces sudden insensibility, with or without convulsions, at a temperature of 108° F., and death when a temperature of 113° F. is reached; that this effect of the local application of heat is not due to induced congestion, but is the result of the direct action of heat upon the cerebrum, and that consequently the nerve-centres are as perniciously affected by a high temperature as the muscles are."

(*y*²) See Boston Journal of Med., vol. x. p. 350.

§ 877. The conclusions arrived at are as follows: "that the nature of sunstroke is that of a fever, or, in other words, that *coup de soleil* is a fever, not dependent upon blood-poisoning, but upon heat."

Dr. Wood thinks that in the majority of cases there are some premonitory symptoms, but that in some cases the sunstroke is absolutely sudden, followed by instant death.

CHAPTER V.

LIGHTNING.

- I. Symptoms, § 878.
 II. Post-mortem appearances, § 879.

§ 878. I. *Symptoms*.—Cases of sudden death from this cause are quite common, and there can rarely, if ever, be any doubt of the agency by which the person is killed. This is usually sufficiently attested by the circumstances. The person may be found dead either in an open place or in a building. The fact of a thunderstorm having occurred will, of course, be generally known, and the traces left by the electric fluid upon the body and surrounding objects can hardly be misunderstood.(z) It is remarkable that in death from this cause, as

(z) It is not impossible that the stroke of lightning should have been neither preceded nor followed by rain and wind, as is usual in thunderstorms. On Sunday, the 2d of July, 1843, about 3 o'clock P.M., five negroes were simultaneously prostrated by a single stroke of lightning, on a plantation in Georgia. "The sun was shining brilliantly at the time, and a greater portion of the visible hemisphere presented the usual serenity of the summer sky. A singular and rather angry-looking cloud had for a short time previously been observed near the verge of the southeastern horizon, from which occasionally proceeded the low rumblings of very distant thunder. But nothing in the appearance of the heavens betokened the immediate proximity of a thunderstorm, or prepared them for the terrible electrical explosion which followed. Not a drop of rain had yet fallen, and the earth was quite dry. Such was the condition of things when suddenly the whole atmosphere in the neighborhood was momentarily illuminated by what appeared to be a

in other kinds of instantaneous death, the body retains the position in which it was performing the last act of life. M. Boudin has collected numerous examples of this fact. According to Carden, quoted by Rivière, eight reapers, taking their food under an oak, were struck by lightning, and died, preserving their attitude—one of a man eating, another drinking. In Lorraine a woman and one of her children were killed, and remained in a sitting posture. At Dover a man killed with four horses was found sitting under a bush. A man of law at Troyes was struck dead by lightning when on horseback. On January 22, 1849, a goat was killed near Clermont, and was found sitting on his haunches, with a bunch of green leaves in his mouth. A woman was struck while plucking a flower, and her body was found standing nearly erect, with the flower in her hand. A priest was killed while on horseback; the animal reached home, a distance of two leagues, his dead master still sitting erect in the saddle. The clothes are torn and burnt; metallic articles upon the person, if in the track of the fluid, are fused; and there will be found upon some part of the person, usually about the head or shoulders, a reddened spot, a lacerated puncture, or a discolored streak, indicating the point at which the electric fluid has entered the body. A great many cases have been reported in which images of trees and other objects have been found

universal flash, which was accompanied, or rather succeeded, by a single astounding report. No dust was observed to rise from the ground, nor any other evidence of mechanical violence. No thunder was heard after this explosion; the cloud quickly dispersed, precipitating only a little rain a few minutes after the accident; and in the course of an hour the atmosphere resumed its usual tranquillity. The five negroes were taken up in a state of insensibility amounting to apparent death." Three of them had been instantaneously killed. In two no marks of injury were discovered; in the third there was a burnt spot of the size of a dollar under the right axilla. The other two recovered. One of these was a woman aged seventy years, and the singular fact is stated that in her the catamenial discharge, which had, in the ordinary course of nature, ceased for more than twenty years, was completely, and thus far (about a year afterwards) permanently, re-established. For this and many curious cases and ingenious speculations we beg leave to refer the reader to *Le Conte on the effects of lightning*, New York Journ. of Med., vol. iii. p. 295; also *Hist. Méd. de la Foudre et de ses Effets sur l'Homme*, etc., par M. Boudin, Ann. d'Hygiène, 1852.

imprinted upon the skin of persons struck by lightning or exposed to its vivid glare.^(z¹) The amount of visible injury is generally trifling, and it is said that occasionally no marks whatever are perceived. In the latter case the person is probably killed by the agency of the *returning stroke* or electric shock, his body being the conductor by which the positive electricity of the earth is transmitted to a cloud which has come in near proximity to it. The absence of any external mark of injury may indeed leave us in doubt of the mode by which death has been produced, but it at the same time equally negatives the suspicion of homicidal violence. In such cases death can therefore be attributed only to natural causes, or to those poisons which act rapidly. A post-mortem examination can hardly fail to show to which of these it is due, and, if required, a chemical analysis may be made of the contents of the stomach. These suggestions are, however, of but little practical importance, since attendant circumstances will, as we have already intimated, enable us to dispense with any examination of the body.

§ 879. II. *Post mortem appearances*.—In the examination of the bodies of two women, one 32 years of age and the other 17, who were struck instantly dead by a flash of lightning as they were seated spinning near the fireplace, the following observations of the *external* appearances were made by Dr. Martin twenty hours after death. In both bodies putrefaction had begun, the abdomen was already distended and of a bluish color, and dissolved blood flowed from the mouth and nose. On one of them the whole surface of the neck and breast was covered with reddish-brown spots, under which, however, the arborescent tracks of the electric fire could be traced, until, uniting into three larger branches, they ended in the left lumbar region, in an oblong burn, of a dark-red color, six inches long and three broad, and penetrating into the substance of the true skin, under which, however, there were no lesions discoverable. The skin was here and there, in the course of the marks, of a parchment-like consistence. On the other body, which was that of the young girl, the electric

(z¹) Poey, *Med. Times and Gaz.*, March, 1857, p. 317; and Boudin, *loc. cit.*

fluid appeared to have entered over the left temple, as here a tolerably deep scorched spot was to be seen; the eyebrows and lashes on this side were burnt. The skin was striped and spotted, exactly as in the preceding case. The neckerchiefs worn by both these females were torn to rags, but did not exhibit the slightest trace of combustion, nor was any other part of their clothing, or of the furniture of the house, burnt in the least degree.^(a) Sometimes, however, there is considerable external injury, the skin being contused and lacerated, but it does not appear that there is ever any actual burning of the skin, unless the clothes have been set on fire by the electric current. The idea that the blood remains fluid in the persons struck by lightning, and that putrefaction occurs at a very early period, is not sustained by the observation of all authors upon the subject, but it is probable that such is the general rule in the human subject. It is also generally supposed that rigidity is very slight or is absent after death from this cause. But it is not uniformly so. A case is reported by Maerklin in which cadaveric rigidity began within three or four hours after death, and in the course of twenty-four hours reached a very high degree.^(a')

CHAPTER VI.

COLD.

- I. Symptoms, § 880.
- II. Post-mortem appearances, § 882.

§ 880. I. *Symptoms*.—Where the body of a person is found who is supposed to have perished from exposure to cold, the chief inquiries which require attention are, whether the cold was the sole cause of death, and, if not, what were the additional causes, or whether the disease or injury, if any, was

(a) Henke's Zeitschrift, 1844, p. 193.

(a') Casper's Vierteljahrs., xvi. 332.

not in itself suddenly fatal; the cold having had nothing to do with the result.

§ 881. The effect of intense cold upon the human body is too familiar to need illustrating. After prolonged exposure to its influence, the whole body becomes benumbed, the respiration oppressed, and the head heavy. Perception and sensation are obtunded, the mind wanders, an invincible lethargy steals over the senses, the limbs become paralyzed, and the unfortunate person, overcome with drowsiness and exhaustion, sinks down into apparent death. Unless speedy relief is afforded, this condition soon merges into real death. According to Larrey, death is preceded by a general pallor, stupor, difficulty of speech, dimness of sight, and sometimes a total loss of these functions. In the retreat from Moscow, some men, he says, led by their comrades, were able to march for a considerable time in this condition. But their limbs soon refused to support them, they reeled like drunken men, and fell benumbed and lethargic, and soon expired. Almost all the men who perished in this manner were found lying with their faces to the ground.

§ 882. II. *Post-mortem appearances.*—The *post-mortem* examinations which have been made of persons dying from cold, have shown that the most constant appearance is an extreme congestion of the venous system in the principal organs of the body, but especially in the brain. Serous effusion into the ventricles, or under the arachnoid, is met with. Dr. Kellie observed it in two cases, and Professor Blossfeld mentions it in three of six cases of death by cold.(b)

Such are the only positive results of *post-mortem* investigations. Unless the examiner knew the circumstances in which the body was found, which favored the supposition of death from cold, he could not possibly assert from these signs that death had resulted from this cause. Practically, therefore, they are of little importance except in those cases in which, from the absence of other injuries, and of serious disease, and

(b) Beck's Med. Jour., vol. ii. 68; Henke's Zeitschrift, 1845, p. 245. One hundred legal autopsies made in the Institute for instruction in Forensic Medicine in the Russian University at Kasan.

from a knowledge of the circumstances under which the body was found, the cause of death is already rendered probable. Adults, who perish in this manner, are generally either intoxicated or else helpless and infirm. The intemperate, the aged, or those whose nervous energy is exhausted by long watching, fatigue, hunger, or depressing emotions, succumb to this form of death much more speedily than the temperate and vigorous. Children, and above all, infants, can sustain only a moderate degree of cold. Hence intoxication, old age, and privation, as well as actual disease, must be enumerated as predisposing causes of death from cold.

§ 883. If marks of violence be found upon the body, they must be judged according to the rules already laid down in the chapter on wounds. If necessarily mortal, the influence of cold need not be considered, but in all other cases it is obvious that cold must have greatly accelerated the fatal result. The same remarks are applicable when the subject is very young. It must be remembered, however, that cold itself may here be more readily employed as a homicidal agent, and that possibly the other marks of ill-treatment may be few or none. An atrocious case of murder by cold has been frequently quoted, on account of the rarity of examples of the kind. A man and his wife, at Lyons, were tried for the murder of their daughter, a girl aged eleven, under the following circumstances. On the 28th of December, at a time when there was a severe degree of cold, the female prisoner compelled the deceased to get out of her bed, and place herself in a vessel of ice-cold water. The deceased complained of exhaustion and dimness of sight; the prisoner then threw a pail of iced-water upon her head, soon after which the child expired.(c)

(c) Ann. d'Hyg., 1831, p. 207.

CHAPTER VII.

STARVATION.

- I. Mode, § 884.
- II. Period, § 885.
- III. Symptoms, § 887.
- IV. Post-mortem appearances, § 888.

§ 884. I. *Mode*.—A person may starve himself to death ; he may perish from the want of food, being unable to procure, to swallow, or to digest it, or he may purposely be deprived of it. Medical evidence can only attempt to establish the fact of death by starvation, and can, in many cases, indicate the physical cause of it, but cannot, of course, determine whether the act was voluntary or homicidal. In the case of young children, however, homicidal intentions may be inferred, while in adults, on the contrary, starvation is mostly a suicidal act.^(c¹) The *mode* of starvation is not always the same. In some cases the privation of suitable nourishment is gradual, and death ensues only after a considerable period ; in others, although no solid food is swallowed, life is prolonged by the use of a little water, and in others, again, after a variable period of total abstinence from food or drink, the imperative demands of nature are gratified, perhaps too freely and too late to save life.

§ 885. II. *Period*.—The *period* at which *death* ensues after starvation is, therefore, dependent not only upon the age and constitutional powers of the individual, but also upon the foregoing varieties in the manner in which it is effected. It cannot be determined with precision. Wonderful examples of prolonged abstinence may be found in abundance in the

(c¹) A case is related in Henke's Zeitschrift, lxxxix. 147, in which a man seventy-seven years old was killed by ill-treatment and starvation. His assassins were his own daughter and his son-in-law.

older works, and are not wanting in our own day. But the numerous instances in which trickery has been detected should make us wholly incredulous of their genuineness. Instances of abstinence for months, and even years, are gravely related; but it is probable that there is no well-authenticated case of entire abstinence from food and drink for more than thirty days, while on the other hand it is highly probable, that, in the majority of cases, death takes place within a week or ten days. Dr. Gadermann reports a case, however, in which for twenty-three days all liquid or solid nourishment was refused, the person being bent upon self-destruction. At the end of this time he ate and drank greedily, which did not, however, avail him; he died shortly afterwards. The body was almost a skeleton. In this case, the author says, there could not be the slightest suspicion of deception.(d) Professor McNaughten has published a case where a man lived fifty-four days on water alone.(e) In another case, of a prisoner at Toulouse, who resorted to starvation to avoid punishment, life was prolonged to the fifty-eighth day. He drank water occasionally. Valentin refers to the case of a woman who lived seventy-eight days on water and lemon-juice.(f) In another case a man lived sixty days on a little water and syrup of orgeat.(g) A man aged 56 years was accidentally shut up in a coal mine. He remained there *twenty-three* days before he was discovered, almost completely exhausted. He had been able to procure a small quantity of dirty water during the first ten days of his confinement. Notwithstanding every effort was made to save him, he died three days after he was found.(h)

§ 886. Two very interesting cases of prolonged abstinence in persons afflicted with slight mental derangement, or melancholy, are related by Dr. Taylor, of Ohio. In one, after two periods of fasting, of ten and fourteen days respectively, during the last of which he took neither food nor water, this gentleman, on the fifteenth day, took a little water, and then at

(d) Henke's Zeitschrift, 1848, 3 H.

(e) Am. Journ. Med. Sci., vi. 543.

(f) Lehrb. der Physiol., vol. i. p. 218.

(g) Archiv. gén., xxvii. p. 180.

(h) Lond. Med. Gaz., xvii. 389.

intervals a small quantity of milk in it. He died about one hundred days afterwards, having lived in "an almost constant state of abstinence." In the other, a little water was taken on the twelfth day after complete abstinence from food and drink, and a gill every twenty-four hours afterwards for thirty-nine successive days, when he died. For the last seventy-two days prior to his death, he had no fecal evacuation, but passed urine in small quantities every three or four days.(i)

Under the subsequent topic of "Priority of Death," or "Survivorship," a case will be found of a party of miners who survived over fourteen days without food, without any permanent serious consequences.

§ 887. III. *Symptoms*.—"Dr. Donovan gives the following description of those who suffered from the Irish famine in 1847. They described the pain of hunger as at first very acute, but said, that, after twenty-four hours had been passed without food, the pain subsided, and was succeeded by a feeling of weakness and sinking, experienced principally in the epigastric region, accompanied with insatiable thirst, a strong desire for cold water, and a distressing feeling of coldness over the whole body. In a short time, the face and limbs became frightfully emaciated, the eyes acquired a most peculiar stare, the skin exhaled a peculiar and offensive fetor, and was covered with a brownish, filthy-looking coating, almost as indelible as varnish. The sufferer tottered in walking, like a drunken man; his voice became weak, like that of a person in cholera; he whined like a child, and burst into tears on the slightest occasion. In respect to the mental faculties, their prostration kept pace with the general wreck of bodily power; in many there was a state of imbecility; in some, almost complete idiotism; but in no instance was there delirium or mania, which is often described as a consequence of protracted abstinence among shipwrecked mariners."(j)

§ 888. IV. *Post-mortem appearances*.—In a child, six months old, which was starved to death by its mother, the following

(i) Am. Journ. Med. Sci., Jan. 1851. In the same place will be found some references to remarkable cases of abstinence by the editor, Dr. Hays.

(j) Taylor, Med. Jur., from Donovan, Dub. Med. Press, Feb. 1848.

conditions were observed: Excessive emaciation; the body weighed only six pounds and a half, and the thickest part of the thigh measured only an inch and a quarter in diameter. There was no fat anywhere to be found, not even in the omentum, and only a small amount of blood in the body. There was no food in the stomach or intestines. A trifling quantity of old and hardened feces remained in the rectum. Extreme contraction of the stomach and all the intestines existed.(k)

§ 889. Wildberg examined the body of a man 50 years of age, who died of hunger, seven days after being buried in the ruins of a fallen house; he was known to have been healthy before the accident. The body was extremely emaciated, being reduced almost to a skeleton; the eyes stood open, and were highly injected; the mouth and tongue exceedingly dry; and the abdomen so flat, that the anterior wall lay almost in contact with the spine. Although the body was still fresh, it exhaled a peculiar penetrating fetor, different from that of putrefaction. The lungs were shrivelled and of a yellowish-white color, the heart small and flaccid, and a small quantity of loosely coagulated and highly offensive blood was found in it and in the great vessels. In the abdomen there was not a trace of adipose tissue remaining; the stomach was very much shrunken, and contained a little dark and viscid liquid. The mucous surface was corroded in several places. The intestines were pale and contracted, and entirely empty, with the exception of a little greenish fluid in the small intestine, and in the large a very small quantity of dry excrement.

The liver was pale, the gall-bladder very much distended with thick, dark-brown bile, which, exuding through its coats, had tinged all the neighboring viscera. All the other abdominal organs were small, flaccid, and contained but little blood; in the bladder, the internal coat of which had an inflamed appearance, there was found a little dark and fetid urine. The brain and its membranes were extremely anæmic, and the former firm and dry. In addition to this description, it may be stated that Dr. Donovan found, in some cases inspected by him during the Irish famine, a peculiarly thin

(k) Rothamel, Henke's Zeitsch., 1845, 3 H.

condition of the small intestines, "which, in such cases, were so transparent, that if the deceased had taken any food immediately before death, the contents would be seen through the coats of the bowel; on one occasion (at an inquest) he was able to recognize a portion of raw green cabbage in the duodenum of a man who had died of inanition." The above description, from Wildberg, coincides very closely with the statements of other observers, and may probably be assumed as correct when there is no other cause of death present. It is further substantiated by the observation of Casper, in a case where, from occlusion of the mouth by disease, death took place from hunger.^(l)

§ 890. In 1869, a girl, 12 years of age, in Carmarthenshire, Wales,^(l') excited a vast amount of interest from the statement that she had lived for two years without eating or drinking, except a drop of water which was placed on her lips every few days. It was also asserted that nothing was evacuated from her bowels; but that every nine days she passed a drachm or two of urine. She occasionally had "swooning fits." The parents positively denied that any food was given her, and many persons believed their account of the case. The girl was confined to bed, but looked fat and rosy.

§ 891. At the request of her father, who expressed a strong desire that the case should be investigated, a committee, consisting of the vicar of the parish, a surgeon, and several gentlemen and respectable farmers, met and determined to have the girl closely watched. For this purpose four nurses were sent from Guy's Hospital, London, one of whom was to be in constant attendance on the case. The watching began on Dec. 9th, and ended with the girl's death on Dec. 17th, 1869. On December 11th, she is reported as not looking as well as usual, but up to the 14th she is stated to have been cheerful and amused herself with reading. On December 12th stains of excrement were observed on her dress. On the 13th she passed a large quantity of urine, and on the 14th and 15th smaller amounts were voided. For three days before death

(l) Casper, Gericht. Lichenöff, 2tes Hundert. Fall. 99.

(l') Lancet, 1869.

her extremities were cold, and during the last two days she was very restless. She asked for no food and made no confession of imposition. There was no attempt made to force her to take food, but it was offered to her on the day of her death. "She made no reply, but appeared to go off in a fit." On the same day her father refused to allow the surgeon in attendance to give her food, but afterwards, "when it was too late," he consented.

§ 892. At the *post-mortem* examination made by Mr. J. Phillips and Mr. Thomas⁽²⁾ the following appearances were noted:—

"*Exterior.*—Hair nearly black, long and plentiful; eyes very sunken, pupils dilated; very handsome features; left cheek still florid; chest and body generally well developed; mammæ slightly so; armpits and pubes showing precocious puberty; right shoulder more developed than left; left axilla more than usually hollow, as if a bottle or hard substance had been kept there; thighs well rounded, but the legs below the knee small in proportion—less developed than the thighs; soles of the feet soft, bearing no evidence of being used for locomotion. * * * *

"*Head.*—On removing calvarium, found the vessels on the surface of brain turgid, the membranes quite healthy, brain beautifully developed, the anterior lobes especially, cerebellum of ordinary size (on cutting into the substance it was found firm, having a large portion of cineritious matter, a few red spots only visible on the cut surface); ventricles empty, base quite normal, containing no fluid.

"*Chest.*—Lungs collapsed, free, rather small, but quite healthy in color and touch. Heart in every respect natural; pericardium containing no fluid or adhesions.

"*Abdomen.*—The whole alimentary canal free from any thickening or contraction, and perfectly healthy throughout. Stomach of ordinary size, containing no food, but about half an ounce of a thickened acid mucous exudation; duodenum contained a little of the same fluid tinged with bile; jejunum also a little of the same fluid, as well as the ilium, where it

(2) Medical Times and Gazette, Jan. 8, 1870, p. 45.

became slightly grumous. Five half-grown lumbrici, and one full-grown, were in the ileum. In the cæcum the fluid became thicker but same in character. Colon fairly distended with gas, and, with the rectum, contained about eight ounces of hardened feces—not in one spot, but diffused through its entire length. Anus pervious, having a little thickened mucus therein; bladder empty; uterus small, but quite healthy; spleen normal, also kidneys and liver; gall-bladder distended with healthy bile; omentum contained a little fat. The body measured fifty-three inches in length; and under the integument was a thick layer of fat; from half an inch on the thorax to one inch on the lower portion of the abdomen.”

§ 893. It may be mentioned that the parents of the deceased girl were tried for having caused her death. The father was sentenced to imprisonment for twelve months, and the mother for six months, it being represented that she acted under the orders of her husband.

§ 894. In estimating the value of the post-mortem appearances, as evidence of death from starvation, it should be remembered, that, unless there is absence of disease sufficient to have induced the emaciation and anæmic condition described, death cannot be attributed to starvation as its cause. There are many diseases which would produce a similar condition of the body—some by mechanical obstruction to the ingestion or chylication of the food, and others by their baleful effect upon the system generally. Hence, the medical witness should be extremely cautious in attributing, upon the grounds of a post-mortem inspection alone, the death of the individual to starvation, especially if the person have been the subject of any chronic disease.

CHAPTER VIII.

SUFFOCATION.

- I. Post-mortem appearances, § 896.
- II. Accidental, § 897.
- III. Suicidal, § 899.
- IV. Homicidal, § 903.

§ 895. ALTHOUGH the general definition of this word may not improperly include all those modes of death in which the respiration is mechanically prevented, yet, as hanging, strangulation, and drowning require a separate consideration, it remains for us here to speak only of those modes of suffocation not elsewhere discussed. These are exceedingly numerous, and comprise all those cases in which by any means air is excluded from the larynx, or the chest prevented from expanding to receive it.

§ 896. I. *Post-mortem appearances*.—These, as Casper has pointed out, will be found to differ more or less according to whether death has been sudden or prolonged, whether it was produced by syncope or by congestion of the internal organs, and whether the person was scantily or abundantly furnished with blood. Lividity and turgescence of the face, fluidity of the blood, and sanguineous engorgement of the thoracic and abdominal viscera are the general and most constant features. Casper pronounces erroneous the opinion that cadaveric rigidity is absent after death by suffocation, and declares that it exists neither more nor less than in other cases. The heat of the body, and particularly of the internal organs, is of longer duration than usual; the blood is uniformly more liquid, and of a darker color, than is usual except after death from putrid fevers, septic poisons, etc., and hence it flows more abundantly when sections of the vascular organs, as the brain, are made. Bloody infiltration of the eyes and eyelids, and minute ecchy-

mosis of the neck and chest, are common.^(m) The lungs, according to Casper, are generally engorged, as well as the right side of the heart and the pulmonary arteries, while the left cavities of this organ contain little or no blood. M. Tardieu, on the other hand, declares that in general the lungs do not present the characters usually attributable to asphyxia, being in the majority of cases of moderate volume, rosy or even pale, and sometimes engorged about the base and posterior portion.⁽ⁿ⁾ Underneath the scalp and the pulmonary pleura, on the lining membrane of the heart and aorta, and in the mucous membrane of the larynx and trachea, within and upon the thymus gland, bloody points, spots, and stripes, resembling ecchymoses, but more strictly circumscribed, may be found, which are probably due to the efforts of inspiration made when no air can enter the lungs, and when of course the struggle to breathe forces the blood through the walls of the vessels. The permanence of these spots renders them valuable signs. M. Tardieu found them under the pleura of a fœtus which had been for ten months in a privy well. Frequently, but not in every case, a pale-reddish foam is found in the trachea and bronchia, the lining membrane of which is pale or dusky, according to the condition of the lungs. Congestion of the kidneys is another and peculiar indication of this mode of death. On the other hand, projection of the tongue between the teeth is far from peculiar to death by suffocation,

(*m*) The following case proves the necessity of caution in regard to the significance of such spots. A watchmaker, aged fifty years, was found dead upon the floor of his chamber, at nine o'clock in the evening. He had not been seen since the previous evening. During the day several persons had knocked at his door in vain, and it was at last perceived that a forcible entrance had been made. This circumstance suggested that the man had been assassinated. On examining the body, no trace of violence was discovered, but upon the neck and chest were many spots resembling those of purpura; no similar spots were found in the pleura. The brain and lungs were strongly congested, and the tongue and lips were wounded by the teeth. It was clear that death had occurred in an epileptiform attack, and the man was found to have formerly been subject to this disease. Robbers, supposing the occupant of the room absent, had effected an entrance, but, probably alarmed at the sight of the corpse, had fled.—*Annales d'Hygiène*, 2ème sér., iv. 389.

(*n*) *Annales d'Hygiène*, 2ème sér., iv. 378.

and the same remark is true of foam upon the lips. It is evident that the greater number of these signs are valuable only in proportion to the freshness of the body; when once decomposition has set in, they gradually lose their distinctness and their significance. It will be observed, also, that the above signs are those merely of asphyxia in general. In hanging, strangulation, and drowning, there are one or more signs characteristic of the agent by which life is extinguished, the presence of which, together with the general signs of this kind of death, is almost if not quite conclusive. But in other modes of suffocation, if any trace of the instrumentality by which death was produced is found, it will be most probably due, in homicidal cases, to haste on the part of the assassin, and yet cannot afford any addition to the medical evidence. Thus, if a person have been smothered with the bedclothes, or suffocated by a hand held before the mouth, or by compression of the chest, a distinct and satisfactory indication of the fact will seldom be had. For this reason the medical examiner will often be at a loss whether to ascribe the death to natural or to violent causes. The case may be one of apoplexy, of faucial disease, or of pulmonary congestion, or may be due to a variety of accidental causes, not apparent without a careful inspection of the body. This must, therefore, in all cases where it is important to remove doubt, be conducted in the most careful and searching manner. The absence of any characteristic mark to indicate the mode of death gives a latitude to conjecture, and to the proposition of general questions, which, in case of trial, will seriously embarrass the physician. If no accidental cause, such as a foreign body in the larynx, nor any evidence of disease fatal by the production of asphyxia be discovered, the physician should still be guarded in his opinion, and leave the explanation of the manner of the death to those whose duty it is to investigate the collateral evidence. This is of greater weight than the medical testimony, for while the physician has merely to declare the probability of the person having died suddenly by suffocation, the collateral evidence must establish the instrumentality by which the act was done. In cases where marks of other violence are found upon the body, or the hands and feet are tied, these facts will,

of course, require an interpretation from the medical witness. When a dead body is discovered in sand, earth, ashes, or similar substance, the question whether the person was alive or dead when placed there, must arise. From experiment and observation, M. Tardieu concludes that if the substance has reached the œsophagus or stomach, it must have been during life; and that if the body was buried after death the substance will seldom penetrate beyond the entrance of the mouth and nostrils; some traces of it may occasionally be found in the fauces, and quite exceptionally in the air-passages, but in the œsophagus and stomach, never.

§ 897. II. *Accidental suffocation*.—M. Tardieu distributes cases of suffocation into four groups: 1. When the mouth and nostrils are obstructed by the hands or other foreign body; 2. When death is produced by pressure upon the chest or the abdomen; 3. Burial in earth, sand, ashes, snow, etc.; 4. Inclosure in a narrow space, as a box or closet, etc. The modes in which accidental suffocation occurs are very numerous. They bear, however, only upon the question of survivance. In those cases in which persons are buried alive under banks of earth, covered up in the ruins of falling houses, or in any way confined in a narrow space in which the air becomes unfit for the sustenance of life, they perish by suffocation.

§ 898. Those, however, in which a foreign body becoming impacted in the air-passages causes death by suffocation, are more important, because the cause of death is not at all suspected. This accident happens usually from over-haste in eating, but an instance has been reported in which it occurred probably during the act of vomiting. The case was an unusual one, from the fact that the man who fell a victim to the accident was entirely alone at the time of his death. Hence, a suspicion of violence might have been entertained, had not the evident cause of death, the vomited food, been found in the larynx.^(o) A case of fatal asphyxia has occurred from the

(o) Henke's *Zeitseh.*, 1853, 4 II. A similar case may be found in the *Ed. Med. and Surg. Journ.*, April, 1844, p. 390, and a more recent one, in the *Lond. Times and Gaz.*, April, 1859, p. 419. In a case related in the *Lancet* (March, 1850, p. 313), a person having died suddenly after eating, previous

detachment of a diseased bronchial gland which became impacted in the larynx,^(p) and another, in which a lumbricus ascended from the stomach and entered the larynx.^(q) A case is recorded of a child,^(r) three years of age, who while eating her dinner was suddenly seized with symptoms of suffocation, the face becoming turgid, the lips livid, and the respiration seemingly arrested. A probang was passed to the stomach, and tracheotomy performed, but no reaction took place. On examination after death, a constriction of the lower part of the œsophagus, reducing its calibre to that of a quill, was found, but the stomach was filled with food. The vertebræ from the fifth to the ninth dorsal were softened or broken down, and the corresponding portion of the spinal marrow was surrounded with scrofulous matter. In this disease the cause of the suffocation probably originated, but its mode of action cannot be explained. The case, however, supposing it to be accurately reported, presents a mode of suffocation hitherto without example. Children are peculiarly liable to suffocation from the introduction of peas, marbles, etc., into their mouths. In the great majority of these cases, however, as well as in those of sudden death from diseases which leave the aspect of suffocation upon the body, the cause of death will be known, and no examination required. Cases also sometimes occur in which persons, helpless from age, infirmity, or intoxication, are found with their face buried in dust, snow, and other such substances. The cause of death is here self-evident, since the slightest effort would have enabled the person to escape. Still another form of accidental suffocation may be mentioned as occurring to young children, in being overlaid by persons with whom they sleep.^(s)

to which he had been engaged in a scuffle, the man with whom he had been fighting was arrested on a charge of manslaughter. A post-mortem examination disclosed the cause of death to be a piece of meat wedged in the throat. The prisoner was therefore discharged.

(p) Edwardes, *Med.-Chir. Trans.*, xxxvii. 151.

(q) Aronsohn, *Arch. Gén.*, October, 1855, p. 475.

(r) *Times and Gaz.*, July, 1855, p. 88.

(s) The Prussian penal code provides punishment by imprisonment for mothers and nurses who take children under two years of age to bed with them.—*Casper*.

§ 899. III. *Suicidal suffocation*.—The possibility of suffocation being made a voluntary act, is undoubted; but this mode of suicide must be extremely uncommon. The only manner in which, without the aid of others, it has been accomplished, is either by an alleged retroversion of the tongue (a power which few if any possess), or by a mechanical obstruction of the mouth and fauces, with various articles. In the latter case, the presumption will, of course, be in favor of homicide. Several instances of the sort referred to are related by Dr. Taylor, who also quotes the remarkable case of a woman who placed herself in bed under the bedclothes, and desired her young child to pile several articles of furniture upon her. When found, some hours afterwards, she was dead.

§ 900. One of the most remarkable cases of suicidal suffocation occurred in Germany. It is related by Dr. Roth, and the following is an abridgment, in the Lond. Med. Gaz., from the original, in Henke's Zeitschrift:—

The deceased was well formed, about the middle height, and about 25 years of age. She had been seen to retire to her sleeping-room, at nine o'clock one evening, in her usual state of health and spirits. The apartment was only separated by a partition from the one in which her master and mistress slept, and was over a room occupied by others of the household. At half-past five o'clock in the following morning, the master knocked against the partition to awaken H., but, receiving no answer, supposed she had risen and gone out to her work. On getting up, however, he found all the doors and windows of the house closed, when he went into the servants' room, but did not find her there. On the bed was an axe of a peculiar shape, employed in that part of the country for clipping off branches from the trees, and which used to hang behind the door. The blade of the axe rested against the back of the bed, and the handle on the bed. Beside it lay the best bonnet, which she used to keep in her chest. The bed appeared to have been slept on. After searching the well, lest she had drowned herself, H.'s father was sent for, from a neighboring village. On his arrival, he suggested that the chest should be opened to learn in what trim his daughter had left the place. Finding the chest locked, and the key missing,

a blacksmith was got to force it open, when the body of the servant was discovered in the chest, lying in a prone position, on the left side, with its knees drawn up, the upper extremities flexed, and the missing key grasped in the right hand. The chest was about four and a half feet in length, and of proportionate depth. It locked itself on the fall of the lid, and could not be opened from the inside. The corpse was nearly dressed, and the vest (camisole) was put on with its inner side out. On the following day, the body, which had been removed and laid on a bed, was viewed by the reporter. The cuticle was abraded and reddish-brown at seven or eight points, about the centre and upper part of the forehead. The largest of these abrasions corresponded with the thick part of the axe, and underneath them, the integuments were slightly swollen and bluish. The face and upper part of the chest were mottled with cadaveric lividity, the ears were blue, the eyelids closed, the conjunctiva injected, and the pupils dilated. There was bloody froth about the lips and nostrils, partly dry, partly fresh, and giving this part of the face a blood-stained appearance. Bloody froth was issuing at the time from the right nostril. The mouth readily opened, showing the tongue in its natural position. The key was still grasped in the right hand. With the exception of the abrasions on the forehead, no traces of injury were detected on the body. The clothes were entire.

§ 901. From the foregoing circumstances, the reporter was of opinion that the deceased had employed the axe which hung in her room, to kill herself, in the way she had seen others slaughter oxen, and that, failing in the attempt, and, perhaps, ashamed of the injuries on her forehead, she had then shut herself up in her chest, and perished by smothering. This conclusion satisfied the law authorities so completely, that they decided that there was no necessity for making a *post-mortem* inspection.

Dr. Wossialo relates the following remarkable case: A young woman about 20 years old, who had given birth to an illegitimate child seven days before, died suddenly. Poisoning was suspected, but this was negated by the autopsy.

The signs of death, however, by suffocation were very distinct. The eyes protruded, the face was swollen, the tongue projected between the lips. The outer surface of the neck was in vain examined for any sign of strangulation; but a large ball of hay, the size of a goose's egg, was found in the throat, reaching down into the pharynx at the back of the larynx, and just visible when the mouth was widely opened.

There was no doubt that this was the cause of death; the question was whether the case was one of suicide or murder. She had just left the room in which were several persons. The mistress of the house went out to seek her, and saw her standing on the floor of a hay-loft, and noticed that she trembled and breathed with difficulty. When the girl was asked what was the matter, she made no answer. The woman, therefore, called her son, and they got her down through a hole in the floor of the loft, and led her indoors. Several women were present, and they thought she was in a fit; she was blue in the face, trembled in the hands and feet, rolled her eyes, and from time to time opened her mouth as if gasping for breath. After about a quarter of an hour she died.

In spite of the improbability of the thing, there was no doubt that this was a case of suicide. There were no marks of violence, and the people in the house heard no cry. She had also full opportunity of calling attention to the cause of her sufferings when she was first found standing in the loft.^(s¹)

§ 902. IV. *Homicidal suffocation*.—Those who are usually the victims of this form of murder are infants and the aged, or those who are otherwise helpless. So slight a degree of resistance is necessary to defeat the purpose of the assassin, that a great disproportion of strength must exist for the attempt to be successful. Nevertheless, those miserable wretches, Burke and his accomplices, reduced murder by suffocation to a system, choosing it as the mode of death most likely to leave no marks of crime behind it. The murderer bore with his whole weight upon the breast of his victim, and with his hands covered forcibly the mouth and nostrils till death came on.

(s¹) Vjhrschrift. f. ger. Med., N. F. I., p. 293; Year-Book of Med. and Surg., 1864, p. 458.

The body of one of the victims presented, according to Dr. Christison, so few traces of injury, that without the assistance of proof from other sources, it would have been impossible to have declared that the death was not a natural one. In a case related by Dr. Casper, the body of a rich old lady, who lived in one of the most frequented streets of Berlin, was found one morning, in her bed, her head buried among the pillows, and heaped over with bedclothes. Her hands were tied fast behind her back, and her legs bound together by a band, including also her underclothing. The room being warm, the body was rapidly decomposing, the head was blackish-green, and the epidermis was loose. At the same time the eyes were prominent and injected, and the tongue swollen and protruding. Some marks were found upon the neck, which, being hard and distinct in color from the surrounding skin, were thought to indicate an attempt at strangulation. Everything was in the greatest disorder in the chamber, the drawers and cabinets being rifled of their contents. The opinion of the examiners was that death resulted from asphyxia, produced both by strangulation and suffocation.(t)

(t) The following is an extremely interesting case in this connection ; it is reported by Dr. Charles A. Lee, in the N. Y. Journal of Medicine, July, 1844 :—

A case of trial for murder, by *suffocation*, lately came before the Court of Oyer and Terminer of the City of New York, Judge William Kent presiding, in which William Leitga, the prisoner, was accused of thus destroying his wife, and afterwards setting fire to her bed, by which the body was considerably burned before the fire was discovered and arrested. It appeared in evidence that they had lived very unhappily together, both being addicted to habits of intemperance, and had been quarrelling at one or two o'clock in the morning on which the fire took place (it being discovered about six o'clock). The deceased was found lying on a cot, a little on her right side, with a large pillow over her feet, but not covering the whole head : the arms bent up and lying across the breast under the pillow, which was partly burnt—her limbs were burnt to the knees, and also her right arm, the rest of the body not much burnt—the countenance was distorted, the eyes open, and the tongue protruded from the mouth nearly an inch. The cot on which she lay was about four feet from the stove ; there was no appearance of fire between the cot and the stove ; but everything showed that the fire had commenced at the foot of the cot and worked up ; an empty lamp lay on the floor about three feet from the foot of the cot ; bedclothes were lying about the room, and everything indicating that there had been a violent quarrel. As the tes-

§ 903. Still another circumstance under which death may be accomplished by suffocation, will be found in some cases of

timony of Dr. Rogers contains the principal facts in the case, we present it in detail:—

Dr. James L. Rogers testified, that he “saw the body about 8 o'clock in the morning of October 29th, 1843; the body was slightly inclined to the right; the arms were up, inclining to the breast, but not on it; the lower part of the right arm and hand were burnt to a crisp; the hair was burnt off the top of her head; the left cheek was burnt on a place about as large as half a dollar; the transparent part of the left eye was scorched; the body was burnt across the stomach down; below the knee the flesh was burnt almost entirely off—above the knee to the abdomen, it had the appearance of a ham being smoked; there was no burn on any other portion of the body except the left ear; the mouth was not burnt; the tongue protruded; the countenance perfectly calm; no mark was perceptible about the neck or any other place, except a small flesh wound in the right side of the eye. On dissection, the brain was found perfectly natural—stomach also healthy, containing about two spoonfuls of liquid matter; the bowels were perfectly healthy, as were the kidneys, except that they all appeared somewhat congested; the lungs and heart were healthy, but the vessels of the lungs were deluged with dark venous blood, as was the right side of the heart; the left side of the heart was nearly free of blood.”

The District Attorney asked, What was his opinion of the cause of death?

Witness: “In the absence of all natural causes, of which there were none, I should say she died from stoppage or prevention of air from the lungs; it may be called *suffocation*: the same appearances would be produced, either by the breath being stopped by something placed over the nose and mouth, or by drowning. I observed no appearance of intoxication; I think I never examined a body where there was a more healthy appearance than that presented. Where there is a dense smoke of carbonic acid gas from the burning of charcoal, the same appearances of the lungs and heart would exist in some measure, but not so fully, as the air in such cases continues partially to have effect. The fact that one eye was burnt, the placid state of the countenance (this was denied by other witnesses who first saw the body, and can hardly be presumed from the protruding of the tongue, etc.), and the position in which she lay, led to the conclusion that she must have died before the fire. The probability is, that, if the person had been alive when the fire reached her, she would have shut her eyes, and one of them would not have been burnt. There was no blister in the eye, as there would have been, had it been burned during life. There was also no red line on the body to where the fire came, which is also a very certain sign of burning before death.”

Cross-examined: “In the case of a person who dies of suffocation there is a congestion of the brain; the eyeballs are distended, and there is at all times” (in drunkards dying thus) “a smell of alcohol in the stomach and brain.”

Mr. Brady asked the witness, If a person got intoxicated and in a position

rape. An instructive example of this kind will be found in the following German case. In it, the subsequent confession of

to prevent respiration, whether the same appearances would not be presented as in the present case ?

Witness : " It would depend upon this position. If the head was down and respiration stopped, there might be a paralysis ; it is very difficult for persons to suffocate themselves. If paralysis did occur from intoxication, the brain would show it ; but there was no appearance of the kind in the present case at all. There was hardly the usual quantity of water in the brain."

Brady : " Could not this woman have got so beastly drunk, that she might have got in a position to suffocate ?"

Witness : " Such might have been the case, but it would show itself in the brain."

Brady : " Would you say, that she did not go to bed drunk that night ?"

Witness : " In the absence of all appearance or symptom to that effect, we were induced to believe that there was nothing to justify a supposition of the kind. If a person died of intoxication, the brain would show it, and in persons habituated to intoxication, there would be a morbid appearance about the stomach and lungs—a bloated countenance, and other marks which would distinguish it. Suffocation and apoplexy present different appearances after death ; in the first case the lungs cease their functions for want of air, yet the blood passes to the brain and returns, as there is nothing in the neck to prevent it ; but in apoplexy or strangulation, as in the case of a cord round the neck, the blood stops and the brain exhibits the effect. In suffocation, the breath may be stopped in a minute or half a minute, so that a person would cease to struggle, and in ten minutes be dead. There was an indentation of a key on the left breast of the deceased, which might have been made by a heavy arm pressing on it."

Dr. Putnam testified to nearly the same effect. He said : " That none of the viscera exhibited any marks of intemperance ; that if death had been so caused, the brain, stomach, and countenance would show it ; the brain particularly would be congested. In death by strangulation, there would probably be proof of violence perceptible about the neck, and the tongue would ordinarily protrude ; it generally produces apoplexy. Suffocation may be produced by stopping the respiratory organs, or by inhaling gases. To distinguish which of these causes, one must know the attending circumstances. A person dying of suffocation by inhaling carbonic acid gas would exhibit some change of countenance. I saw nothing in the body externally or internally, that could account for death. Taking everything into consideration, I conclude the death to have happened from suffocation. A pillow laid over the nose and mouth produces such death in two or three minutes, without external marks. I believe the fire to have been communicated to the body after death."

Cross-examined : " My opinions have been formed from reading ; never attended but four post-mortem examinations ; never of one who died from suffocation from any cause. Congestion of the brain would certainly be

the criminal confirmed the accuracy of the opinion given by the medical officer, which was, that after a struggle the woman

found after death from intoxication ; so would also inflammation of the stomach. Post-mortem examination was made at 11 o'clock A. M. Stomach appeared as if she had not eaten for six or eight hours ; had she gone to bed drunk at one or two o'clock the night before, should expect to find evidence of the fact. I should not expect to find a morbid state of the stomach in the case of a person who drank *moderately*, that is habitually, but not to intoxication ; never read of a case of strangulation without marks of external force ; whether the tongue protrudes or not, depends upon the peculiar way in which the exterior force is applied. Suffocation may happen accidentally, by getting into a position in which it is impossible to breathe ; this is the case often with infants ; it is not impossible that this might occur in the case of an adult, in a case as helpless as a child, but the probability is against such an occurrence. In the case of a person in a room where there was smoke, or gas, or corrupt air of any kind, a drunken person's death might be much expedited. In cases of death by noxious gases, the tongue is usually more or less protruded, and there is more or less frothy appearance about the mouth. In ordinary suffocation, not by gases, etc., it is rare that the tongue protrudes ; in cases of violent suffocation it is not common ; difficult to say, on a post-mortem examination, whether the person died from violent or accidental suffocation."

Physicians, as usual, were called on *behalf* of the prisoner, and some conflicting if not opposing opinions were advanced.

Dr. Archer (Coroner) : "Thought that the burns had been inflicted after death ; saw the stomach, thought it did not look entirely healthy, as there was a turbid appearance of the vessels, showing that it had been a good deal stimulated. There was no pink margin around the burns ; never found an exception of death from burning that there was absence of the pink margin ; did not consider it a sign of suffocation that the tongue protruded ; thought the eye was burnt after death. In death from carbonic acid the countenance is generally placid, and it is not common for the tongue to be protruded ; the brain and lungs are more or less congested ; if there are no external marks, no person can say positively whether the persons died from natural causes or from violence. If a person dies after a debauch, I should expect to find evidence of it in the brain or stomach. It is impossible to say how long after a person has been drinking, its traces would be lost from the system ; when the effect is gone, however, the liquor is gone."

Dr. Ranson testified that "he had attended post-mortem examinations in cases of death from suffocation, and lately, where two persons were suffocated by charcoal ; their countenances were swollen, and the eyes somewhat protruded ; there was a distortion of features (one more than the other, as the patient lay on his face) ; in cases of suffocation, the brain is generally congested and the blood blacker in the different vessels than in ordinary cases, and the lungs more or less congested ; countenance more or less distorted ; in such cases should judge more from the blood in the arterial sys-

had been overpowered and forcibly compelled to submit to the desires of her ravisher; who at the same time held his hand over her face to prevent her crying for help. In doing so, however, he had, according to his own story, unintentionally suffocated her. The body of the deceased, in this case, presented the signs of asphyxia in a marked degree, the face being purple and turgid, the eyes injected, the lips and tongue swollen and livid, and the fingers convulsively clenched. The lungs were perfectly black with blood, and so distended that, upon incision, the blood escaped in profusion; the vena cava and right side of the heart were also gorged with dark, but *coagulated* blood. The cerebral veins and sinuses were not remarkably full. If the crime had in this instance been unconnected with rape, it is probable that some marks of violence would have been found, but the weight of the man's body, no doubt, as well as other causes, contributed to the ease with which the suffocation was accomplished.

§ 904. A curious case of suffocation, unintentionally pro-

tem, than from the brain; there is no particular condition of the heart, except there is black blood."

The testimony of Dr. Middleton Goldsmith was to the same effect.

In summing up the case, Mr. Warner, the counsel for the accused, among other remarks, said, that the medical testimony did not agree, and that it was filled with doubts and uncertainty. "The positiveness," he observed, "with which medical men give their testimony, is to be ascribed to the care they have of their own reputation in their profession, and to the fear they have of seeming ignorant of their profession. These witnesses disagreed as to the indications of intemperance presented by the stomach of the deceased. Dr. Archer alone said any. The fact will appear abundantly that she was very intemperate," etc. Mr. Brady quoted from Beck's "Medical Jurisprudence," where it is stated that most physicians are not competent to make post-mortem examinations, and hence argued that those who made the dissection in the present case were probably incompetent! Judge Kent, in his charge, came to the conclusion, after a full recapitulation of the testimony, that, first, *nothing positively certain was shown as to the cause of death; and, second, nothing positively excluded the idea that it was occasioned by suffocation—the probability being in favor of the latter.* The judge also instructed the jury that unless they found the death was occasioned by *smothering*, no matter in what way effected, they could not find the prisoner guilty; although they might come to the conclusion that the deceased perished from burning, or in some other manner, not stated in the indictment, and by the hands of the prisoner. *Verdict—Not guilty.*

duced, is given in the *London Lancet*. A lad, eighteen years of age, was, by way of a joke, forced head downwards into a sack containing about a bushel of bran, by two of his fellow-laborers on the farm. According to the testimony of one of the parties, who were at the same time the perpetrators and the only witnesses of the outrage, the mouth of the sack was tied with rope-yarn, round the legs of the lad. This was almost immediately cut, and the boy released from the sack. He was reported to be black in the face and frothing at the mouth, but became sufficiently sensible to drink a small quantity of water. He breathed, however, with great difficulty, remained insensible, and lived only twenty minutes after being extricated from the sack. Upon post-mortem examination, it was found that sixteen hours after death the thorax and abdomen retained a considerable degree of warmth. At the bifurcation of the trachea a large quantity of bran was found; the left bronchus was entirely filled with it, and the right nearly so, and their subdivisions, as far as they could be traced into the substance of the lungs, were full of the same material.^(u)

§ 905. The following interesting and curious case occurred at Edinburgh in 1855: Janet Stewart, between 60 and 70 years of age, lived in the family of her niece, consisting of three adults and a child besides herself. All were grossly addicted to intemperance. Janet was found dead with a contused and lacerated wound of the scalp, extensive emphysema beneath the skin of the trunk and in the chest, and seven ribs of the left side fractured. The face was pale and slightly swollen, the features composed, the eyelids shut, the lips nearly closed, and the tongue slightly protruding. On examining the neck, a hard mass was felt at the back part of the throat, which proved to be the cork of a quart bottle, tightly inserted into the upper part of the larynx, the sealed end being uppermost. It was covered with a frothy brown mucus. The epiglottis, larynx, and trachea were considerably injected. The last with the bronchia presented a bright florid appearance, and their

(u) Another case in many respects similar to this one is reported by Raymond and Devergie. *Ann. d'Hyg.*, July, 1852.

whole surface was coated with mucus. By experiments on the dead body it was ascertained that when a cork, such as had here been found, was pushed along the mouth against the cervical vertebræ, the upper end was forced backwards, while the lower end was tilted forwards, and by continuing the pressure made to enter the larynx. It was hence concluded that the attempt to kill indicated by the wound of the scalp, and the fractured ribs, had been successfully completed by suffocation by means of the cork, the frothy mucus around this body and the redness of the mucous membrane proving that death had not immediately followed its introduction. One of the party, who was indicted on the testimony of the rest as the author of these outrages, was tried. The jury returned a verdict of "not proven;" but a few weeks afterwards a body believed to be that of the prisoner was found floating in the Clyde.(v)

In infants, murder by suffocation is undoubtedly very common, it being very rapidly effected, and leaving no characteristic traces behind it. Death, thus criminally produced, has often been attributed to convulsions.

§ 906. It is a common habit among nurses, in order to quiet a child, to thrust into its mouth a bag made of rag or wash leather containing sugar or crushed crackers. The infant is thus generally pacified, and, the mouth being filled with the bag, it breathes chiefly through the nostrils. If by any accident these should be obstructed or by a sudden act of inspiration the bag should fall back into the throat, death by suffocation must result, unless prompt assistance be rendered. Should this occur through the carelessness of the nurse, she may remove every trace of the cause of death by taking the bag out of the mouth.(v¹)

(v) Edinb. Med. Journ., i. 511.

(v¹) Dr. Taylor states that he knows of but one instance in which it gave rise to a criminal charge. (Reg. v. Cox, Warwick Lent Assizes, 1848.)

CHAPTER IX.

STRANGULATION.

- I. Cause, § 907.
- II. Marks, § 908.
- III. Period, § 910.
- IV. Accidental, suicidal, or homicidal, § 911.

§ 907. THE *causes of death* in simple strangulation, as in that which is complicated with suspension, are an interruption of the access of air to the lungs, by pressure upon the wind-pipe, and congestion of the brain from the impeded return of the blood to the heart through the jugular veins. The first of these causes is in hanging the efficient and principal one, but in strangulation, owing to the more complete constriction of the neck, especially where a cord is used, the cause last mentioned certainly greatly accelerates the fatal result. The constriction varies with the band and its adjustment. Sometimes a rope is used, sometimes a handkerchief, a strap, a ribbon, or a strip from the bedding or some article of clothing. Sometimes it is wound several times around the neck, in others twisted like a tourniquet with a spoon, knife-handle, or some similar body. But throttling by the hand is by far the most frequent mode in which the violence is employed, especially in cases of homicidal strangulation. The aspect of a person who has been strangled resembles, therefore, more closely that which was formerly described as characteristic of hanging, viz., a livid and swollen condition of the face, staring eyes with dilated pupils, and protruded tongue. The swollen features, the neck, chest, and eyes are studded with minute ecchymoses which are very characteristic of death by strangulation, when they exist, and they do so whenever the violence applied has been great and the struggle protracted. The other and internal post-mortem appearances are sometimes incorrectly said to be those of death by asphyxia. The lungs and right

cavities of the heart are not usually filled with dark fluid blood, the abdominal organs and especially the liver and kidneys are not congested, and the mesenteric veins and the vessels of the head are not always engorged. M. Tardieu states that an intervesicular emphysema resulting from a rupture of the pulmonary vessels is an almost constant phenomenon. It gives the surface of the organs the appearance of being studded with very white pseudo-membranous spots of variable dimensions. Sub-pleural ecchymosis, which is characteristic of suffocation, is not met with, but in its stead apoplectic nodules in the tissue of the lung measuring from half an inch to an inch and a half in diameter. If death have been caused by suffocation combined with strangulation, punctated ecchymoses under the pulmonary pleura will be found in addition.^(w) In young children much reliance is placed by Dr. Casper upon the existence of petechial ecchymoses upon the pulmonary pleura, the heart, and aorta. Actual extravasation of blood upon the brain is, however, of very rare occurrence, if, indeed, it ever appears as a direct result of the strangulation. This fact is of considerable importance in many cases, since in death by apoplexy, the turgor and discoloration of the countenance may occasionally lead to a suspicion of homicidal strangulation, especially if any questionable traces of constriction be discovered upon the neck.

§ 908. II. *Marks of violence upon the neck.*—These are far more evident and important than in hanging, because in homicidal strangulation more force usually is employed than is necessary to accomplish the object of the murderer. If the strangulation have been effected with the hand, the marks of the fingers will be found upon the front of the neck; and sometimes by the form, number, and arrangement of the marks it is easy to determine which hand was used to make the constriction. If by a cord or other ligature, the mark will be nearly horizontal, more or less distinct, and generally ecchymosed. The differences between the slight marks produced by strangulation, as compared with those caused by hanging, depend upon the continuity of action of the compressing

(w) Annales d'Hygiène, 2ème ser., xi. 133.

cause in the latter case, and also in some cases, as in those of infants and aged persons, upon the small degree of force required to arrest the breathing. Subcutaneous extravasation is not always found. In a case of suicidal strangulation examined by Dr. Casper, in which the ligature consisted of a pack-thread wound thrice around the neck and tied fast over the larynx, the mark was but slightly depressed, and only consisted of a single line, broad, white, and here and there tinged with blue.(*x*) The subjacent parts will present traces of injury corresponding to the violence which has been used. The condition of the more deeply seated organs of the neck cannot be at all inferred from the state of the skin which covers them. M. Tardieu has shown that, even when no external bruise exists, effusion of blood may be discovered beneath the skin, among the more deeply seated muscles, and even upon the larynx and trachea, or, if the hand has been used to effect the compression, the effusion may extend to the upper part of the neck and the chest. Two cases are referred to below in which the ossified thyroid cartilage was fractured, but these lesions are unusual. The interior surface of the larynx and trachea is usually congested and of a uniformly red or violet color, and bathed with frothy and bloody mucus which extends also to the smaller air-tubes. We are not acquainted with any case in which laceration of the carotid artery has been found after death by homicidal strangulation. But as this lesion can be produced by imitating strangulation on the dead body,(*y*) it is also probably one of the occasional effects of the homicidal act.

§ 909. The distinction of the signs of apoplexy from those of strangulation consists essentially in this, that in the former none of the derangements which have been described of the parts beneath the skin can be detected. The proofs of strangulation are also different from those of hanging. This distinction is important chiefly when a dead body is found suspended; for it must be remembered that this position generally denotes suicide, while strangulation ordinarily indicates death by

(*x*) Gericht. Leich., 2tes Hund. 1854, Fall. 59.

(*y*) Simon, Virchow's Archiv., xi. 297.

homicidal violence. The cases most apt to be confounded are those in which strangulation has been effected by a cord or similar constricting band. The obliquity of the mark has been generally insisted upon as proving death by suspension. But, when the whole weight of the body has not exercised its traction, this sign may fail, and, on the other hand, the complete circular mark is often wanting even where strangling has been the cause of death. In the latter case, also, the constricting band or cord leaves a comparatively slight impression, while in the former a deep furrow is produced. But in strangulation the injuries to the soft parts beneath the skin are very marked, while in hanging they are comparatively slight as a general rule. The discharge of feces, urine, and semen, which has been regarded as peculiarly the effect of death by hanging, may result from almost any form of violent death, and occurs in many forms of natural death when the bodily vigor is not greatly impaired.

The signs of death by strangulation differ from those of death by suffocation, in this, that the latter are observed about the nostrils and the mouth, and not upon the neck; but in many cases the evidences of both forms of violence will be found combined.(z)

§ 910. III. *Was the strangulation effected before or after death?*—This question is one of inferior practical importance. The object of any one, in applying a ligature around the neck after death, would be, of course, to convey the idea that the person had committed suicide. As, however, this mode of self-destruction is extremely uncommon and usually attended with circumstances which betray it, the presumption, in the case of a person found strangled, is that the deed was committed by another. Hence the probability of suicide, which obtains in hanging, from the frequency with which this mode of self-destruction is chosen, is, in cases of strangulation not to be entertained, unless direct or circumstantial evidence supports it. Moreover, the cases in which it may be possible to admit the suspicion of suicide, are not those in which any doubt can be entertained, because, if the cord have been

(z) Tardieu, loc. cit.

placed upon the neck merely for the purpose of concealing the fact of murder, the means by which life really has been taken will not fail to be revealed. Thus, marks of fatal violence will be found upon some part of the body, or traces of poison in the stomach. Yet, if any doubt should still remain of the truth of these considerations, it only remains that the signs of death by strangulation cannot be closely imitated after death. We have seen above, that, when death has resulted from this cause, not only will the marks of the fingers or of the constricting band be found of various depths and of different degrees of discoloration, but also that the aspect of the countenance taken in connection therewith as well as the internal signs of death by asphyxia will indicate the mode of death. Although the experiments made upon dead bodies by Dr. Casper show that if the attempt to imitate the mark of strangulation were made six hours after death, it would be unsuccessful, yet, as the attempt would most probably be made *immediately* after death, and even before life was quite extinct, it is evident that any satisfactory conclusion can be drawn only from an examination of the mark, *in connection* with the other signs of asphyxia. These cannot be produced after death, and we may, therefore, be certain where we find a mark indicating strangulation, and, at the same time, the face purple and congested, the tongue protruded, the eyes prominent, and the other indications of death by apnœa, that the individual has been strangled during life. This will lead us to the question—

§ 911. IV. *Was the strangulation accidental, homicidal, or suicidal?*—A few cases of accidental strangulation are upon record. Dr. Taylor relates that a girl was accidentally strangled in the following way: “She was employed in carrying fish in a basket at her back, supported by a leathern strap passing round the forepart of her neck, above her shoulders in front. She was found dead, sitting on a stone wall; the basket had slipped off, probably, while she was resting, and had thus raised the strap, which firmly compressed the trachea. A similar case is recorded by Watson (Homicide).” Should the body not have been removed from the position it occupied at the time of death, and if the evidence of veracious and disinterested

witnesses relative to this fact can be obtained, there will seldom be any hesitation in admitting the possibility of the accident.

The allegation, may, however, be made for the purpose of concealing crime. A person, who, in a state of helplessness from intoxication or other cause, has fallen into a position in which his throat becomes compressed by a tight cravat, may possibly thus die accidentally of strangulation. But if marks of constriction be found upon the neck, it is much more probable that they were caused by criminal violence than that they were due to accident. As in courts of law undue stress, medically speaking, may be laid upon the possibility of strangulation marks being accidentally produced, the medical witness will do well to compare closely the impressions upon the neck with the ligature supposed to have produced it, as in many cases an important and conclusive discrepancy will be found.

§ 912. *Suicidal strangulation.*—Were there not a sufficient number of well-attested cases of suicide by strangulation upon record, it might fairly be doubted whether it were possible for persons voluntarily to destroy themselves in this manner. But the annals of legal medicine abound with examples of the most determined tenacity of purpose, and the most singular choice of modes of death upon the part of suicides. Without dwelling upon this fact, it may be stated that in this mode of death an infirmity of purpose is less likely than in many others to frustrate the intentions of the suicide. Unconsciousness steals in such an insidious but rapid manner over the senses, that the will and power to escape are speedily lost.

The ligature used by those who thus destroy themselves is generally chosen from those articles of dress which lie nearest at hand, as cravats, garters, and the like. The knot will most probably be found in front, or a little to the side, and the mark left will convey the idea of less violence than will that made in homicidal cases, where no other injury has been inflicted. The question often arises, says Casper, whether the mark upon the neck has been caused by a certain instrument which is supposed to have been used. This question it is not always easy to answer. It is true that hard, rough substances, cords, etc., usually produce excoriations, which is seldom the case with softer ones. It is also true, as a general rule, that

the breadth or diameter of the mark upon the neck corresponds to that of the instrument used. But many exceptions occur to these rules. The instrument may be of a soft texture, and yet have rough edges; it may be twisted, and the sides press against the neck, etc. Some light may often be thrown upon cases of murder or suicide by hanging, by observing what kind of a knot is tied in the ligature, as it is known that different classes of tradesmen are in the habit of tying knots in a way peculiar to themselves.

§ 913. A remarkable instance, showing the rapidity and ease with which self-strangulation may be effected, is the following. A gentleman was placed in a private insane asylum. His relatives desired the superintending physician to use every endeavor to prevent him from committing suicide, as he had repeatedly attempted it. In consequence of this request, two attendants were placed near him. Fatigued with the long journey he had made, the patient desired permission to retire to bed; the two attendants remained at his bedside. A short time after, at his pressing solicitation, these men were directed to leave his bedside, but still remained in the room, keeping a close watch upon him. In two hours afterwards the physician paid a visit to his patient. The attendants remarked that he had been and was still sleeping quietly, and had not stirred. Upon approaching the bed, however, and proposing a question to the gentleman, no answer was received, and, to their horror and surprise, he was found to be dead. He had torn a strip from the bottom of his shirt, rolled it into a cord, and simply tied it around his neck.(a)

Mr. Pollock, in his evidence in the case of *Drory*, gave the following case: "Pizzala, an Italian, about fifty years of age, employed as a porter, was found dead in the forenoon of the 3d of January, 1851, in an attic of the house of his employer. He had been missing from his employment thirty hours. When found, he was lying on his back, rather inclining to the left side, with a piece of ordinary sash-line coiled *four times* around his neck, two of the coils so tight and imbedded therein that there was some difficulty of undoing it. The

(a) Ann. Méd.-Psycholog., tome iv. p. 113.

right hand held one end of the line, and the left hand the other, with a turn of line around each, to hold it the more securely. The right arm was extended, the left flexed. I made a post-mortem examination of the body on the fourth day after it was found. Externally, the face was swollen and purple, the vessels of the conjunctivæ were injected, the tongue protruded towards the left side, bloody froth issued from the mouth, and the lower jaw was slightly twisted to the left side. The skin of the neck was abraded in a nearly continuous line around it, about five-eighths of an inch in width, and presenting the appearance of being produced by two coils of the line. There was considerable ecchymosis above and below the line of abrasion. Each hand retained the impression of the line being coiled around it. *Internally*, the vessels of the brain and its membranes were greatly congested. The evidence before the coroner left no doubt of this having been a suicidal act. This case proves that a person may strangle himself, and that he may accomplish strangulation by pulling the two ends of a cord coiled several times round the neck; and that some degree of local violence to the neck may thus be produced by the ligature used.”(b)

Prof. Tardieu gives in the *Ann. d'Hyg.* (xxi. p. 415) a long account of the case of M. Arnaud, of Montpellier, a trial which excited the greatest interest in France and in England. On July 7, 1863, Maurice Roux, a servant of M. Arnaud, was found lying in a cellar in a state of asphyxia, with a cord round his neck and his feet and hands tied. He rapidly recovered, and in less than three hours was quite well, except that he was mute, being unable not only to speak, but even to groan or to produce the slightest sound.

The next morning he gave by signs a description of what had occurred. According to this statement, his master, M. Arnaud, came into the cellar, gave him a blow behind the head and afterwards strangled him and tied his hands and feet. This took place about 8.30 A.M., that is to say, eleven hours before he was found by the servant who always went down at that time to fetch some wine.

(b) Taylor, Brit. and For. Med.-Chir. Rev., April, 1852.

M. Tardieu came to the conclusion that this was false, and that M. Roux had fabricated the whole charge.

In forming an opinion as to the truth of the man's statement, it is, of course, of primary importance to ascertain whether the ligatures were so placed that they could not have been applied except by another person. Now, about this there can be no doubt. The cord about the neck encircled that part several times; according to one of the witnesses as many as ten times, while others gave four or six as the number of the turns. It was not fastened in any way. Its position was marked by several sugillations, which were quite recent and superficial and presented no ecchymoses. It is therefore clear that no force was used in applying it; and the numerous turns and the absence of any knot are much more characteristic of suicide than of homicide. The hands were fastened behind the back. The cord by which this was effected was wound ten times around the right wrist, and tied with a knot at each turn. The other hand was encircled with but three turns of the cord, with only one knot. The portion of the cord between the two hands was the length of a finger. It is quite possible, therefore, that Roux may have himself tied up his hands. The cord around the right wrist was tight, and this is of importance, for the hand was not swollen, and this could hardly have been the case if the ligature had been applied for eleven hours.

The state in which Roux was found was extremely critical. His arms and forearms were cold, though his face and head were of the natural temperature. His respiration was stertorous, his pulse scarcely to be felt. His conjunctiva almost insensible. Mr. Surdun, who saw him a little later, says, that his respiration was nearly normal, his pulse feeble, regular, and very slow. His whole body cold, the chest and abdomen being the only parts at all warm. These descriptions are not quite congruous, but they seem to show that the pulse and respiration improved rapidly under the means which were used to restore animation. This renders it probable that the asphyxia was not of long duration and certainly that it had not lasted, as said by Roux, for eleven hours. It is true that the gradual swelling of the tissues beneath the cord might tighten it, and so render

dangerous a ligature which at first produced no ill effects; but it is contrary to all experience that asphyxia should last for so long a time without a fatal termination.

It was stated by Roux that his master stood before him, and gave him a blow with a stick or billet of wood on the neck, which rendered him insensible. M. Surdun examined the neck at the time without finding any injury, but the next morning he observed a small excoriation near the insertion of the right trapezius muscle. With reference to this, three questions were put to the experts, which well illustrate the disadvantages of putting theoretical propositions without reference to the actual case. These questions were: 1. Can a blow on the neck occasion symptoms of concussion ("commotion"), or of syncope? 2. Must a blow on that part be violent, or very violent to produce such symptoms? 3. Must such an injury always leave well-marked traces of contusion, such as ecchymoses? The answers to these questions were: 1. Yes. 2. No. 3. No. Yet, as M. Tardieu observes, it is most unlikely that a blow with a piece of wood, on a part so well protected by a large mass of muscles, should produce severe effects without causing more than a slight excoriation.

It is much more probable that the injury was produced, as a similar one on the chest was no doubt produced, by the fragments of coal which covered the floor of the cellar.

Equally unsatisfactory is the statement of Roux as to what followed the blow on the head. He first described in signs that M. Arnaud tied a cord around his neck, fastened his hands behind his back, and afterwards bound his legs together with a handkerchief. The next morning he stated that the blow rendered him insensible. He even gave a third account, according to which he was stupefied and unable to move or cry out; but it seemed to him that M. Arnaud practised some extraordinary action upon him, and that afterwards he became strangled and bound. He also said that he heard a noise in the adjacent cellars without being able to call out. This state of clairvoyance is certainly extremely improbable as the effect of a blow, and no less remarkable is the state of mutism in which he remained for thirty-six hours after his recovery. He could not speak a word, nor even cry out, nor groan. Yet

he could make gestures, describing the way in which he was attacked. With the aid of an alphabet he answered clearly a long and minute interrogatory. When confronted with his master the play of his countenance indicated his feelings towards him, as well as the perfect state of his consciousness. The next morning his speech suddenly returned. There can hardly be any doubt that the mutism, like the rest of the case, was simulated.

In addition to the paper of M. Tardieu, the opinions of five other eminent physicians are given, expressing full agreement with his conclusions.

M. Arnaud was acquitted in the criminal court, but was afterwards heavily fined when the case was brought before a civil tribunal. This decision has since been reversed by a superior court.^(b¹)

§ 914. We should not expect to find the mark of fingers upon the neck in suicidal strangulation. It has, indeed, been supposed that a person might endeavor to strangle himself with his hand, and, failing in it, afterwards resort to other more effectual means. We have not, however, met with any case which would bear out this view, and must consider such an attempt as highly improbable. In case an intoxicated person should fall into such a position that his cravat or the collar of his shirt impedes his respiration, he may instinctively carry his hand to his throat to remove the constriction, but it is more reasonable to suppose that his effort would be to draw *aside* and *away* from the larynx the collar which was pressing upon it, or unfasten it in any way, than that he should imprint his fingers so deeply in the skin as to leave a visible mark.

An interesting case of suicidal strangulation is related by Dr. Simeons,^(c) in which a sabre was used to tighten the ligature. The latter consisted of a cotton handkerchief tied in a hard knot on the side of the neck. The sabre had been inserted into a loop in front and evidently twisted several times upon its axis, so that the neck became very firmly constricted. The constriction indeed was so great that the sabre

(b¹) Year-book of Medicine and Surgery, 1864.

(c) Henke's Zeitschrift, 1843, H. i. p. 335.

could not be extricated from the loop, until it had been drawn out of the sheath, which was compressible. When the handkerchief was removed, it was found that a broad, deep, and ecchymosed impression had been left, which was still more marked and attended with excoriation in the point corresponding to the knot. The borders of the mark had a parchment-like appearance. The individual was a corporal, remarkably robust in constitution, and destroyed himself in consequence of having been put under arrest for neglect of duty. Collateral evidence rendered the fact of suicide unquestionable. A man about sixty years of age was found in a wood, a napkin around his neck, tightened by a walking-stick twisted through a loop in it. When found, the corpse *was lying on its back, the lower limbs extended, and the arms straight and close by the sides*, the whole as if the body had been laid out artificially after death. There was, however, sufficient evidence that the man had strangled himself.(d)

Mr. Thorpe, in his evidence in the case of *Drory* already referred to, mentioned the case of a man who effected self-destruction in the following manner: "He passed a noose of cord over his head and then inserted a stick, about fourteen inches long, between the cord and his neck. Having done so, he, with the assistance of the stick, twisted the end sufficiently tight to cause almost immediate suffocation. Still, it appeared that there was time for him to insert the lower end of the stick in the inner side of the waistcoat, and the upper end was accurately adapted to the internal jugular vein and carotid artery." Other cases in which a stick was employed are on record. In this way General Pichegru died in prison, and was supposed to have been strangled by the orders of Napoleon. But the case was most probably one of suicide. The question of suicide will, however, seldom rest upon an estimate of the evidence from such circumstances as these alone, but rather upon the absence of marks of violence and other signs of homicidal interference.

§ 915. *Homicidal strangulation*.—The characteristics of homicidal strangulation will be found in the great amount of

(d) Brit. and For. Med.-Chir. Rev., xix. 301.

violence, the marks of which will be seen either upon the neck or elsewhere. The marks upon the neck will be either simply broader, deeper, and more ecchymosed than those which are met with in the rare cases of suicide, or will be attended with other local injury which could result only from the application of a rude and sudden force. A case is related by Casper(*e*) in which there was not only a brownish-yellow groove with reddened edges upon the neck, but also three ecchymosed spots, two at the angle of the jaw on the left side, and one on the right side of the jaw. These could only have resulted from outward compression, and they were supposed to indicate a grasp of the throat by the hand, the thumb leaving its impression on the one side and two of the fingers on the other. Without doubt, the murdered woman had been first seized by the throat, and then, after having been rendered senseless, was strangled by the ligature, the mark of which we have described. In a case communicated to Dr. Taylor by Dr. Campbell, of Lisburn, there was a mark on either side of the larynx under which, also, in the substance of the muscles, coagulated blood was found. The thyroid cartilage, which was partly ossified, was fractured through the ossified portion. The case was clearly one of homicidal strangulation with the hand.

An equally clear case is reported by Dr. Wilson(*f*) The body of a woman, two days after death, presented the following appearances. The right cheek, and the lower part of the neck over the collar bones, were deeply livid; the eyes were suffused and red; there was a circular contusion on the forehead; a hard and parchment-like yellowish-brown mark, about an inch and a half in length by half an inch in breadth, on the left side of the chin, running along the lower margin of the jaw; and another similar mark of nearly equal dimensions passed transversely across the throat immediately over the larynx. There were traces of blood which had flowed from the right nostril. There was an extravasation of blood among the muscles of the neck, and the thyroid gland was largely

(*e*) Gericht. Leichenöffnungen, 1stes Hundert. 1853, Fall. 49.

(*f*) Edinb. Med. Journ., i. 290.

infiltrated. The trachea contained frothy mucus; blood was effused beneath the lining membrane of the larynx, there was a fracture of the right wing of the os hyoides, and the cricoid cartilage was broken in two places. Extravasated blood was found below the left mamma and greater pectoral muscle. The brain was congested. No other lesions existed. The probable interpretation of these facts was that the woman had been felled by a blow upon the forehead, that the murderer had then knelt at her right side, with his face towards hers, and his right knee across her chest, causing the effusion under the pectoralis major muscle; and then, pressing her head to the floor by his left hand on the left side of her chin, producing here another mark, he had grasped her throat with his right hand, and strangled her with violent pressure, either with the hand alone or aided by a ligature. The husband of the woman, who was indicted for her murder, admitted that he was alone with her at the time of her death, which he explained by her falling while intoxicated. The judge objected to the medical evidence that it was "merely inferential," and the prisoner was acquitted! Upon which, Dr. Wilson quotes from Archbishop Whateley: "He who infers proves, and he who proves infers."

MM. Briand and Chaudé quote the case of a woman who was found dead in her bed. Some discoloration of the neck suggested the suspicion that she had hung herself, and that her family, to avoid scandal, had laid her body in bed. But a more attentive examination showed that the bruises were confined to one side of the neck, that the two horns of the hyoid bone were unusually movable, and that the thyroid cartilage was flattened; the cricoid cartilage was also broken across its middle. The brother-in-law of the woman afterwards confessed that he had attempted to violate her, and, in order to stifle her cries, had grasped her by the neck until she ceased to live. He was found guilty of murder.(g)

§ 916. Mr. O. Pemberton (h) relates the following case. A maiden lady, aged 60, who resided alone, was found one evening

(g) Manuel de Méd. Lég., 6ème éd. p. 393.

(h) Lancet, May 22, 1869, p. 707.

about half past six o'clock, lying dead at the top of a flight of stone steps leading to the cellar. The body was still warm. The post-mortem examination was made eighty-eight hours after death. The body was fresh; marked lividity of the middle third of the nose; nasal cartilages torn from the bones, and nose pushed to the right side. Mouth closed placidly; no marks of violence about gums or tongue. Anterior aspect of neck was livid and in places greenish from decomposition. Cricoid cartilage fractured on left side, fracture running through the cartilage in an angular direction, the angle jutting out and pointing to middle line. This and the thyroid cartilage were ossified in a marked degree—the thyroid most. Blood was effused about the crico-thyroid muscle and adjacent cellular tissue. Inside the larynx the mucous membrane was uninjured, but the submucous tissue was infiltrated for a space corresponding to the fracture. Lungs and heart in the condition usually found after death from suffocation. Vessels of brain congested.

Four persons were arrested, one of whom confessed that they had entered the house for the purpose of robbery. A fifth man, who had not been arrested, had been given the old lady in charge, and it was supposed that, in attempting to stifle her cries, he had unintentionally "squeezed her too tight."

§ 917. A very interesting case is related by Dr. Gräff,^(h¹) in which a woman was murdered by strangulation, and the assassin had taken great pains to convey the impression that the act was one of suicide by hanging. The body was found lying close to a door, with a string passed twice around the neck, and fastened in a slip-knot behind. The impression made upon the neck was deep, and, for the most part, of a dark-brown color, particularly on the sides. It was perfectly *horizontal*. The free end of the string looked as if it had been broken. There was a peg in the door over the body, on which a towel was hanging, not in the least disarranged; the peg itself was slight and incapable of bearing the weight of the woman's body. Furthermore, there was no portion of the

(h¹) Henke's Zeitschrift, 1846, p. 145.

string attached to it. An overturned chair lay near the body ; and on a writing-table in the room, a paper was found declaring the intention of suicide, and purporting to have been written and signed by the deceased. It was clearly proved, however, that this document was not in her handwriting, nor correctly signed, and the fact of her having been murdered was abundantly shown by these attempts at deception, other marks of violence upon the body, and the subsequent discovery that robbery had been committed.

One of the most interesting cases of homicidal strangulation is that given by Dr. Taylor, in Guy's Hospital Reports for 1851. The prisoner was found guilty, and before his execution made a confession, in which he stated that he met the deceased by appointment, that they talked and walked about, after which, at her suggestion, they sat down on a bank. She had come to urge him to marry her. He passed a rope, which he had previously secreted, gently around her neck as they were sitting, and had got the end of it in a loop before she perceived it. She jumped up at once, and put up her hands to save her throat, but he pulled hard and she fell without a struggle. We have thought this case of sufficient interest to present a tolerably full abstract of it in the note, since it offers many incidental suggestions worthy of consideration.(i)

(i) " At the Chelmsford Lent Assizes, for 1851, Thomas Drory was tried for the murder, by strangulation, of a female named Jael Denny. He was the son of a farmer of great respectability, and resided within a short distance of the cottage where the deceased lived. Both were about twenty years of age, and the girl, who was pregnant by the prisoner, had reached the ninth month of her pregnancy. On the afternoon of Saturday, October 12th, 1850, the prisoner and deceased were seen conversing together for about twenty minutes, in the neighborhood of the prisoner's cottage. This was about half-past five P. M. The evidence respecting *the deceased* showed, that about six o'clock on this day, she had tea with her parents as usual, appearing to be in good health and in high spirits. She told her mother that she had made an appointment with the prisoner to meet him at a stile very near their cottage, *at half-past six o'clock*, and the prisoner, it was supposed, had led her to expect that at this interview he would make some arrangement regarding his marriage with her. At or about this time, the deceased left her tea half-finished, dressed herself hastily in some of her mother's clothing, left the house, and was not again seen alive. She was found next morning, at or about *eight o'clock*, lying dead in a field at a short distance from the

M. Tardieu reminds us that strangulation may be simulated by persons who have an interest in pretending to be the vic-

stile, at which she said she had made an appointment to meet the prisoner on the previous evening.

“When her body was found, the head was cold, and the arms and legs cold and stiff; but the body (the abdomen) was perceptibly warm to the hand. It will be remarked, that from the time the deceased was last seen alive, thirteen and a half hours had elapsed.

“The attitude of the body when found is thus described by the different witnesses: The deceased was lying on her face, a little inclined on one side, owing probably to the prominence of the abdomen. Her lower clothes were arranged in a straight and orderly manner, and her fur-tippet was lying on the ground, two or three yards from the body. Her bonnet was on her head, much crushed and broken. It was flattened in front as if from pressure from behind, while the deceased was on her face. Her face was flat on the ground, and her nose pressed down tightly. The nose is described as being quite flattened, and turned a little to the left side by pressure; it was impossible, in the opinion of one witness, that the mere weight of the head could have produced either this degree of pressure, or the indentation observed in the ground. The features were so altered, that, although this witness had known the deceased for four or five years, he could not recognize her. When the body was turned over, blood escaped or bubbled from the mouth, nose, and eyes; and the face was observed to be black and much swollen. There was half a teacupful of blood on the spot where the face lay—under the mouth, and more blood in another spot about a foot from the head; the hair was matted together with blood and dirt. The right arm was lying bent at a right angle underneath the body, and pressed down by its weight; the left was raised, with the hand directed towards the left shoulder, but partly covered by the body. There was a cord on the neck, which was twisted round it three times. One of the witnesses took the third turn from off the neck, and observed that this turn was a little loose; but on putting his finger to the throat, he found a knot of cord lying in front of the neck. The remainder of the cord was very tight, a portion being actually imbedded in the neck, and the cord was drawn so tightly that the skin of the neck had swollen up between the coils. From other evidence it appeared that the knot which formed the loop of the rope was pressing on the front part of the neck, while the bite of the noose was at the back part, a little behind left ear. There were *three coils and a half* of rope round the neck, and, with the exception of the last half coil, all were tight, the two innermost coils being so tight as to indent and cut the skin. The end of the cord went over the back of the left shoulder, and about an inch of its extremity was lying loosely (without being grasped) between the thumb and finger of the *left* hand of the deceased, which was raised towards it. One witness described this hand as being stretched out a little, so that the end of the cord could be seen lying in the hand, before the body was moved or turned over. The deceased was *right-handed*; there was no mark of grasping, laceration, or indentation on

tims of violence. When this mode of violence has really been attempted without a fatal result, the signs of it are evi-

either hand ; and from the position of the bite of the noose and the direction of the coils, the cord could have been tightened only by pulling to the *left* of the deceased. The cord was stout, and of the thickness of a window sash-line. At the part where the noose had been tightened, the pressure had been so great that the cord was condensed to about half its thickness, and some of the fibres had been cut through by the force used. There was no blood upon it, except just at the end, where there was a small spot. The second coil had, at the back part, tightly locked in a portion of the apron of the bonnet and handkerchief of the deceased.

“ A woman who undressed the deceased, six hours after the body was found, stated that she examined her face and found the mouth bubbling with blood ; her tongue protruded out of her mouth, and was clenched very tightly with her teeth. Blood oozed from her eyes, mouth, and ears. Her body, from her head to the shoulders, was very black (livid). There were two marks where the cord went round the neck, quite lacerated through the skin. Upon the back of her left wrist were marks apparently of a bite from both rows of teeth—the impressions were quite distinct before they were washed, and blood was oozing from them. On the right elbow a piece of skin had been taken off, about the size of a shilling, and the patch was very black. The elbow had a bruised appearance.

“ A *post-mortem* examination of the body of the deceased was made by Mr. Williams, surgeon, of Brentwood, on the second day after it was found. The eyes were much distended and suffused with blood, and the pupils were dilated. There was a general lividity and swelling of the face ; and the tongue, which protruded from the mouth, had been bitten by the teeth. There was a superficial laceration of the skin, covering the lower part of the throat on both sides ; and there were two deep marks, as if from two cords, or from two impressions of one cord, tied tightly round the neck. The two impressions were both situated over the trachea, and the skin had swollen up between them. The trachea had been flattened by strong pressure, but had regained its shape ; it had a bruised appearance in the parts corresponding to the two marks on the neck, and its structure there was softer than natural. There was extreme ecchymosis on the upper part of the chest, such as might have been produced by a heavy blow, or by the pressure of a person kneeling upon it. There was a contraction of the fingers, which were drawn into the palms of the hands. There was an abrasion of skin at the back of the right elbow. There were marks, apparently of teeth, on the back of the right wrist, and there were also scratches on the back of the left arm and hand. On opening the head, there was great congestion of the whole of the brain. The heart was healthy, but much distended on the right side with blood in a coagulated state. The lungs were congested to an unnatural degree ; the right pleura was adherent—a result of previous inflammation. The stomach contained ordinary food, and the coats were in a healthy condition. The intestines were healthy. On opening the uterus it was found to contain a male fœtus in the

dent in the discoloration and swelling of the neck, along with a marked difficulty in swallowing, and often a very great al-

ninth month; and this was probably alive at the time of the deceased's death."

For the defence, two surgeons, Mr. Thorpe and Mr. Pollock, deposed—the first that he thought there was a *doubt* as to whether the deceased committed suicide or not; the second, that he would feel *considerable difficulty* in forming an opinion as to the cause of death, whether suicide or homicide. Both of these opinions were founded upon cases which they had met with, but which, as they had no similarity with the present case, may here be omitted. Dr. Taylor, however, gave a decided opinion that the case was one of homicide, and his observations, which are remarkable for their minuteness and logical accuracy, we here subjoin.

"1. The deceased was *right-handed*, and, on the hypothesis of suicide, she must have made the tension with her *left* arm and hand. From the position of the loop or noose, any traction to the right would not have tightened, but have loosened the cord.

"2. That, supposing her to have exerted such a traction at all, she must have been in the erect or sitting posture. The force used, indicated by the great local violence to the neck, could not have been exerted by a person attempting to tighten a cord by drawing it to the left while in a recumbent posture, whether prone or supine. This hypothesis would, besides, leave wholly unexplained the flattening of the nose (obviously from direct pressure, not from a fall), and the fact that the deceased had bled in *two* places, one spot being a foot from the other.

"3. The cord must have been pulled with excessive violence in a horizontal direction by *one end only*, as the mark was *circular* around the neck. The other end of the cord formed a noose or loop, and was tightly fixed at the back of the neck. Thus, then, all the force of traction must have been exerted to the left, in which direction the right hand of a right-handed person could not act horizontally, so as to produce the amount of violence found on the soft parts of the neck.

"4. That the fact of there being three coils and a half of rope round the neck, formed an obstacle to the tightening of the cord, by pulling one end to the left so as to imbed the two inner coils in the skin, and to leave the outer or third coil loose. On the supposition that the deceased produced the constriction by her own act, it follows that the three coils must have been round the neck at one time, and the two inner coils sufficiently loose to allow of respiration before traction was commenced.

"5. The double indentation found on the trachea could not have been produced by the two inner coils (on the supposition of suicide), except by the great tightening of the outer coil.

"6. As insensibility and loss of power must have immediately followed the complete compression and obliteration of the trachea by the two inner coils, the outer coil ought not to have been found loose or unconnected with the object by which the force of the contraction had been produced.

teration of the voice. An intelligent and respectable young woman, who desired to excite an interest in her behalf, gave

“To suppose that the deceased could have produced the intense constriction by the first coil, and afterwards retained sufficient power to pass a *second* coil from right to left around her neck, indenting the skin and flattening the trachea as much by the second as by the first coil, involves, in my judgment, a physiological impossibility. There was, therefore, on the suicidal hypothesis, no explanation to resort to—but that all three had been placed at once round the neck *loosely*—that one end only of the cord had then been so pulled to the *left* as to produce the great amount of violence found, and to tighten equally the two inner coils; while the outer coil and extremity of the cord, by which this immense force must have been applied to the two inner coils, was found lying loosely, without any attachment either to the hand of the deceased or to any other fixed point.

“7. To have indented the neck, compressed and bruised the trachea in two distinct places, to have caused effusion of blood to the amount of a cupful from mouth, nose, and ears—this effusion being found in two distinct places, a foot distant from each other—would have required a very considerable tension of the outer coil, and, at the same time, a *continued* tension, lasting sufficiently long for the head to move a foot after a cupful of blood had been lost as a mechanical result of the first constriction.

“8. Admitting such conditions of the body and cord to be compatible with suicide, the act could only be conceived to be possible in this case, by the fact of the end of the cord being found tightly wound round the left hand of the deceased.

“9. On the suicidal hypothesis, it would undoubtedly have required a very firm grasp of a rope to produce such effects as were here observed; and from the rapid production of unconsciousness by the compression of the trachea and the arrest of respiration, it would have been impossible, on the part of the deceased, to relax the grasp. Hence the cord should have been found, either firmly held in the hand in the rigidity of death, or wound round it in a state of tension. Unless we adopt this view, we must suppose that after having used an enormous amount of violence by a rope in the left hand, the dead body had the power of relaxing the grasp, of loosening the outer coil of cord, and so moving the hand that the end of the cord should be found lying between the finger and thumb, and barely touching the palm. Such a condition is not only physiologically, but in this case, as it will be presently shown from the length of the cord, physically impossible.”

10. (This refers to the absence of any marks of the cord upon the hands, such as would have been there, if forcible traction had been made by them.)

“11. The length of the cord renders it impossible to suppose that such a force could have been exerted by the deceased herself. The length of the cord was fifty-nine and a half inches. The three coils and a half must have consumed at least fifty-two and a half inches, leaving only seven inches for the traction. ‘This,’ says Dr. Taylor, ‘was barely enough to reach the finger and thumb of the raised left hand, and not enough to allow of such a

out that she was the victim of political conspirators, whose secrets she had discovered. One evening she was found at the door of her chamber in a state of great excitement and apparently alarm. She did not speak, but at first made signs, and after a time wrote that she had been attacked by a man who attempted to strangle her with his hand, and at the same time stabbed her twice in the breast. These blows had only injured her clothing, and her corset was not pierced at the same place as her dress, and the alleged throttling had not altered the character of the voice but suppressed it entirely! No external sign of violence could be found upon her, and ultimately she confessed her trick.

§ 918. In conclusion, the fact should not be overlooked that, even where the body has lain a considerable time in the ground, and is advanced in putrefaction, the marks of strangulation, if this have been forcible, will occasionally be recognized. An instructive case is upon record, in which, after a lapse of thirty-eight days from the interment, a corpse was, by order of the authorities, disinterred. The body was already greatly decomposed, but the evidence of strangulation was obtained chiefly from the fact of the striking contrast of the integuments of the neck with those of the rest of the body. There

firm grasp by the hand as would be necessary to the production of so much violence to the soft parts of the neck. I find, by measurement, that the circumference of a small female hand in the adult is rather more than *seven inches*. This measurement includes only the palm of the hand without the thumb, and embraces the part of the hand around which a coil would be placed, when the object of a person was to produce firm traction. Hence, then, the hypothesis of suicide involves one of these physical conditions. Without a firm hold of the cord, which could not have been had with less than one coil round the hand, it is impossible to conceive that such violence to the neck could have been produced by the act of the deceased; and if one coil had been thus spontaneously wound round the hand, it would have consumed the whole length of the cord up to the last half coil, and left no portion whatever to give a purchase for pulling with so much violence. Either condition is a physical impossibility; and no theory will suit the facts, or explain them, excepting that which admits that the act was not the result of suicide, but of manual violence applied by another person.

“The evidence by which the crime was fixed upon the prisoner Drory, it is not necessary here to relate. The chain of evidence was complete and irresistible, and, as has been stated in the text, the criminal made a confession previous to his execution.”

was observed a white and shrivelled space over the larynx, half an inch in breadth, and extending back on each side of the sterno-cleido-mastoid muscles, from which, also, to the nape of the neck over the second vertebra, there ran a groove of a blackish-brown color, and parchment-like appearance. It was very difficult to cut through this condensed skin, which, upon incision, gave the sensation of old dry leather, and its section was yellowish-white, and perfectly dry. Another remarkable case occurred in Paris, where, after the body of a female had lain several years in the ground, and was reduced to an almost perfect skeleton, an examination made by M. Boys de Loury, Orfila, and other medical jurists, proved that the woman had perished by strangulation. The third, fourth, fifth, and sixth cervical vertebræ, as well as the right clavicle, were held together by a blackish mass, in the composition of which there could not be recognized any tissue. This mass was surrounded at its lower point by several twists of a cord, two lines in diameter; the cord was in a very decayed condition, and no knot could be found upon it; its direction was exactly horizontal.

CHAPTER X.

HANGING.

- I. General symptoms, § 919.
- II. Marks of the cord, § 922.
- III. Rupture of artery, § 926.
- IV. Tumefaction of genital organs, § 927.
- V. Condition of eyes, § 928.
- VI. Suicidal or homicidal? § 929.
 - 1st. Position and condition of body, § 930.
 - 2d. Marks of violence, § 936.

§ 919. I. *General symptoms.*—In hanging, death is caused mainly by the pressure of the cord upon the windpipe, by which the access of air to the lungs is cut off. The individual is therefore strangled; he dies more rapidly, but in the same manner,

physiologically speaking, as do those who are suffocated by drowning, or who are placed in any irrespirable medium. If, however, the air be not completely cut off from the lungs, as in those instances in which the cord presses upon a portion of the larynx which is ossified, as in some public executions, it tears the os hyoides loose from its connections with the larynx, or the noose slips from its proper position and catches against the lower jaw, death does not ensue with the same rapidity. In these cases other secondary causes aid in the extinction of life, the veins of the neck being compressed or the cervical vertebræ injured.

§ 920. The signs of hanging are, therefore, in general terms, the same as those of asphyxia from other causes, but will vary in intensity according to the position of the body and the suddenness of death. While, in some cases, the face is swollen and livid, the eyes prominent, and the tongue protruded between the contorted lips; in others, these striking signs of struggling are absent, and the features remain placid or unchanged. The latter condition is more frequently observed in persons whose death has been voluntary, but a greater or less congestion of the face is found in the majority of cases of hanging. Dr. Burrows(*w*) explains the difference observed in executed criminals by the unequal pressure of the cord in different cases. He says, "the knot of the rope is usually adjusted on one side of the neck, and it is found, after death, beneath the ear resting on the mastoid process. It has been often observed, in the dissection of such criminals, that the cheek and integuments on this same side of the head are not nearly so livid and congested as on the other side. The pressure of the rope has not completely obstructed the return of blood through the external jugular vein on the one side, though it has effectually stopped the current of the other. In such cases, it is also probable that the deep-seated internal jugular vein on the one side has been only partially compressed, and has permitted, to a certain extent, the return of blood from the internal parts of the cranium. Another efficient cause is the subsidence of fluid blood after death, while the

(*w*) "Diseases of the Cerebral Circulation," 1846.

body is yet suspended, through the cervical vessels, which are not completely obliterated by the pressure of the cord. Other channels not at all affected by the pressure of the rope, are the vertebral sinuses and the spinal plexus of veins." In addition to the marks of congestion in the head and face, the shoulders and upper part of the trunk are often livid. The hands and lower parts of the arms are also frequently of a purple color; the arms are usually straight and rigid, and the fingers clenched. A bloody froth is sometimes seen issuing from the mouth, and there are various marks of violence upon the neck, dependent, however, upon the nature of the ligature and the force employed. To these we shall presently refer in detail. The urine and feces are not unfrequently passed involuntarily, (*w*¹) the genital organs become turgid, and the semen in the male is said to be discharged. It would appear that the circumscribed bloody spots in the lungs, pericardium, and pericranium, which are met with in all the other forms of suffocation, are absent in this.

§ 921. When a person is found dead, suspended by a cord or other ligature, the first question which arises is, whether the act was his own or that of another. Before, however, this question can be satisfactorily answered, we must endeavor to determine whether the person was *living at the time he was hung*. Now, the fallacy of relying upon any one medical sign as indicative of death from a given cause, is nowhere more apparent than in death by hanging. A partial consideration of the sign of death from this cause, or a too confident reliance upon one or more of the phenomena usually observed in authenticated criminal cases or in public executions, will often lead the physician to an erroneous judgment. However strong the presumption may be that life was destroyed in this manner, rarely, if ever, can a perfect conviction be acquired by medical evidence alone. On the other hand, the moral and circumstantial evidence is, in a large majority of cases, so significant that medical testimony is superfluous. This will

(*w*¹) Tardieu (*Annales d'Hygiène Publique*, Jan. 1870, and *Journ. Psycholog. Med.*, vol. iv. 634) refers to some observations at the "Prison Cellulaire" where the evacuation of the urine and feces was noted in only two out of forty-one cases.

at once be evident, when it is remembered that hanging is usually a suicidal act. As, however, cases occur where life is first destroyed by other means and the body afterwards hung, in order to suggest a belief that suicide has been committed, it becomes necessary to consider what assistance can be rendered by medical facts to corroborate the evidence derived from other sources.

§ 922. II. *Marks of the cord.*—In persons who are hung, the cord always leaves some impression.(x) This may be deep or

(x) The following is certainly an anomalous case. The facts were observed at a public execution. The rope used was ten lines in diameter; the knot was large, formed of three turns of the rope, and, on the noose being tightened by the executioner, corresponded to the occipital protuberance. The bolt being withdrawn, the man fell through a space of seven feet and a half. "The body fell with a tremendous jerk, and oscillated for a few minutes; the arms and legs became rigid; the forearms flexed on the arms, the fingers upon the palms, and the thighs adducted and slightly drawn up towards the abdomen; the sterno-mastoid muscles were affected with spasms, and the hands became livid. After a short time the limbs relaxed; the legs approached each other, the toes pointing downwards; the hands became pale, fell down by the side, and the fingers became relaxed. The body, having been suspended for forty-five minutes, was cut down, and the cord removed from the neck. There was *not* any protrusion or unnatural suffusion of the eyes; the upper and lower teeth were half an inch apart, and the tongue was indented by them: the lips were rather livid, and the face *pale*; a *slight* depression marked the position of the rope; there was not any discoloration of the integuments of the neck, breast, or shoulders; the thumbs and fingers were flaccid; the cap in which the head had been enveloped was slightly stained by bloody mucus, which had flowed from the mouth and nose; the bladder was empty, the criminal having made water a few minutes before his execution; the penis appeared as if it had been recently erect; it lay upwards against the abdomen, and a thin, transparent fluid had stained the shirt;" numerous spermatozoa in it were detected under the microscope. Eighteen hours afterwards, the body having in the mean time lain upon its back, it was found to be rigid, the face, lips, and ears were purple, the shoulders and the upper and front part of the chest also; the mark of the rope was scarcely perceptible, there being only in one place, for about the extent of a quarter of an inch, a *slight* parchment-like discoloration of the skin. The portion of the skin covered by the rope having been removed, there was not found the slightest extravasation of blood, nor any peculiar silvery-white appearance of the areolar tissue, and none of the bloodvessels or muscles were at all injured; the thoroid cartilage was slightly flattened but not broken, and there was no dislocation or fracture of the vertebral column or injury of the ligaments or spinal cord. The brain, lungs, and right side of the heart were congested

superficial, according to the strain upon it and its thickness and firmness. The skin under this mark acquires a peculiarly dense and tough character, and has been aptly compared, for this reason and from its color, to old parchment. It resembles exactly the desiccated skin, from which the epidermis has been detached, and which has been exposed to the air. This appearance is more marked a few hours after death, if the cord has been removed; its color is yellowish-brown, and the cellular tissue underneath is likewise condensed and presents a silvery appearance.

§ 923. This color must not be confounded with that resulting from an extravasation of blood under the skin, the latter being livid or purple. In cases which present the parchment-like appearance, there is often no ecchymosis, or this is confined to a slight line of lividity upon the margins of the depression. In cases, however, where much violence has been used, as in the execution of criminals, a livid mark is frequently observed. The two conditions are sometimes united, an ecchymosis existing upon the forepart of the neck, and the burnt appearance at the sides. Late writers agree that ecchymosis is of much rarer occurrence than was formerly supposed. Devergie collected fifty-two cases of hanging, of which *three* only presented traces of ecchymosis. The cases are taken from Klein, Esquirol, and from his own observation. These results are confirmed by Orfila, Dr. Taylor, and Dr. Casper.

§ 924. The impression of the cord, whether ecchymosed or not, is, however, not positive evidence that the person was hung when alive, since it has been shown beyond dispute that the same marks may be designedly made by hanging *after* death, while the body is yet warm. Orfila (*y*) suspended the bodies of persons, of different ages, at various periods after death, from the moment life was extinct up to twenty-four hours afterwards. In every one he found the same brown and

with blood, and the mucous membrane of the larynx was of a bright-red color. (*On Death by Hanging, etc.* By Charles Croker King, M.D., M.B.I.A., Professor of Anatomy and Physiology, etc. Dublin Quarterly Journal, August, 1854.)

(*y*) Annales d'Hygiène, tome xxvii.

parchment-like furrow which has been described as produced in the living. Devergie made similar experiments, with a like result. Those performed by Dr. Casper,^(z) in addition, prove that when the bodies of persons have been hung within two hours after death, the mark upon the skin may be also slightly ecchymosed. In one case, the first of his series, a man was suspended by a double cord passed above the larynx *an hour* after death from typhus. In about twenty-four hours the body was cut down and examined. "Around the neck, between the larynx and os hyoides, was a double parallel mark, about three lines deep, *of a brown color, with a slight tinge of blue*. There were traces of cadaveric ecchymosis about the body. The whole appearance was such that any individual not acquainted with the circumstances would have supposed that the deceased had been hanged while living. Some spots on the right side of the neck were strongly colored. The skin of this part was hard, like leather, and in patches slightly excoriated. There was no extravasation of blood in the cellular texture, but the muscles of the neck beneath were of a deep violet color. In the two next cases, the body of a young man, aged twenty-three, suspended *an hour* after death from phthisis, and that of a man, aged seventy, two hours after death from dropsy, each by a double cord, and the bodies examined on the following day, the appearances were similar; there was a double depression around the neck, *of a yellowish-brown color, without ecchymosis*. The cutis looked as if burnt, and was like parchment, both when felt and cut. There was no blood extravasated in the cellular tissue beneath." In other cases, in which the body was hung at later periods after death, there was neither ecchymosis nor the parchment-like appearance, the mark of the cord being merely a slight depression in the skin. In the case, however, of a child, a year and a half old, on whose neck, *the day* after death, a small cord was tightly drawn, a small bluish-colored mark was produced. There was no blood, however, extravasated beneath it. The nature of the ligature, as whether it be a cord or some soft material, such as a handkerchief, does not make much difference in the

(z) Brit. and For. Med. Rev., vol. v. p. 615.

character of the mark, except, of course, that where a cord is used it is better defined in every respect. The yellow and parchment-like appearance may, however, be produced by either kind of ligature.

§ 925. The unavoidable inference from the experiments above referred to is, that the mark left by the cord is not a reliable sign of the hanging having taken place while the person was alive, since it may present the same characters if the body have been suspended shortly after death. If this mark, which, at first sight, would appear to afford the most palpable evidence of death by hanging, is open to this objection, much more so are those inconstant signs derived from the state of the countenance, position of the tongue, and discoloration of the skin. Turgescence and lividity of the face, ecchymosis upon the trunk, and protrusion of the tongue may render probable death by hanging; but, as they may all occur in any other mode of death by suffocation, are not indubitable proof that the body was suspended during life. Besides, these signs may be altogether wanting in persons who have evidently perished by hanging. Protrusion of the tongue is far from being invariable in hanging, and depends probably upon the position of the cord, and in some cases of the execution of criminals the face has been observed to remain quite pale.

In those cases where much injury has been done to the neck, are where the muscles are found lacerated, the cartilages broken, and the ligaments torn, while blood is extensively effused in the soft parts and in the spinal canal, there can remain, of course, no probability of these injuries having been produced after death. Such cases are, however, exceptional, being rarely met with except among executed criminals.

§ 926. III. *A rupture of the internal and middle coats of the common carotid artery* is occasionally found. Amussat was the first who observed it. Devergie examined the bodies of thirteen persons who had died by hanging, and found it only in one case. Dr. Mildner^(a) has reported an instance in which he discovered it, and refers to another published by a German physician. At the same time, he states the important fact

(a) Vierteljahrsschrift f. prakt. Heilkunde, 1850, Prag.

that in his case the internal coats of the artery gave way very easily by stretching, as was proved by experiment upon the corresponding vessel on the other side. The experiment, moreover, was tried upon the carotids of persons of various ages, and the result obtained was that the rupture occurred only in those taken from old persons, where the artery had already lost its natural elasticity. In six cases of death by hanging, Simon found laceration of the internal coat of the carotid only twice. In one of these cases the vessel was sound, and in the other not. From these observations, and from experiments upon the dead body, he further concluded that the occurrence of this rupture depends upon the thinness of the cord, and its position between the larynx and the hyoid bone, and that the weight of the body and the force of its fall favor its occurrence. It also follows from these data that the existence of such a laceration, even in the absence of external signs, renders probable the occurrence of death by hanging or by strangulation.^(a¹) Malle found this lesion only twice in eighty-two bodies in which he imitated the act of hanging or strangling. The best mode of determining whether the rupture occurred before or after death would be by noting the signs of effusion in the adjacent cellular tissue. This has been clearly shown by Kussmaul,^(b) who adds, as still more important signs, injection and swelling of the surrounding cellular tissue in those cases in which all of the coats of the artery have been divided. The amount of probability in favor of death from hanging will depend upon the degree in which these two signs exist.

§ 927. IV. *Tumefaction of the genital organs, and a discharge of semen in the male*, are regarded by some authors, but principally by Devergie, as characteristic of death by hanging. There are many manifest objections to this sign, were it even constant in its appearance, or even if it were peculiar to this mode of death, neither of which it is. It will suffice, however, to refer to the testimony of Orfila^(b¹) upon this point. According to this eminent observer:—

(a¹) Virchow's Archiv, xi. 297.

(b) Ibid., xiii. 60.

(b¹) Bulletin de l'Acad. Roy. de Méd., 1839.

1st. Spermatie animalcules may be found in the urine, for twelve hours after emission.

2d. They may be found in the urethra of persons dying of various diseases.(c)

3d. Congestion of the organs of generation may be produced by hanging persons after death. One of the cases was that of a man 50 years of age. Three hours after death, the penis was found to measure three inches and a line in circumference, and neither it nor the scrotum was discolored. The orifice of the urethra was full of a viscid liquid, containing seminal animalcules. The body was *then* hung, and eight hours afterwards the scrotum and penis had acquired a violet color, the circumference of the latter had increased by seven lines, and the meatus still contained spermatozoa. In another case, the body of a man aged 49 was hung five hours after death, and left suspended three hours and a half. The penis, which, before, was slightly turgid, was now erect, and formed almost a right angle with the abdomen; it had increased nine lines in circumference, was of a violet color, and all the veins about it were very much distended. The vesiculæ seminales were very full, and at the orifice of the urethra, there was a drop of viscid fluid, containing a great number of spermatozoa, of which many were alive. Congestion of the genital organs, and an ejaculation or discharge of the seminal fluid, having thus been observed in those dying from other causes, and in those who have been hung *after death*, cannot be looked upon as a sign of death by hanging, unless these two objections are first satisfactorily answered. Casper emphatically states that he never saw erection of the penis in a person who had died by hanging, and in a very small proportion of cases only a slight degree of turgescence. In seventy-seven cases collected by Casper,(d) the seminal discharge was observed in nineteen only,

(c) Klein observed the penis in a state of erection in a man who had committed suicide by shooting; Schlegel observed freshly effused semen in a youth who had thrown himself from a church tower and fallen upon his head; and a case of poisoning with prussic acid is related by Merzdorf, in which the penis was found in a state of semi-erection, with the spermatic fluid effused. *Vide* Siebold, Handbuch der Ger. Med., § 343.

(d) Brit. For. Med. Rev., vol. v. p. 615.

and in thirty-five cases reported by Remer, congestion or ejaculation was found only in fifteen. In some observations upon suicide by strangulation, Dr. Brierre de Boismont states that he has found the fact of ejaculation mentioned in one-seventh of the cases (the whole number being 114), and of erection in one-tenth. In one case, in which the traces of the emission were very abundant, there was a dislocation of the second vertebra upon the first.^(e)

§ 928. V. *Condition of the eyes.*—Dr. Dyer^(e') has made some observations of great value on the person of Anton Probst, who was hanged in Philadelphia June 8, 1866, for the brutal murder of a whole family, eight in number.

Two days before the execution, Dr. Dyer made an ophthalmoscopic examination of Probst's eyes, using the light from an ordinary lamp. Nothing unusual was observed except a slight prominence of the eyeballs and a sluggishness of the pupils to respond to light; the optic media were clear and the fundus normal.

The rope used in the execution was five feet six inches long, five-eighths of an inch in diameter, and the fall was three feet. The knot was placed under the left ear, and death was very quiet and rapid.

The body hung thirty minutes, and was then immediately removed to the dissecting-room.

“Post-mortem examination thirty-five minutes after the drop fell. Body and head moist and warm; there had been an emission of semen; face was livid, and the upper lip discolored; abrasions of the skin under the right ear, and a deep red mark all around the neck.

“The eyeballs were not more prominent than before death; lids were closed and not discolored; there was scarcely any tension in the eyeballs; corneæ a little dull; pupils a little more dilated than before, and moist from mucus.

“The body was placed upright in a chair and supported, as the head had a tendency to fall. The eyes were first examined with the same oil lamp that had been used at the examination

(e) Ann. d'Hyg., Juillet, 1848.

(e') New York Medical Journal, vol. iii. 1866, p. 416.

before death. Nothing could be obtained but a deep tan color from the whole of the fundus. * * * *

“The examination of the eyes of Probst with the electric light gave the following results: Right eye—there was a line running transversely across the lens, and about a line below the centre. From it, at various angles, ran short and long fine lines, very near together but not regular. This line had an iridescent or opalescent appearance, and as it was illuminated, a gentleman standing behind remarked that it looked like a crack in a cake of clear ice. At first I thought it a film of mucus on the cornea, but soon saw that it was in the lens. It was a fracture involving the anterior capsule, and extending in a horizontal plane backwards into the substance of the lens. It gave even to those present, unaccustomed to the ophthalmoscope, the idea of a plane extending backwards.

“On rotating the ball downwards, the fracture could be seen to stop about the centre of the lens, and to end in several lines projecting backwards, longer than the rest. The little fissures running upwards and downwards from the main transverse fissure were of different lengths; more than half of those on the lower side ran down to the margin of the pupil, almost all those on the upper side extended above the horizontal diameter of the lens, and the longer ones perhaps a line further.

“The whole lens had a most beautiful iridescent appearance, which was greatest in the line of the main fissure. This was determined by strong convex glasses. Nothing of the fundus could be seen, not even a trace of a vessel.

“The left eye presented the same transverse line, a line and a half below the centre of the lens. It was evidently the same thing as in the right, only less in extent. The line had very short lines running upwards and downwards, which were very close together. They could only be seen with a strong glass, and gave the line a feathery look. I judged that here the crack was confined to the capsule. The line was perfectly evident to a person standing three feet behind the examiner. The fundus could not be seen. Neither pupil contracted under the light. The body was then laid on the table, and the battery used to contract the various muscles of the body. The flexors of the arms and legs responded, and I tried, from

curiosity, to stimulate the contractile films of the iris, but without success.

“The eyes were then removed, and four hours afterwards carefully examined. Dr. S. W. Mitchell assisted me. The condition of the right lens was precisely as described above: Lens in place; fractured transversely from *edge* to *edge* of the capsule, one line below and parallel to the horizontal diameter of the lens. From this crack a fissure extended backwards into the substance of the lens, as far as the middle suspensory ligament, which was not ruptured. Retina not detached; eyes normal, except as above mentioned; left eye showed a line difficult to distinguish, but made out with certainty, corresponding in position to that of the right eye. It was undoubtedly a fracture of the anterior capsule. The weight of the fall coming principally on the right side (the knot being under the left ear), probably explains the difference in the condition of the two eyes.”

Dr. Dyer, with the view of further investigating this subject, procured three “very large dogs,” which he hanged, the drop being three feet.

The first dog weighed 35 pounds. The rope broke twice. The falls apparently did not affect his general condition, but, on examining the eyes, “a slight line, looking exactly like those in the eyes of Probst, about a line in length, was observed in the left eye, starting from the external border of the pupil towards the centre.” A third attempt at hanging him was successful, and he died quickly and without struggling. After death it was clearly seen that there was a fracture in the lens of each eye, but most marked in the left eye. The knot in this dog was on the right side.

The second dog weighed 30 pounds. He struggled hard for eight or ten minutes before death. There was no lesion in either eye.

The third dog weighed 30 pounds, and also struggled, but not as long and hard as No. 2. “After 15 minutes a faint line was seen across the right lens; 30 minutes after, very marked and distinct.”

Dr. Dyer says in conclusion: “I consider that these experiments are very satisfactory. They were made with every pre-

caution and great care, and the results are certainly interesting. I will not attempt to explain the matter, but in a few words give the *résumé*.

“One man and three dogs were violently hanged. The man and two of the dogs, *i. e.*, three out of four subjects, showed this peculiar lesion. The man and dog No. 1 died without struggle. In both the fracture extended through half the lens of one side and across the capsule of the other. Knot on the opposite side of the greatest lesion in both cases. Dog No. 3 died with convulsions, which lasted a short time. Lesion found in one eye well marked, the other eye normal. Dog No. 2 died with prolonged convulsions; no lesion could be observed.”

§ 929. VI. *Was the hanging suicidal or homicidal?*—The probability is always in favor of the former, not only from the known frequency with which this mode of self-destruction is chosen, but also from the evident difficulty of accomplishing murder in this way. The distinction between them seldom rests entirely upon medical grounds. Taken alone, the medical signs will rarely be sufficient to determine the question. They can afford often only a probability which must be confirmed by moral and circumstantial evidence. The latter, indeed, is not always beyond the cognizance of the physician, for he may be called upon to state the verisimilitude of the inferences drawn from it. Thus, if the body of a person found hung exhibit traces of violence externally, or some poisonous substance be discovered in the stomach, the opinion of the medical expert may be required not only in reference to the possibility of death having resulted from these causes, but also whether they were immediately fatal, or whether there did not remain sufficient time and strength for subsequent self-destruction by hanging. Questions of this nature can be answered only upon general principles, it being impossible to lay down any positive rules which would be applicable to all cases that may arise. We can, therefore, in the ensuing remarks, allude to them in only a cursory manner. The chief facts upon which the physician will base his decision, are the position of the body, the marks of violence, both external

and internal, and finally, both of these elements in connection with the ordinary signs of hanging heretofore enumerated.

§ 930. 1st. *Position and condition of the body.*—Experience has fully demonstrated the fact, that a *complete* suspension of the body is not necessary to produce death. The tenacity with which those who are bent upon suicide await the catastrophe, from which they could, with ease, escape, will afford a key to the explanation of the cases of death by incomplete suspension. It is, moreover, not improbable, from what is known of the sensations produced by a constriction of the throat in those who have experimented upon themselves, or who have been restored after apparent death by hanging, that consciousness and sensation are very speedily lost, or first give way to an indescribable feeling of pleasure. Dr. Schneider, who succeeded in restoring a man, who had attempted suicide by this means, states that his patient was quite angry at being awakened from the delicious slumber into which he had fallen.(f) Wepfer and Morgagni relate, that, having interrogated certain criminals as to their sensations, who had been hung, but afterwards restored to life, they answered, that they had not suffered at all, but had simply remained without sensation and plunged, as it were, in a profound sleep. Mr. Fleischmann, in experimenting upon himself, found that when the cord pressed upon the trachea, or between the principal cartilages of the windpipe, consciousness was almost immediately lost, but that if the obstruction to the entrance of air into the lungs was not so great, by constriction, for example, upon the thyroid cartilage, the effect was less rapid. We may, therefore, explain the fact of death in cases of incomplete suspension by a want both of the will and the power in the person to escape.

§ 931. Dr. Duchesne,(g) from an examination of fifty-eight cases, arrived at the conclusion that suicide by strangulation may be admitted, whatever the position in which the body may be found, and even if resting upon the feet. Devergie also, from a review of a very large number of cases, states that

(f) Henke's Zeitschrift, 1851, 43, Erg. II.

(g) Ann. d'Hyg., tom. xxxiv. pp. 141 and 346.

suspension followed by death may take place with the feet or knees resting upon the ground, or with the body in an almost horizontal posture, and that the weight of the shoulders and chest is sufficient to exercise a fatal constriction upon the neck. Dr. Taylor (*h*) says, "I have now before me the reports of eleven cases of suicidal hanging or strangulation, which have occurred within the last few years. In three, the deceased were found nearly recumbent; in four, in a kneeling posture—the body being more or less supported by the legs; and in four, the persons were found sitting." A case has been reported, in which the body was entirely supported by the bedstead, while the neck rested in a loop of leather, depending from the bedpost. The case was evidently one of suicide. (*i*) Many other similar cases are on record, which it would be tedious to enumerate. The facts here stated derive their importance chiefly from the prevalent notion, that, if the body were not completely suspended, the suspicion of homicide would be strengthened. This opinion was held and urged by some medical jurists in the case of the *Prince de Condé*, who was found hanging in his room from the curtain rod, with his toes touching the floor. The attitude in which the body was found raised some suspicion of foul play, and a most accurate investigation of all the circumstances connected with the event was instituted, from which it appeared to have been a case of suicide. In the journal where this case is reported will be found also several instances of self-destruction by hanging, where the bodies were found in the most extraordinary situations and attitudes, accompanied with plates of the same. (*j*)

§ 932. Tardieu (*j*¹) found in 261 cases of incomplete suspension, 168 in which the feet were recorded as resting on the ground; the body kneeling in 42; extended and lying in 29; sitting in 19, and squatting in 3.

§ 933. The inference to be drawn from the position of the body is, therefore, that, *in itself*, it proves neither homicide nor

(*h*) Med. Jur., Am. ed., p. 505.

(*i*) Med. Times, Aug. 7, 1852.

(*j*) Ann. d'Hyg., tom. v. p. 165.

(*j*¹) Ann. d'Hyg., Jan. 1870, and Journ. of Psycholog. Med., vol. iv. p.

suicide. A person may hang himself from a high beam or the branch of a tree, or may choose to strangle himself by simply placing his neck in a noose or loop and lean forward against it until he loses his consciousness. On the other hand, a murderer may find it more convenient to hang his victim imperfectly than to suspend him from an elevated position. In either case, the position in which the body is found is neither a safe criterion of its position at the moment of death, nor an index of the voluntary or involuntary character of the act. The cord, in many cases, slips or stretches by the weight of the body or the momentum of the fall, so that the latter will come to occupy a lower position than at the moment when unconsciousness was produced by constriction of the neck. And, even were this not the case, the more or less imperfect suspension of the body cannot, as we have already seen, enlighten us with respect to the question of homicide.

§ 934. It is hardly necessary to state that, if the hands or feet are found tied, the inference is not necessarily warranted that the act was homicidal. In such cases, the opinion of the physician will be guided, in a measure, by the remaining indicatory evidence. Thus, if an individual is found suspended from a position which he could not easily have reached, or to attain which there were no obvious means, the fact of the hands or feet being tied will afford certainly a strong presumption of homicide. But if, on the other hand, chairs or tables or any other means of support are found near the deceased, this presumption will no longer hold, since it is evident that the person may have, himself, applied these ligatures, and then hung himself by thrusting his head through the noose and overturning or pushing away the means of support.

§ 935. It is, however, of importance to observe whether ligatures upon the wrists are tied in such a manner as could have been done by the person himself. The following remarkable case (*k*) may be cited in illustration: "John Robinson, a married man, aged thirty-four, was admitted into the asylum of the workhouse, on the 24th of November last, having been in a desponding, melancholy state some time, caused by religious

(*k*) Lond. Med. Gaz., vol. xiv. p. 388, by Mr. J. H. Taylor.

delusions. He had attempted to destroy himself several times, by throwing himself out of the window; and rushing into the fire, and said he had a desire to hang himself. On admission, his hands were found much burnt. He refused his food for some days, but continued gradually to improve for the ensuing six weeks, and went to bed in a tranquil state on the evening of the 5th inst., about nine P. M. He was found next morning at half-past six, suspended to a bar of the window of his cell, by means of the bandage which he had taken from his hands and folded double. His wrists were fastened together behind his back, by a piece of bandage, in which two running nooses had been made and slipped over his hands, and then pulled tight. His ankles were tightly fastened together, and his night-cap was pulled down over his face, below his nose. The toes almost, if not quite, touched the ground; the body hanging between the bed and a night-chair, with the face towards the wall. On cutting him down, it was apparent, from the coldness and rigidity of the body, that he had been dead some time. The features were quite composed. No discoloration of the face; eyes in the natural position, if anything a little depressed; no froth at the mouth or protrusion of the tongue, or lividity of the neck, but, on the right side, extending nearly from the angle of the jaw to the commencement of the thyroid cartilage, the skin was cut through, as if with a blunt knife, to the depth of nearly a quarter of an inch. The hands and feet were extended and pointed downwards. No erection of the penis, or emission of semen, urine, or feces. The body, in fact, presented the appearance of that of a person dying from other causes, and being afterwards suspended. It was only the absence of suspicion of any kind that made the cause of death appear satisfactory. He must have first taken the bandages from his hands and cut them into suitable pieces, then stood on the night-chair, then tied his legs, then fastened the noose around his neck and pulled the cap over his face, and, lastly, slipped his hands behind his back, put the nooses over his wrists, and then jumped off. His friends would not permit a post-mortem examination, and the coroner did not consider any medical evidence requisite."

§ 936. 2d. *Marks of violence.*—Under this denomination may be included all those injuries which affect the question of homicide. For the sake of practical convenience, the various injuries to the neck, consisting of those which affect the windpipe as well as those of the cervical vertebræ, may be classed together. Under the former are embraced, fracture of the os hyoides, of the cartilages of the larynx, and laceration of their intervening membranes and ligaments; under the latter, fracture and displacement of the vertebræ, and rupture of their ligamentous bands and intervertebral substance. The consequences in both cases are extensive laceration of and effusion of blood into the structure of the neck; and in the injury to the spine, compression of the spinal marrow, either by the displaced vertebræ, or by effused blood. It is at once apparent that a great degree of violence will be required to produce such extensive and serious injuries, and will, therefore, in almost every case exclude the idea of suicide.

§ 937. The injuries above enumerated are sometimes made in criminal executions, where the fall is great, and the body at the moment of the execution is violently rotated by the hangman, but even in these cases luxation and fracture of the vertebræ are of rare occurrence. Orfila states that, in the bodies of fifty persons who had been hung, he met with a fracture of the os hyoides in only one case, while he had *never* met with fracture and luxation of the vertebræ. In the bodies of persons which were hung after death, for the sake of experiment, he succeeded, in some cases, in producing a rupture of the yellow ligaments of the spine, and the intervertebral substance. In one case the odontoid process was broken but not displaced, and in another the second vertebra was broken horizontally. In all of these experiments, however, both the extending and rotating force was extremely great, such, indeed, as can hardly be conceived in a case of suicide.

Dr. Houston, of Dublin, in an account of the appearance found in two executed criminals, says: "The cervical vertebræ were unbroken, and the spinal marrow and brain presented no trace of injury. In both, the sterno-mastoid muscle on the right side (the opposite to that on which the rope was applied) was ecchymosed, contused, and broken; that of the

left side was only slightly bruised. The os hyoides and thyroid cartilage were completely severed from each other." A few shreds of the small muscles of these parts alone remained, and nothing, in fact, but the skin interposed between the rope and the cavity of the pharynx.(l)

§ 938. There are only two well-authenticated cases of suicide by hanging in which injury to the cervical vertebræ has been met with, and in these it was far less important than in any of the experiments referred to, or in cases of judicial or homicidal hanging. One is reported by M. Ansiaux, of Liege. He found in the body of a woman who had hung herself, that the posterior ligaments of the spine between the first two cervical vertebræ were ruptured, and the transverse ligament of the atlas so stretched that the odontoid process of the second vertebra was locked against the articular surface. The perpendicular and oblique ligaments were not injured. The first two cervical vertebræ were considerably separated behind, the spinal marrow was injured, and extravasated blood found at the place of separation. The deceased was a stout woman; when discovered, she was hanging from a beam of the ceiling, and her feet were about a foot and a half above the ground. Near her there was a chair overturned.

§ 939. Another case is reported in the *Lancet* by Mr. Campbell de Morgan.(m) "A married woman, aged fifty, worn out and exhausted by disease, was found hanging quite lifeless from the rail of a bed, which was not more than five feet eight inches from the ground. The front of her body was turned round towards the bed, the head thrown forcibly back—the knot of the ligature, an old silk handkerchief, being placed in the middle of the under side of the chin. Her heels were about three inches from the ground, the knees being on a level with the bed-frame, and resting against it. The body was seen by a medical man, about an hour after it was cut down—the features were perfectly calm, and there was no trace of congestion about the face; it was pale and in all respects natural. There was no lividity; the eyes were

(l) Dublin Hosp. Reports, vol. v. p. 317.

(m) *Lancet*, Aug. 10, 1844, quoted by Taylor, *Med. Jur.*, p. 503.

neither injected nor prominent; the tongue pale, lying far back in the mouth, and without any mark of indentation. The cord-mark well defined, and, like parchment, dry, brown, and hard, without any ecchymosis, but with a thin line of congestion at the upper edge of the groove—it was very deep at the back of the neck, just over the atlas, probably owing to the head hanging backwards. The mucous membrane of the stomach was pale; the lungs natural; no congestion of the large veins, or of the cavities of the heart; the two ventricles contained about an equal quantity of blood. These appearances seemed to show that death was not caused either by asphyxia or by cerebral congestion. Neither the trachea nor the great vessels of the neck could have sustained any pressure or constriction. The deep muscles over the second and third cervical vertebræ were ecchymosed; this ecchymosis extended to the sheath of the spinal marrow; and on the left side, and exterior to the sheath, there was an extensive effusion of blood firmly coagulated. There was no displacement of the second or other vertebræ, and the ligaments were sound; but between the third and fourth vertebræ, there was unusual mobility, as if they had been stretched. In this case, the body was not heavy, and the fall, if any, could have been but trifling. The effusion on the spinal marrow was the cause of death; and its origin was sufficiently explained, by the falling back of the head and sudden bending of the cervical vertebræ. Her husband and family were in an adjoining room, but heard no noise; it was only by accident that the deceased was discovered.”

In a case of suicide, reported by Dr. Mildner,⁽ⁿ⁾ the left *corner* of the os hyoides was broken and the adjacent soft parts infiltrated with dark and fluid blood. The person was a robust and heavy woman of forty-eight years of age. The indentation, which was of a yellowish-brown color, and of a parchment-like and desiccated appearance, was also excoriated and deeper on the side corresponding to the fracture.

§ 940. It is well known that manual strangulation is one of the most frequent complications of homicidal hanging, and

(n) Prag. Vierteljahrsch. f. d. praktische Heilkunde, 1850. Bd. iii. p. 157.

hence the injuries to the neck here referred to will throw much doubt upon the idea of the act having been voluntary. A murderer who strangles his victim will commonly use more violence than is necessary for his purpose, and thus produce some of the serious injuries to the neck which have been described. But in such cases we are seldom left without a guide to the nature of the deed. The thumb and finger will have left their traces upon the throat, differing widely from the uniform discolored furrow left by the cord. Or if the act of strangulation has been accomplished with anything in the nature of a cord, the direction of the mark will be, if not horizontal, at least not oblique in the same manner as that produced by suspension. This distinction manifestly applies only to those cases in which the person is fairly hung, and in which the cord has formed but one noose around the neck, because if it has been twisted twice around it, the lower mark will generally be circular and horizontal. Hence, if the marks of fingers upon the throat, or a *horizontal* discolored impression upon it, be found, there will be good reason to believe, even if the person be found hung apparently with a single noose, that it was an act of violence committed by another upon him. The probability of this will be much increased by the existence of serious injury to the subjacent parts of the neck. A full confirmation of the fact can, however, only be obtained from other moral and collateral evidence, into which it is rather the province of the jury than of the physician to inquire. In the following case, the evidence of homicide was derived from various sources. "The deceased was found sitting in a corner of her room, with a narrow tape around her neck, hung loosely and singly over a small brass hook, about three feet above her head. Her clothes were placed smoothly under her, and her hands stretched out by her side. There was a severe bruise on the right eye, and there were marks of blood on the tape, as well as on the floor and wall of the room at a distance from the body. There was a stain of blood on the knot of the tape where it passed over the hook; and there was no blood on the hands of the deceased. The windpipe for about an inch and a half was lacerated longitudinally in its rings, and there was a deep

mark round the neck in the course of the double tape, as if from great pressure applied by some person, or from the weight of the suspended body: The latter hypothesis was untenable. The body of the deceased did not weigh less than 126 pounds, while the tape found round her neck broke with a weight of 49 pounds; hence, the deceased never could have been suspended by it." The prisoner confessed the crime.(o)

§ 941. *Other marks of violence* are found in every variety upon the person of the hanged. We subjoin three cases, one of homicide and two of suicide by hanging, to illustrate the nature of the evidence required for the settlement of doubtful cases.

A gamekeeper, thirty-two years of age, robust and hardy in his constitution, was found hanging upon a tree in the forest, three days after he had left home in pursuit of poachers. The deceased was suspended by his cravat to the branch of a young oak-tree, and so near to the branch that the right side of his face was in contact with it. His feet were rather more than three feet from the ground, which bore no traces of a struggle. The tobacco-pipe of the deceased was found about forty paces distant from the tree, but his hunting-knife and rifle were nowhere to be found. The cravat had left the following mark upon the neck: a groove from a half to three-quarters of an inch wide, the skin in it brown and parchment-like, and over the thyroid cartilage three-quarters of an inch deep. The indentation was more superficial upon the left side. The direction of the mark was horizontal to the back of the neck, and thence upwards on the right side to the angle of the jaw. At this point, corresponding exactly to the knot of the noose, the skin was very deeply ecchymosed, and also excoriated. The right ear was greatly discolored, as well as the integuments around it. The skin of the face and head was excoriated in many places, and bruised and lacerated also. There were, moreover, a great number of small lacerated wounds upon the hands and arms, and bruises on the knees. No other external injuries of serious character were found. The os hyoides was broken, and the muscles and soft parts of

(o) Taylor, Med. Journ., 5th ed. 754.

the neck infiltrated with blood. The horizontal direction of the mark upon the neck, the extreme tightness with which the cravat was fastened upon it, the fracture of the hyoid bone, together with the large number of trifling wounds, led the examiners to give as their opinion that the deceased had been overpowered by numbers, thrown down, strangled, and afterwards hung.(p)

Another remarkable case, in which the *suicidal* nature of the act was clearly determined, is reported by Dr. Heyfelder; it occurred at the prison at Sigmaringen, in Germany.(q) One of the prisoners, who a few hours before had been left by the turnkey in his cell, of which the latter alone had the key, was found hanging from the jamb of the door. The ligature used was his own silk cravat, twisted into a cord, three and a half feet long, two inches broad, and four lines thick. His head was sunk upon his breast, his face pale and without expression, the lips blue, eyes, tongue, and mouth unchanged in position and appearance. The arms were brought forward over the stomach, and were rigid; the fingers were bent, and the feet extended and touching the ground. *The mouth of the deceased was stopped with his own handkerchief.* The mark of the cord was oblique, commencing between the os hyoides and thyroid cartilage, and ran upwards and backwards to the occiput. The skin was brown, and in some places shrivelled, but there was no ecchymosis. Five contused and lacerated wounds were found upon the sides of the head; the right ear also was lacerated, and a portion of the head and face covered with blood. On the sharp edge of the window-sill, which was only two feet from the floor, traces of dried blood and hair were found, and on the wall below the window there were several lines of dried blood running towards the ground. Had this case occurred in any other place than in a locked prison-cell with a single occupant, the wounds upon the head and the handkerchief thrust into his mouth would have raised a very strong presumption of homicide, and perhaps involved the life of an innocent person.

(p) Henke's Zeitsch., 1835, H. 3.

(q) Ibid., 1849, H. 1.

We would here refer the reader to another case of hanging, singular and important from the fact of the woman having previously inflicted upon her own head, with a hatchet, no less than *fifty-five* wounds, some of which penetrated to and fractured the bone. Besides these, there were twenty-six superficial incised wounds upon the breast and stomach, made from three to four days previously, as they were in a state of suppuration. The loss of blood must have been very great, being estimated at three pounds. Yet this woman had been able to leave the room where she had committed this violence upon her own person, and proceed to a stable at the back of the house, and there, mounting upon a milking-stool, attach the cord to a beam, and consummate the act of self-destruction. In this case the indentation of the cord left no discoloration of the skin, probably owing to the loss of blood. The deceased had long been melancholy, and this, together with other facts and circumstantial evidence which came out upon investigation, left no doubt that the act was suicidal.^(r)

§ 942. The influence which the discovery of wounds and marks of violence upon the body of a person found hung, will exert in the determination of the voluntary or passive character of the act, must be decided, in each case, by the light obtained from an inquiry into the possible motives for suicide, into all the circumstances connected with the act, and into those general principles elsewhere referred to for the discrimination between self-inflicted and homicidal wounds. In some cases the injury may have been of accidental origin, as indeed may the hanging itself, but the case is hardly conceivable, in which the true nature of the latter could not be ascertained, or the former not rendered probable. In conclusion, we would repeat the statement, that hanging is preëminently a suicidal mode of death, and strong evidence, both medical and other, will be required in any given case to overthrow this presumption, it being far more likely that a person should inflict barbarous injuries upon his own person, and then hang himself, than that a murderer should resort to so difficult and unusual mode of assassination. This form of homicide can hardly be regarded

(r) Henke's Zeitschrift, 1840, II. 1 (Krügelstein).

as practicable, unless there be an exceeding disproportion between the strength of the murderer and that of his victim. It can only be taken into consideration, when the body found hung is that of a very young or feeble person, or one whom infirmity or temporary intoxication may have rendered helpless.

CHAPTER XI.

DROWNING.

- I. How producing death, § 943.
- II. Time when body will float, etc., § 945.
- III. Signs of death by drowning, § 947.
 - 1st. Paleness and coldness of skin, etc., § 948.
 - 2d. Abrasion of the hands, etc., § 949.
 - 3d. Water and froth in the lungs, § 950.
 - 4th. Water in the stomach, § 952.
 - 5th. Signs of asphyxia, § 954.
 - 6th. Marks of violence, § 955.
 - 7th. Putrefaction, etc., § 956.
- IV. Accidental or otherwise, § 958.

§ 943. I. *How producing death.*—The immediate cause of death in drowning has been the theme of considerable discussion. At present, however, from the numerous experiments made to determine this point, there can be but little doubt that the true cause of death in drowning is *suffocation*. By this word is meant, the prevention of the ingress of air into the lungs. The truth of this statement will be apparent, by a consideration of the external and internal condition of the body after death from this cause.

Before, however, proceeding to describe the post-mortem appearances in the drowned, the act of drowning demands our attention. A person who falls alive into the water, and is unable to swim, sinks at once below the surface. Presently the impossibility of respiring forces him to struggle to reach the air, and the effort to respire is instinctively repressed until

this is accomplished, when he gasps convulsively, and takes in with the air a certain quantity of water also, which is unavoidably swallowed. Sinking once more, the air in the lungs is partially expelled by an act of expiration, and bubbles are seen to rise to the surface. New and probably involuntary efforts to breathe are made, and the water, being thus drawn into the lungs, instead of air, brings on an act of coughing, by which water and air are both expelled. These efforts alternate for a few moments. If again successful in reaching the surface, the death-struggle is a little prolonged; but the privation of air soon benumbs both the mental and physical faculties, and with gradually lessening effort the unconscious and exhausted body sinks lifeless to the bottom.^(r¹)

The physiological explanation of this manner of death is found in the fact that, in consequence of the privation of air, the blood ceases to undergo in the lungs those changes indispensable for the maintenance of life. Hence the functions of the brain and nervous system are paralyzed, and presently the muscular and respiratory movements also. The heart continues to pulsate feebly for a short time after the stoppage of the voluntary functions of the body; but the blood, having become completely venous, is not long capable of affording the necessary stimulus to this organ.

§ 944. The rapidity with which life is extinguished by drowning depends upon the frequency and completeness of the renewal of the air in the lungs. If the individual have come several times to the surface of the water and breathed, he will, of course, not die so quickly as one who has not had this opportunity; but it is probable that in cases of drowning, where the person has not been able to support himself above the water by any extraneous aid, life is extinct within five minutes. Where the submersion has been complete from the beginning, life can scarcely be prolonged more than two minutes. "Mr. Woolley, the surgical attendant at the Receiving House of the Royal Humane Society in Hyde Park,

(r¹) M. Beau concludes, from numerous experiments upon animals, that death by drowning is always a suffocation produced by the arrest of breathing from spasm of the muscles of the larynx. Archives Gén., Juill. 1860, p. 64.

believes that very few lives are preserved after four minutes of complete submersion. In the year 1840, however, he met with a case in which a person recovered, although there was reason to believe that he had been five minutes under water, and a similar instance has since come under his observation.”(s) In an account of the pearl-fishery, by the Rev. Mr. Corder, who resided several years at Columbo, he says, “that he observed with attention the time during which many of the divers remained under water at the depth of seven fathoms. Some of them performed the dip within the space of one minute; others came up in one minute and twenty seconds. Some persons, who have frequently attended the fisheries and accompanied the divers to the banks, consider one minute and a half to be the longest period during which any diver remains under water. Other gentlemen, who are willing to allow the greatest latitude, say that they certainly never knew a diver to exceed two minutes.”(t) The same observation was made by Dr. Lefevre, of Rochefort, relative to the Navarino sponge-divers; he says that there was not one who could remain entirely submerged for two consecutive minutes.(u) Nevertheless, some cases, said to be authentic, have been reported, in which recovery has taken place after a much longer period of submersion.(v) The only exception to this rapid death in complete submersion is when the person falling into the water is in a state of syncope. As it is known that one may remain without respiration and circulation, in a state of apparent death, for a few minutes, or even longer, it may be admitted that occasionally a person falling or thrown into the water may suddenly faint from terror, and be rescued before respiration has returned. In illustration of this fact, a case related by Plater is often cited. A woman, condemned to be drowned for infanticide, fainted away at the moment she was thrown into the water. She was left in it a quarter of an hour, and upon then being drawn out recovered her senses.

(s) Brodie’s Lectures on Pathology and Surgery.

(t) Ibid.

(u) Med. Gaz., xvi. 608.

(v) *Vide* Assoc. Med. Journ., April 22, 1853; Med. Gaz., vol. xxi. p. 448; Ibid, xxix. p. 78; and Med. Times, Dec. 2, 1848, p. 125.

§ 945. II. *The time at which a drowned body will float*, or rise again to the surface after having been once sunk, appears to be subject to considerable variation. It depends upon the rapidity of the access of decomposition, and the body therefore rises sooner in summer than in winter; upon the density of the water itself (whether salt or fresh); upon the age and sex of the individual, children, females, and fat persons being comparatively buoyant; and also upon whether or not the body is clothed. The question is one not merely of scientific interest, but, as will be seen in the following case, may have important legal bearings.

“*Voltan and Adams v. The National Loan Fund Life Assurance Company.*”

“The action was brought by the plaintiffs, as assignees of this policy, to recover on a policy of insurance issued by the defendants upon the life of one Conrad Shoemaker. The insurance was for \$10,000, and the policy was issued on the 15th of May, 1850. The premium on the policy was payable quarterly in advance.

“On the 23d of August, 1850, Soemaker paid the premium for the quarter ending on the 15th of November, 1850. On the 4th of September, 1850, the plaintiffs alleged that Shoemaker was drowned, while on a fishing excursion with one Ottman, a German, in the waters of the bay of New York, about opposite to Hoboken, and nearest to the New Jersey shore. The theory of the defence substantially was, that Voltan, Martin, and Shoemaker (Germans) had entered into a conspiracy to defraud the insurance company, by causing an insurance to be effected for a large amount on the life of Shoemaker, and subsequently secreting and disposing of him.

“To obtain a recovery, it was, of course, necessary that the plaintiffs should satisfy the jury of the death of Shoemaker. This they attempted to do—1st, by the testimony of Ottman, who swore to the circumstances of his drowning, and of the time and place, which was on the 4th of September, 1850, about dusk, in the Hudson River, opposite Hoboken, and near midway of the river; 2d, by showing that a body *found floating* on the river near Jersey City, on the 7th of September, 1850, was the body of Shoemaker.

“This body was examined by the coroner of Jersey City, soon after being discovered. The skin was somewhat bleached, and the face disfigured; a part of the lips being eaten off by crabs, lobsters, or fish of some kind. After examination, it was interred by direction of the coroner.

“It was not attempted to identify this as the body of Shoemaker, except from some of the clothes found on it, and particularly the handkerchief on the neck. The handkerchief on the body was the half of a black silk one, with stripes, and cut from its mate diagonally. It was shown by a witness that Voltan, a short period before the alleged drowning, had purchased a handkerchief for his son, and, at the suggestion of Voltan’s daughter, it was cut in two, and half of it given to Shoemaker, after being hemmed by her; the other half to the son. The part retained by the son and the part found on the neck of the body were exhibited in court and found to match in color and stripes, and when laid together, formed a square, and although cut across the stripes, matched in the run and character of the stripes. The pantaloons were also shown to be of the same general character worn by Shoemaker, about the time of his alleged death.

“To rebut the presumption that this was the body of Shoemaker, a number of witnesses were sworn on the part of the defence, with the view of showing that, as a general rule, bodies will not rise and float, even when the water is of the temperature that it is in the month of September, under from six to ten days. As Shoemaker was alleged to have been drowned on the 4th of September, and the body was found floating on the 7th of September, three days afterwards, if it were universally true that bodies do not float until decomposition takes place, in the waters of the Hudson, under from six to ten days, then this could not be the body of Shoemaker.

“The first witness sworn on the subject was *Dr. Barent P. Staats*. He testified that he had had occasion, in the course of his professional reading, to examine the subject as to how long a body will remain in the water before rising and floating. That it depends on the time of year, and the temperature of the water, and the size and make of the man. When the temperature is 65°, he did not think any body would rise

in from less than seven to ten days. On his cross-examination, he said he did not know that he could point out any book that he had consulted.

“*Dr. Benj. Budd* was the next witness called. He testified that he was assistant-coroner in New York—has had occasion to see many drowned bodies—some one hundred and fifty. Never knew a body to rise in less than six days, unless some mechanical means were used to raise it. Should judge the body found at Jersey City to have been in the water from ten to twenty days. Has never known a body to be in the water less than seven days that was mutilated by fishes. Bodies that have been hooked up in three, four, or five days, have not that peculiar bleached appearance as those present that come up from seven to ten days. The body will not rise until decomposition has commenced. He is twenty-five years of age, and has only studied the book of experience.

“*Dr. Seth Geer* was then called. He testified that he was coroner in New York for eighteen months, during which time he had examined between three and four hundred drowned bodies. The general rule as to the rising of drowned bodies in the harbor of New York, is from eight to ten days. In his judgment, from the description given, the body found at Jersey City, had been in the water two or three weeks. Never knew a body that had been in the water but three days mutilated by fishes. The hotter the water, the sooner the body would bleach.

“*Andrew Blakeley* was then called. He testified that he was deputy coroner in New York a little over two years, during which time he examined rising two hundred and fifty drowned bodies. Drowned bodies would rise in the summer months on an average of from six to ten days, as he found out by experience. He did not remember any case of rising when the body had been in the water but three days. He never saw a drowned body that had laid in the water but three days eaten by fishes. On his cross-examination he stated that he had never read any medical book on the subject, nor did he know, except from testimony taken as coroner, of a body lying under water seven days. It takes a body from six to eight or ten

days to get bleached. He means by bleaching, a soaking of the body—a general softening and whitening of the body.

“*Henry C. Van Wie* was called on the part of the plaintiffs. He testified that he was coroner of the county of Albany for four years. Has held a good many inquests on drowned bodies. Has known two or three instances where the bodies have risen in three or four days. In warm or sultry weather they will rise in from three to four days. They will bleach out directly in warm weather. They will be mutilated by fishes directly after decomposition takes place. Remembers an instance of holding an inquest on a body that drifted ashore, and had been drowned four, five, or six days. (This witness related the startling fact of holding, in one season, inquests on fifteen infants under three months old, found floating in cigar boxes near the city of Albany—cases, doubtless, of infanticide.)

“*Henry C. Allen*, called for the plaintiffs. He testified that he had been coroner of Albany County for twelve or fourteen years. He never could make up his mind as to any definite time that a body would remain under water. He knew an instance of a girl of fourteen years of age, who was drowned on Friday at 12 o'clock, and floated on Sunday at 12 o'clock. She was drowned at Greenbush Ferry. Had known instances of bodies rising in five or six days; sometimes sooner. Knew of one man, by the name of Moreton, who floated on the fourth or fifth day. The girl spoken of had turned a dark livid color. Females float sooner than males.

“*George E. Cutler*, called by plaintiffs. He testified that he was coroner of Jersey City. He knew of the case of a young man who was drowned on Sunday, about 7 or 8 o'clock in the morning, and on Tuesday or Wednesday succeeding, about 11 o'clock, he was found floating about two miles from the place where he was drowned. He knew of a female by the name of Smith, was seen alive on Wednesday evening, about 7 o'clock; on Wednesday, about 4 o'clock, P. M., he was called to view the body floating. A person of temperate habits will bleach very quick; those who have been inveterate drinkers never will bleach.

“*John Osborn*, called by plaintiffs. He testified that he was coroner of Albany County three years. Had occasion fre-

quently to reclaim drowned bodies. Had known bodies to come up in two days, others not in several months. Had a case of an Irish girl. She had been drowned some two or three days; it might have been four. Had another case of a man, McCarregan, an Irish auctioneer, who rose in four or five days.

“*Silas M. Benton*, called for plaintiffs. He testified that he was acting coroner in 1847, 1848, and 1849, in New Haven (Conn.). He knew a case of a person, whom he saw on Friday, was missed on Saturday, and found floating in the water on Sunday. The man was a German, and a baker by trade.

“The verdict of the jury was in favor of the plaintiffs.”^(w)

The same question was largely discussed on the trial of Spencer Cowper, for the murder of Sarah Stout.^(x)

§ 946. In two cases mentioned by Dr. Taylor, bodies floated in a much shorter time. In one a woman, who was seen on the banks of a river at half-past eleven in the evening, was found drowned at eight o'clock in the morning. The body was floating on the water with the face downwards. In another, in the month of December, a factory girl fell into a river while walking along the bank in the evening. The body was found floating on the surface of the water the following morning. The bodies in these cases were clothed, and this, it is supposed, may have rendered them more buoyant.^(x')

§ 947. III. *Signs of death by drowning.*—In the enumeration of the evidences of this mode of death, it is assumed that the inspection is made shortly after the act has occurred and before putrefaction has commenced.

The *countenance* of the drowned is usually described as being natural and composed; the face is pale, but very soon becomes livid and swollen on exposure to the air, and especially in warm weather; the eyes are half open, and the pupils dilated; a light froth is observable about the mouth and nostrils, and the swollen and livid tongue reaches to the margin of the lips. These signs are not exclusively characteristic of death

(w) Am. Journ. Med. Sci., July, 1853, p. 263.

(x) Burke's Trials of the Aristocracy, 284.

(x') Med. Jur., 5th ed., p. 696.

by drowning—they merely render the cause of death by suffocation probable.

§ 948. 1st. *Paleness and coldness of the skin and cutis anserina.*—The first are ascribable merely to the presence of the body in a colder medium than the air, and are altogether destitute of significance as to the cause of death. The projection of the papillæ of the skin, commonly called goose-flesh, is deserving of more attention, for although it may have been caused by the coldness of the air, yet it cannot be produced upon a body already dead, by the chill of the water, unless, possibly, the body be thrown in while yet warm. Löffler very justly remarks, upon this sign: (y) “If we should find a body drawn out of the water in the summer time, and the *cutis anserina* on certain parts of the body not covered with the clothing, we should be fully warranted in the conclusion that it was due to the *sensation* of cold, and consequently that the individual was living on entering the water.” A singular case is reported in the second series of Casper’s observations, in which the opinion that a child two and a half years old was living when thrown into water, rested partly upon this circumstance. The *cutis anserina* was very evident upon the right side of the body and upon one of the thighs. The head having been enveloped in a cloth, neither froth was found in the lungs nor water in the stomach. The fluidity of the blood and the *cutis anserina* were, therefore, the only *medical* signs present.

§ 949. 2d. *Abrasion of the hands, mud and sand under the nails, and substances grasped in the hands.*—In the struggles made by a drowning person to save himself, he clutches wildly at every object in the water; hence, if it is not very deep, and the drowning person is near the bank, the fingers will most probably bear the marks of sand or gravel, and weeds, sticks, etc., will remain firmly grasped in the hands. Unless the substances found in the hands be such as are peculiar to the water, the other marks of injury upon them may have been received in a struggle upon the shore, or in a fall down a precipitous bank. Or, indeed, they may be produced after death by the hands striking against substances at the bottom of the

(y) Henke’s Zeitsch., 1844, 3 H. p. 6. Der Tod durch Ertrinken.

stream. Again, in many instances, these signs are not found at all—a fact which may be explained by the absence of struggling when the person enters the water in a state of unconsciousness from intoxication or other causes. Likewise, if the water be very deep, the body will not have reached the bottom until all its energies are lost and life is extinct.

§ 950. 3d. *Water and froth in the lungs*.—The fact that water is drawn into the lungs by persons who die by drowning, is, as a general fact, perfectly well established. It is found, either in substance, or mixed with air and mucus constituting froth. When found in substance, it may have been imbibed during life or have penetrated after death. If it have entered during life, it must be identical with the medium in which it is presumed the person was drowned, and sometimes it will contain mud, sand, or gravel, which has been dissolved or suspended in the water. Devergie relates a case in which sand and gravel were found in the trachea, and another is reported by Blumhardt, (z) of an epileptic who, having fallen into a shallow brook, was drowned, and on *post-mortem* examination, his trachea was found to contain from three to four drachms of sand and gravel. Metzger (a) examined the body of a newborn child that was drowned in the drain of a slaughter-house. The whole of the trachea to its bifurcation was filled with the liquid refuse. The presence of water in the lungs is not, however, a proof that it was taken in while the person was living. The fact that water will penetrate the lungs of a dead body, which is submerged, rests mainly upon the authority of Orfila, who made experiments which fully demonstrate its possibility. It is, indeed, true that most other experimenters have not succeeded, but they have made their trials, either with dead animals or with stillborn children. Löffler, however, in his experiments upon puppies, found that if the head were kept in a more or less elevated position, and the jaws separated by a piece of cork, the water readily penetrated after death into the lungs. The observations of Orfila, being upon the dead human body, are more to the purpose. He

(z) Wurtemb. Med. Correspond., Bl. iv. No. 1.

(a) Pyl's Aufsätze, St. 6, Fall. 5.

found that, by placing the body in a bath-tub and coloring the water with lampblack or indigo, the colored water could afterwards be found in the subdivisions of the bronchial tubes. In one case even, in which the body, thirty hours after death, was placed *upon its abdomen* in the colored water, the water had penetrated as far as the middle of the trachea. Perhaps, as a general rule, water will not be found in the lungs, if the person did not perish by drowning but was thrown in after death, because the head by its weight falls back, and an obstacle is thus placed to the entrance of the water. But, where a body has been thrown into a well, or is otherwise found in a posture favorable to the ingress of the water, the discovery of this fluid in the respiratory passages may with plausibility be assumed to be of post-mortem occurrence.

The *absence of water* from the lungs is certainly not sufficient evidence that the person was not drowned, because it is not invariably present in cases where the person has undoubtedly perished in this way. Moreover, it may have drained away, especially if such manœuvres have been used to resuscitate the person as by rolling him on the ground or suspending him by the heels. It may also disappear by transudation, when the body remains a long time in the water.

§ 951. *Froth in the lungs* has, on the other hand, greater significance as to the cause of death. Although found to a certain extent in other modes of suffocation, such as hanging and in epilepsy and extensive bronchitis, it does not present in these cases the same distinctive characters by which it may be recognized in death by drowning. In the cases referred to, it is very small in quantity, often bloody, and, being composed entirely of the mucous secretion of the trachea mixed with air, is viscid, in larger bubbles and closely adherent to the sides of the tube. The watery froth of the drowned is on the contrary abundant, foamy, made up of an infinite number of small bubbles which are easily separable, and which soon dissolve on exposure to the air. It often extends from the mouth to the smaller bronchial tubes, but is generally more limited in extent.

The *absence of froth* from the lungs cannot, however, be assigned as a proof that the person did not die from drowning.

Experiments have shown that in certain cases of drowning it is not formed. These are cases in which, from any cause, the person has not risen to the surface to breathe. Piorry, Orfila, and others have shown, that, when animals are completely immersed in water and forcibly held there until dead, no froth is found in their lungs; but if, on the contrary, they are allowed to struggle and come to the surface, it is formed abundantly. Again, from its very nature, this sign is evanescent. If the body have lain for several days in the water, if it have been removed from the water with the head depending, or, finally, if the inspection be not made soon after its removal, especially if the weather be warm, the froth that may possibly have existed will no longer be found. In Dr. Ogston's observations, the watery froth in the lungs was not found later than fifty-five and a half hours after drowning in summer, and the fourth day in winter. This author states, also, that he met with a case of poisoning with laudanum, in which a light watery froth like that of the drowned was found in the trachea.(b)

Hence we may conclude, that the more extensively the froth is found in the respiratory passages, the greater will be the probability of death having taken place by drowning, and of the struggle having been active and prolonged before the extinction of life. Unless there are marks of strangulation upon the body, pathological proof of bronchial catarrh, or evidence that the person has been subject to epilepsy, the sign is positive and conclusive of death by drowning. If, on the other hand, no froth is found, this circumstance is no proof that the person did not die by drowning, unless the inspection was made soon after death, the body having been carefully removed from the water, or unless other injuries sufficient to have caused death were discovered. Even then, it cannot be regarded as conclusive.

§ 952. 4th. *Water in the stomach.*—Water is always swallowed in greater or less quantity, by a drowning person who retains sufficient consciousness to make a struggle for life. It will not, however, always be found, if the inspection have been

(b) Lond. Med. Gaz., 1851, p. 762.

delayed for a long while, or if the popular means have been employed to restore him to life, by getting rid of the water in the stomach. Furthermore, there are certain cases in which the person falls into the water already asphyxiated, or stunned by a blow or a fall, in which case, consciousness not existing, no struggle will be made, and, consequently, no water swallowed. When, however, water is found in the stomach, it may have been swallowed immediately before the presumed accident. Casper (c) relates an interesting case in which a child two years old, playing in the neighborhood of a stream, being thirsty, drank eagerly a large quantity of water given to him by his nurse. She left him for a moment, and on her return, found that he had fallen into the water, and was already drowned. In this case, the usual signs of suffocation were wanting, there was no watery froth in the trachea or bronchia, but the blood was remarkably fluid, and the stomach filled with water. Hence it is necessary to observe whether the fluid in the stomach is identical with that in which the person apparently was drowned, for although the result will frequently be a negative one, yet it is often possible to detect sand, gravel, parts of water-plants, etc., in the œsophagus and stomach, which it is highly improbable would have been voluntarily swallowed. If the individual be discovered lying in a morass, a stagnant pool, or a privy well, there will be, of course, no difficulty in recognizing the liquids from such places, if found in the stomach.

§ 953. The objection to the evidence from the presence of water in the lungs, that it may have penetrated thither after death, cannot be applied to the sign under discussion. Experiments by Riedell, Champeaux and Faisolle, Maschka, Viborg, Kansler, Orfila, and Piorry, on the dead bodies of animals and men, have fully established the certainty, that water does not enter the stomach *after death*, unless putrefaction is far advanced. Hence the conclusion is warranted, that, if the water can be recognized as identical with that in which the individual apparently was drowned (unless it was drunk pre-

(c) Gericht. Leichen öfhnungen. Fall. 77.

vious to submersion) he must have swallowed it in his drowning struggles.

§ 954. 5th. *The general signs of death by asphyxia* are found on drowned persons. Contrary to the once prevailing opinion, that apoplexy was the cause of death in drowning, an extravasation of blood in the brain is rarely met with in the drowned. Those who are predisposed to apoplexy, and who suddenly enter cold water, particularly when the stomach is full, may be struck with apoplexy; or those who fall on the head, from a height, into the water, may rupture one of the cerebral vessels, but the reader should bear in mind that this is neither a necessary nor a usual condition in those who simply die from drowning. Even a congestion or fulness of the vessels of the brain is not constantly observed, and the appearances often described as such are most probably cadaveric, and due to the depending position in which the head is generally found.

The amount of congestion of the brain depends usually upon that of the thoracic viscera. The lungs appear fuller and more voluminous than usual, sometimes overlapping each other in the anterior mediastinum, but do not contain much blood.(d) The ecchymoses which are found beneath the pleura, pericardium, and pericranium, in all cases of suffocation, and in some of strangulation, are never found after death by drowning (Tardieu). M. Faure(e) has called attention to the emphysematous condition of the lungs resulting from the rupture of the pulmonary vesicles and the escape of air mixed with water from them into the intra-vesicular structure, as a distinctive sign of death by drowning, and as being available, therefore, in helping to determine whether a body found in the water was thrown there after death, or is that of a person who died by drowning. Such lungs are remarkable for retaining their natural shape, and for their unusual weight. The heart always contains, in its right half, fluid or loosely coagulated blood, and is distended with it if the lungs are at the same time overloaded.

According to some authors, the blood is always completely

(d) Bock, *Gericht. Sectionen.*, p. 44.

(e) *Arch. Gén.*, 5ème sér. xii. 301, and xv. 474.

fluid, but this statement is liable to exceptions, as coagulated blood has been found in some well authenticated cases of drowning, and also in experiments upon animals which have been killed in this way. (*f*) The abdominal organs are usually found much congested, especially the liver and kidneys. If the drowning have taken place during the process of digestion, the stomach, as observed by Orfila, presents a violet color. The bladder sometimes contains urine, at others not; as a sign of drowning, it is of the most complete insignificance. Retraction of the penis is given by Casper as a sign peculiar to death by drowning.

§ 955. 6th. *Marks of violence.*—The first point to be determined in all cases where marks of violence are discovered upon the bodies of persons found in the water, is, whether the individual was really drowned. This is rendered necessary by the fact that persons are not unfrequently thrown into the water dead, or supposed to be dead, after criminal violence has been employed, and it is hoped in this way to conceal the cause of death. Moreover, suicides endeavor sometimes to destroy themselves by drowning, when they have failed by other means. If it can be shown, from an absence of the signs of drowning before enumerated, that the person was probably dead at the time of submersion, it will, of course, not be necessary to consider the possibility of the injuries having been accidentally received at that time. The character and extent of the wounds or other injuries will often enable us to determine very nearly at what period they were received. Indeed, it is only by a careful examination of these, and a comparison of them with those which could possibly be made accidentally in drowning, or immediately afterwards, that we can hope to approach to a correct judgment of the case. A person falling from a height into the water may sustain various severe injuries, especially if the water be shallow and he fall upon the head. Fractures and even dislocations have been produced by this means. The first may be caused by sudden, violent contact with some hard body in the water, or at its bottom; the second is illustrated in the case of a man

(*f*) Taylor, Med. Jur.

who for a wager jumped from the parapet of London Bridge, and dislocated both arms, probably in consequence of holding them in a horizontal position. Besides these injuries, various contusions and lacerations may occur in drowning or immediately after it, from accidental violence, sustained by the person in his drowning struggles, his body being possibly thrown against projecting rocks, roots of trees, or sharp pieces of wood or iron. Sometimes a mark, similar to that made in hanging, is found upon the neck of persons who have been accidentally drowned, and caused by the pressure of the collar or fastening of the dress rendered tense by the imbibition of water.

A case is recorded (*g*) in which the body of an old man, who had voluntarily drowned himself, was drawn out of the water by means of a rope fastened round the neck for the purpose. This was done probably half an hour after death. The thyroid cartilage was broken into several pieces, and there was a distinct ecchymosis over it, made by the rope.

It is the province of the physician to determine whether these injuries could have been produced in this fortuitous manner, but most of the circumstances which throw light upon these doubtful cases come properly under the cognizance of the jury. There are some injuries, on the other hand, which are of such a nature as to indicate that they were inflicted previous to drowning. They are such as cannot be attributed to any cause incidental to drowning, but must have been either self-inflicted or homicidal. They are stabs, gunshot wounds, incised wounds of the neck, etc. In estimating the cause, nature, and effect of these injuries, the physician will be governed by the facts referred to in the chapter on Wounds, since evidently the circumstance of subsequent immersion will not materially affect the distinction between homicide and suicide. If, however, the body have lain long in the water, and especially if the process of putrefaction have begun, the information derivable from the marks of violence upon the body will be greatly impaired in value. Not only will the coagula, wherever the water has gained access,

(*g*) Henke's Zeitschrift, für 1844, H. i.

be dissolved and washed away, but the size, direction, and color of the wound will be altered. The cause of this fact will be fully apparent from a consideration of the structural changes made by the process of decomposition.

§ 956. 7th. *Putrefaction, etc.*—A body which is taken out of the water presents a pale and bleached appearance, which is more striking the warmer the temperature of the water. In summer it is observable in a few hours; in winter, not until several days after death. After the body has been removed from the water, and while still fresh, the face and head, the neck and the breast as far as the middle of the sternum, acquire one after the other a brick-red appearance. But the putrefactive process very soon begins, and spots of a bluish-green color appear in the midst of this redness, and generally are first evident upon the temples, ears, and nape of the neck, and then on the neck and breast. These spots mingle together, and more rapidly when the body has lain long in the water, so that in summer, after eight to twelve days, and in winter, in twelve to fourteen days, the whole head, neck, and somewhat later the breast also have acquired a dirty-green color, with interspaces of dark red. Casper says that it is not unusual to see bodies of the drowned which exhibit this striking putrefactive change, while at the same time the rest of the body, particularly the abdomen and extremities, retain their pale color. In water of the temperature of 50° to 54° Fahr., the body becomes rigid in a few hours. The skin assumes a yellowish-white color, the lips become blue, and the joints inflexible.

§ 957. After the lapse of from three to ten days, the condition of the body undergoes a marked change. The development of gas becomes so great as to cause the body to float, and in the course of the second week, the skin becomes emphysematous, the cuticle loose, and the parts of the body which are above the surface of the water acquire tints of green, blue, and brown, and become dry and parchment-like. If the body has rolled about in the water, as will be the case where the current is rapid, these changes take place more gradually. If taken out of the water about this time, the features become in a few hours scarcely recognizable in consequence of the

swelling and discoloration, the latter being blackish-green; the whole of the body is swelled and puffy, and the scrotum often distended to the size of a child's head. The penis, on the contrary, is very much shrunken. The internal organs, with the exception of the brain, are comparatively fresh in their appearance. If the body, however, have remained in the water, and the weather be cool, few changes worthy of note take place during the next six or seven weeks. But about the third or fourth month the skin has become so much eroded in various places, but especially over the inguinal region, that perforations will be found leading to the various cavities of the body. In consequence, the gases generated by decomposition escape, and the body sinks again in the water. The skin and the muscular tissue become transformed into incrustations of adipocere, and the bones are so loosely held together, that portions of the skeleton are apt to be separated. The time which a body has lain in the water cannot be determined with any precision, after the process of putrefaction has once commenced. The rapidity and character of the alterations which it undergoes vary according to age, sex, habit of body, temperature of the water and the air, depth of the water, and whether salt or fresh, stagnant or running, the attacks of fish and birds of prey, and finally whether the body is clothed or not.

Hence it may be inferred, from these remarks, how easily, after the body has lain some time in the water, the external features of wounds and other injuries may be masked by the progress of putrefaction and the imbibition of water by the skin.

§ 958. IV. *Accidental or otherwise.*—Infants and the infirm and aged may be accidentally drowned in very shallow water, as may also, indeed, adults who fall into it, the mouth downward, in a fit of epilepsy or helpless from intoxication. A man was in the act of leaving a privy, when he was seized with an epileptic fit and fell with his face in a piece of dirty water, which did not exceed a foot and a half in breadth, with a depth of from three to four inches. When discovered after death, only his mouth and nostrils and one cheek were

found to have been under water.^(h) Moreover, persons bent on suicide have been known to destroy themselves in this way; a case is related by Dr. Smith in which a woman thrust her head in an opening which she had made in the ice and so perished. Where, however, persons are found drowned in shallow water, the natural presumption will be that they have been forcibly held there by one or more murderers. It is only by the absence of any marks of violence, that we may infer that the act may have been suicidal or accidental.

§ 959. The presence of ligatures upon the hands and feet, and of weights attached to the body, rebuts the presumption of accidental drowning, but does not prove that it was homicidal. In a case which occurred in Paris, the body of a man was found in the river, his neck, legs, and hands being fastened together by a cord furnished with slip knots. It was proved that he had died by drowning, and had himself secured the cord, to insure a more speedy death.⁽ⁱ⁾ If, however, as is remarked by Mr. Taylor, the limbs bear evidence of violent constriction from the cord, and especially if these marks are found on the forepart of the neck or on *both wrists*, the presumption of murder becomes very strong. In another case, the body of a man was found in the water, with his legs tied together, over the trowsers, below the knee. The right wrist was fast-

^(h) Dr. Ogston, Med. Gaz., May 2, 1851. Dr. Taylor, in his critique of the medical evidence in the case of Kirwan (Dublin Quarterly Journal, Jan. 1853), says: "Persons while bathing, or exposed to the chance of drowning, are often seized with fits which may prove suddenly fatal, although they may allow of a short struggle; the fit may arise from syncope, apoplexy, or epilepsy. Either of the last conditions would, in my opinion, reconcile all the medical circumstances of this remarkable case. It is the result of twenty years' experience in the investigation of these cases, that the resistance which a healthy and vigorous person can offer to the assault of a murderer, intent upon drowning or suffocating him or her, is in general such as to lead to the infliction of a greater amount of violence than is necessary to insure the death of the victim. The absence of any marks of violence or wounds on the body of Mrs. Kirwan, excepting such small abrasions as might have resulted from accident, may be taken in support of the only view which, it appears to me, can be drawn, namely, that the death was not the result of a homicidal drowning or suffocation, but most probably of a fit resulting from natural causes."

⁽ⁱ⁾ Ann. d'Hygiène, 1833, i. 207.

ened in a noose, and the free end of the cord, after passing around the body, was loosely tied or wrapped around the left. This latter circumstance, together with the absence of marks of violence, rendered it probable that this also was a case of suicide.(j)

CHAPTER XII.

SIGNS OF DEATH.(k)

- I. Cessation of the respiration and circulation, § 960.
- II. Filmy aspect of the eyes, § 961.
- III. Pallor of the body, § 962.
- IV. Extinction of animal heat, § 963.
- V. Relaxation of the muscles, § 964.
- VI. Relaxation of the cornea, § 965.
- VII. Flattening of the fleshy parts, § 966.
- VIII. Suggillations, § 967.
 - 1st. External, § 968.
 - 2d. Internal, § 970.
 - (1) Lungs, § 971.
 - (2) Brain, § 972.
 - (3) Kidneys and intestines, § 973.
 - (4) Heart, § 974.
- IX. Cadaveric rigidity, § 975.
- X. Putrefaction, § 977.
 - 1st. Fat, etc., § 978.
 - 2d. Women after childbirth, § 979.
 - 3d. Newly-born infants, § 980.
 - 4th. Manner of death, § 981.
 - 5th. Effect of external agents, § 982.
 - (1) Exposure in the open air, § 982.
 - (2) Moisture, § 983.
 - (3) Heat, § 984.
 - 6th. External signs, § 985.
- XI. Saponification, § 986.
- XII. Mummification, § 987.

(j) Casper's Vierteljahrschrift, 1854, Heft i. p. 167.

(k). This chapter is mainly drawn from Dr. Casper's Pract. Hand. Gericht. Med., Berlin, 1857; Liman's ed., Berlin, 1871.

XIII. Decomposition of internal organs, § 988.

- 1st. Windpipe, § 989.
- 2d. Brain of infants, § 990.
- 3d. Stomach, § 991.
- 4th. Intestinal canal, § 992.
- 5th. Spleen, § 993.
- 6th. Omentum and mesentery, § 994.
- 7th. Liver, § 995.
- 8th. Brain of grown persons, § 996.
- 9th. Heart, § 997.
- 10th. Lungs, § 998.
- 11th. Kidneys, § 999.
- 12th. Urinary bladder, § 1000.
- 13th. Esophagus, § 1001.
- 14th. Pancreas, § 1002.
- 15th. Diaphragm, § 1003.
- 16th. Arteries, § 1004.
- 17th. Uterus, § 1005.

§ 960. I. *Cessation of the respiration and of the circulation*, so that no pulsation or murmur can be discovered even with the aid of a stethoscope.

§ 961. II. *Filmy aspect of the eyes.*(*l*)

(*l*) M. Bouchut, in *La Tribune Médicale*, No. 47, 1868, gives some signs of death as supplied by ophthalmoscopic examinations.

"1. We are able either with the aid of the ophthalmoscope or by means of atropine to distinguish real from apparent death, and thus to guard against the dangers of premature inhumations.

"2. If death is but apparent, the cornea is translucent, the papilla of a rose-red color, and the fundus of the eye red and furrowed by the arteries and veins of the retina.

"3. After death we may observe with the ophthalmoscope that the transparent cornea is wrinkled, and like in appearance to a piece of moistened window-glass, which prevents our seeing clearly the objects behind it.

"4. At the very instant of death, the choroid loses its red color, and becomes pale, nacreous, or gray, like tarnished lead.

"5. With its change in color after death the choroid acquires a pale tint similar to that of the papilla, so that the extremity of the optic nerve, being no longer made apparent by the red fundus, becomes almost invisible.

"6. Although, after death, the papilla of the optic nerve is no longer recognizable by its color, its place may still be indicated by the venous trunks which radiate from it as a common centre.

"7. Death causes the central artery of the retina to disappear, by removing from it all the blood that it contains.

"8. In consequence of death, the veins of the retina are contracted, or

§ 962. III. *Pallor of the body.*—Persons of a very ruddy complexion, however, often retain a high color for some time after death. Red or livid rings around ulcers on the foot, etc., do not disappear. This is also the case with tattoo marks, jaundice, and discolorations produced by a blow received some time previous to death.

§ 963. IV. *Extinction of animal heat.*—This is a gradual process, and the time required to produce it varies with the condition of the body at the time of death, with the manner of death, and with the medium in which the body is kept after death. Fat bodies, for example, retain warmth, *cæteris paribus*, longer than those which are lean. The same is said to be true of the bodies of persons killed by lightning, and it is certainly the case with all such as perish by any kind of suffocation. Very much depends upon the temperature of the medium in which the body is kept. It is well known that a dead body if thrown into water will cool very rapidly, while if thrown into a dung-heap, or the vault of a water-closet, or even if closely covered in a bed, it will cool very slowly. As a gene-

partly disappear, and the blood arrested in their interior presents more or less extensive interruptions, which hinder us from following the vessels along the whole of their intra-ocular course.

“9. When in a state of apparent death, a solution of atropine placed between the lids always produces at the end of a quarter of an hour a great dilatation of the pupil.

“10. When death is real, the solution of atropine produces no effect on the pupil, so that the absence of dilatation of the iris after the application of this agent ought to be considered as a certain sign of death.”—*Half-Yearly Abstract of the Med. Sci.*, 1868, vol. xliii. p. 101.

It is important to bear in mind, however, that in some cases the pupil will respond to atropine and Calabar bean for some hours after death. Borelli found that, “in exceptional cases, effects followed their application as long as twenty-four hours after death. He found the result of their application less marked in cases where death had resulted from old age or marasmus. The period of time that had elapsed after death also influenced the result. A reflection of the myotic action of the Calabar bean from one eye to the other was also noticed, which was never seen in the case of the mydriatic action of atropia. This difference Borelli attributes to the fact that the brain, which is the organ of reflex action for the circular fibres of the iris, preserves its vitality longer than the great sympathetic which innervates the radiating fibres.”—*Am. Journ. Med. Sci.*, April, 1872, p. 562, from *Edinb. Med. Journ.*, Nov. 1871, and *Giornale d’Oftalmologia Italiano*.

ral rule, bodies become entirely cold within from eight to twelve hours after death.

§ 964. V. *Relaxation of the muscles* generally begins immediately after death, and is the earliest symptom of the extinction of the turgor vitalis.

Want of electro-muscular contractility.—Dr. Taylor states that failure of a superficial muscle to respond to galvanic stimulus may be taken as a certain sign of death in a body.⁽¹⁾

§ 965. VI. *The relaxation and sunken state of the cornea* after death is well known. Still more remarkable is the suppleness or pliancy of the eyeball. Up to the last moment of life the eyeball uniformly remains elastic, and resists any pressure of the finger; but within twelve or eighteen hours after death this resistance ceases, and the ball becomes gradually softer and softer, until decomposition takes place.

§ 966. VII. *The flattening of the fleshy parts* upon which the body rests; not only on the back and sides, but also the calf of the legs, on the upper and lower extremities, on the thighs, etc., according to the position of the body at the time of death and subsequently.

§ 967. VIII. *Suggillation,*⁽²⁾ or livid discoloration, is the result of the settling of the blood in obedience to the law of gravity. Hence it occurs upon the depending parts of the body, as on the back, on the calf of the leg, on the face, on the ears, and on the sides of the breast. It begins to appear within ten or fifteen hours after death, and the spots increase in size until decomposition takes place. As suggillation furnishes in itself satisfactory evidence of the reality of death, we shall notice it further, distinguishing, for the sake of convenience, between external and internal.

§ 968. 1st. *External suggillations, or death spots.*—These deserve careful attention, because they may be easily mistaken by the inexperienced for ecchymoses, or bruises, and conse-

(1) Med. Jurisprudence. Sixth Am. ed. p. 59.

(2) This word is now most commonly employed as synonymous with *cadaveric lividity*, to describe those violet-colored spots which form upon the dependent portions of dead bodies by the influence of gravity.—*Nysten, Dict. de Méd.* 11ème éd.

quently for traces of violence inflicted during life. The scalpel, however, furnishes an easy and certain test by which the two may be distinguished. In post-mortem suggillations, an incision, no matter how bold and deep, will never cause liquid or coagulated blood to appear in the wound. At the most, only small specks of blood will be seen arising from the division of small veins of the skin. But wherever there is the least ecchymosis, an incision will be followed by a flow of blood. As this is the only decisive test between these two appearances, which in many respects are so much alike, it should never be omitted by the examining physician.

§ 969. The color of suggillations varies but little between bluish-red, scarlet, and copper-red. They are never raised at all above the level of the skin, as is often the case with ecchymoses. They also assume different shapes—round, oblong, or angular. At first they appear in separate spots, having the size of a walnut, of an apple, of the hand, etc., until they gradually run together and cover large portions of the body—as the half or the whole of the back. These spots are not affected by age, sex, or constitution, and follow upon all kinds of death, not excepting death by hemorrhage. Engel maintains that suggillations may be caused to disappear by making an incision into them, and allowing that part of the body in which they are to lie dependent. But Dr. Casper remarks that, after a great number of experiments, he had never seen one entirely disappear, although they become somewhat smaller and paler.

§ 970. 2d. *Internal suggillation* (hypostatic congestion) appears in several different organs, but chiefly in the lungs, in the brain, the kidneys, and intestines.

§ 971. (1) In the *lungs* it is seen very frequently. It makes its appearance, according to Orfila, within from twenty-four to thirty-six hours after death, but there is no doubt that it often arises far earlier than this, at the time that the blood in general begins to settle. In the case of bodies which have remained lying on the back, both lungs at their posterior part, or about a fourth part of the whole parenchyma, will be found of a much darker color than the rest, and, on being laid open,

an evident sanguineous engorgement will be seen, even when these organs are anæmic. This is so striking that it may easily mislead the inexperienced, and cause them to attribute the death to apoplexy of the lungs, pneumonia, etc. This is especially apt to be the case where the blood is unusually dark, and where œdema of the lungs had existed.

§ 972. (2) *In the brain.*—It is important to observe that hypostatic congestion often occurs in the brain even in cases of death by bleeding; so that a quantity of blood in the cerebral veins generally, and especially in the posterior sinuses, is no evidence against this manner of death. Whether, in case this condition do not appear soon after death, it can afterwards be made to appear by changing the position of the body, is doubtful. This common appearance of hypostatic congestion in the brain must not be mistaken for active hyperæmia, as may easily be done by the inexperienced, who are thus led to attribute death to an attack of apoplexy where none existed.

§ 973. (3) *In the kidneys and intestines.*—Hypostatic congestion occurs in the kidneys and other organs of the abdomen. It is especially common in the organs which lie in the pelvis. The bluish-red color which appears on the dependent folds of the intestines may easily be mistaken for disease, whereas it is only a cadaveric phenomenon. The diagnosis, however, is easily made by drawing out the whole mass of intestine, when the arborescent appearance will be seen to occur at regular intervals. When the body has remained resting on the back, the posterior half of the kidneys becomes discolored, and in this way may easily be distinguished from a general hyperæmia in this organ.

§ 974. (4) *The heart.*—Suggillation does not occur in the heart; but as this organ exhibits more than any other the so-called *polypus*, a very important formation as regards medical jurisprudence, it may be conveniently noticed here. These heart polypi are merely coagulated fibrin, and are either clear and white, or colored red by the blood. It is not to be admitted that this coagulation of the blood occurs before death, as an ordinary phenomenon, although in cases of a protracted agony it may take place in this long interval between life and death. As a general rule it takes place after death, and as the

body gradually grows cold. Hence, where coagulated blood is found in wounds upon a dead body, it cannot safely be concluded that the wounds were produced before death, upon the ground that "blood cannot coagulate after death." This is one of the many erroneous notions which have remained undetected, from the habit of treating medical jurisprudence in a merely theoretical way. Engel is right when he says, "I do not believe that there is any disease or manner of death after which blood does not coagulate in the dead body. Some special case where it has not occurred may be cited, but many other cases may be adduced where it has occurred after the same disease or manner of death." This coagulation of the blood must follow peculiar laws which are as yet unknown; for it not only takes place after those kinds of death of which a fluid state of the blood is characteristic—as after different kinds of suffocation—but, what seems quite inexplicable, the coagulation occurs in many organs and vessels sooner than in others, not only in the heart (the right ventricle), but also in the inferior vena cava, the liver, etc. The proposition that "coagulated blood around or in a wound shows reaction during life, because no coagulation of the blood can take place after death," is, with all its consequences, erroneous.

§ 975. IX. *Cadaveric rigidity*.—This mark of death is well known. It occurs within tolerably wide limits, but commonly between twelve and twenty hours after death, and lasts from one to seven days. After this rigidity passes off the body again becomes as pliant as before. The primary cause of its appearance is unknown. After death from narcotic poisons it does not take place, or, at least, only for a short time. Neither is it observed, according to Casper, in the body of the immature fœtus. These two cases constitute, perhaps, the only real exceptions. There is a great difference of opinion as to the longer or shorter continuance of cadaveric rigidity after certain specific diseases. A low temperature of the air and the use of alcohol tend to prolong it. Cases are cited by Dr. Casper, in which he observed it after two, four, six, and eight days. The stiffness of a frozen body may easily be distinguished from cadaveric rigidity. In the former case the whole body is as

stiff as a board, while in the latter some suppleness about the joints of the knees and elbows always remains.

§ 976. Where the above marks are observed it may be concluded that the body is that of a person who has been dead from two to three days. (*m*)

(*m*) The subject of cadaveric rigidity has been very thoroughly investigated by Dr. Kussmaul, whose essay upon the subject also presents an epitome of what had previously been written concerning it. (See Prager Vierteljahrs. l. 67.) From this it would appear that, whatever may be the cause of death, the phenomenon in question is never totally wanting. It has been observed by Bertelsen and by Ehrmann, even in the fœtus removed by Cæsarian section from the womb. Yet it may occupy certain portions only of the body. It is usually observed first in the neck and the muscles of the lower jaw, whence it extends both upwards and downwards. In a limb it can, if complete, be removed by forcible flexion; and if not complete, the flexed limb will become rigid again. The period after death at which it begins and that at which it ends are entirely variable. It may commence within an hour, or be delayed for a whole day, and it usually appears latest in the bodies of vigorous and muscular persons. In them, also, it generally lasts longest, and in cold weather may continue for eight or ten days; but when the weather is hot and the body emaciated it may disappear in the course of ten or fifteen hours. Kussmaul lays it down as a law that whatever powerfully depresses the vitality of the muscular fibre favors the speedy supervention of its rigidity. Oxygen, it is stated, being the agent upon which its vital power depends, the more rapidly the influence of this agent is withdrawn the earlier will rigidity occur. We see this condition supervening rapidly in animals which consume a large proportion of oxygen in breathing, as birds, while in those which consume but little air, as the amphibious animals, it is very tardily developed.

It is stated in the text that warmth delays while cold hastens cadaveric rigidity; but such a statement would seem to be applicable only to the extremes of temperature; and hence it matters little in reference to this point whether a body is covered with the bedclothes or is naked, or whether it is exposed to the average temperature of winter or summer. Sommer placed two stillborn infants in a bath at 90°-100° F., immediately after their birth. In from three to four hours rigidity developed itself and reached its maximum in six hours.

The essential cause of cadaveric rigidity is not well known. Brücke, and after him Kühne, have given plausible reasons for supposing it to depend upon the coagulation of the fibro-albuminous fluid which imparts moisture to the organs. (Prager Vierteljahrs. lxi. 93.) Other explanations have been proposed, but none suffice.

It has been shown by Orfila, and more recently by Dr. Ogston (Brit. and For. Med. Rev., April, 1857, p. 303), that under the general title of cadaveric rigidity two conditions have been confounded which are apparently distinct from one another. The one comes on at a variable period after death, and

§ 977. X. *Putrefaction*.—The rapidity with which the process of decomposition takes place depends partly upon the condition of the body, and partly upon external causes.

§ 978. 1st. Fat, soft, lymphatic bodies putrefy, *cæteris paribus*, far sooner than those which are lean, because the quantity of moisture in them favors the work of decomposition. This will account for the fact that the bodies of very aged persons generally decompose more slowly than those of others.

§ 979. 2d. The bodies of women who die soon after childbirth, from whatever disease, decompose very rapidly. But it is not to be supposed that difference of sex, in itself, affects the process.

§ 980. 3d. It is known that the bodies of newly-born infants decompose, *cæteris paribus*, sooner than other bodies. But it must be observed that in the great majority of cases the bodies of infants judicially examined have been subjected to influences to which other bodies are seldom subjected. In most cases the body has been exposed in the open air naked, or only slightly covered.

§ 981. 4th. The process of decomposition is materially affected by the manner of death. After the sudden death of a person in health the body decomposes much less rapidly than after an exhausting sickness, or a disease which impairs the blood, as typhus or putrid fever, organic dropsy, tubercular disease, etc. The process is also very rapid in the case of bodies which have been much bruised or mangled. Those cases, however, must be excepted in which the body remains

the other, which the former writer terms *spasmodic rigidity*, and the latter *cadaveric spasm*, commences at the latest instant of life, and continues until the muscular tissues have begun to alter under the influence of the putrefactive process. Like ordinary cadaveric rigidity, it differs from tetanic spasmodic rigidity in this, that, as Kussmaul has shown in the form last named, the bent limb when forcibly straightened tends to resume its previous posture, while in both of the other forms the limb retains the position in which it is placed. There are numerous instances in which persons have been found dead in a sitting posture from which they must have fallen but for this cadaveric spasm, and Dr. Ogston relates the case of a man who committed suicide by hanging, and between whose knees a Bible was found, retained solely by the lateral pressure of the closely adducted thighs.

protected from the air, as when buried underneath fallen walls, etc. The bodies of persons suffocated by smoke, coal-gas, and sulphuretted hydrogen-gas, decompose very quickly. Decomposition also takes place speedily after death from narcotic poisons. This is not so much the case after death from other poisons, especially after poison by phosphorus. Where a person has been poisoned by sulphuric acid, the process of decomposition is decidedly retarded, probably because the acid hinders the disengagement of ammonia. In the case of persons who have been killed by a stroke of apoplexy, while in a state of drunkenness, the body has been observed to remain sound an unusual length of time, owing to the well-known anti-putrescent powers of alcohol. Where death is produced by arsenic, decomposition takes place as usual up to a certain point, after which it ceases and mummification begins.

In addition to the above-mentioned influences which affect the process of decomposition, there must be others, as yet unknown to us. As evidence of this fact, Dr. Casper cites a case in which he examined the bodies of fourteen men, all of about the same age, who had followed the same course of life, and who had been killed at the same moment by a single cannon-ball. In all of these cases the progress of decomposition was different. The same author cites also the case of a married couple, of nearly the same age, who had been suffocated during the same night by coal-gas. The bodies had been subjected to the same influences up to the time of examination, and yet the back and belly of the man were quite green, the windpipe was brownish-red, etc., while the body of the wife, an uncommonly fat woman, was perfectly sound both without and within.

§ 982. 5th. *Effect of external agents.*—The external agents which affect the process of decomposition are Air, Moisture, and Heat.

(1) Bodies left uncovered in the open air decompose, *cæteris paribus*, far sooner than others. It is not uncommon to find in the case of persons who have been drowned with their clothing on, that part of the leg which is protected by the boot quite sound, when the rest of the body is almost decomposed. Owing to this influence of the atmosphere, the rapidity of de-

composition will be affected by the manner in which the body is clothed, by the kind of coffin in which it is inclosed, by the soil in which it is buried, and by the greater or less depth of the grave. It is well known, for instance, that pine coffins will soon decay and leave the inclosed bodies exposed. So, too, bodies interred in shallow graves are less protected from the decomposing effect of the atmosphere, than those which are interred deeper. A stiff, clay soil shuts out the air more effectually than a porous, sandy soil. But this effect of difference of soil may be more than counterbalanced by the presence or absence of another agency, viz., moisture. Clay or turf soils are apt to contain more moisture than sandy soils, and hence promote to a greater extent decomposition.

§ 983. (2) In proportion to the amount of moisture will be the greater or less rapidity of decomposition. Hence bodies which remain in water, decompose much more quickly than those which are buried in the earth.

§ 984. (3) Although heat of itself has a tendency to dry up the body and thus to check the process of decomposition, yet, when united with the above-mentioned agencies of air and moisture, it promotes the process very greatly. This is seen in the fact, that a body exposed in summer at a temperature of 68 or 78° F., will, in the course of one or two days, be quite unfit for the dissecting-table, while in winter, at a temperature of 14° to 20° F., this will not be the case after ten or twelve days. The same effect of temperature is seen where the body is kept in water. If frozen in ice, it will remain sound a very long, and, indeed, an indefinite time, as is proved by the mammoth found in Siberia, parts of which are still preserved in the University of Moscow. A body kept in water at a temperature of from 35° to 45° often shows, after ten or twelve days, the marks of strangulation, while at a temperature of 70° or 75° these disappear in from five to seven days. It must also be observed, in this connection, that, when the water is deep, the temperature at the bottom differs perceptibly from that at the top, the latter being more affected by the sun. Hence, a body floating on the top of the water will decompose more rapidly than one remaining at the bottom. A body taken out of the water, and exposed to the atmosphere,

will undergo decomposition to a greater extent in a single day than it would have done in two or three days, had it remained in water. A higher or lower temperature of the earth quickens or retards decomposition in the same way as a higher or lower temperature of the water.

Dr. Casper estimates the comparative effect upon a dead body of exposure to the air, and of protection in water or in the earth, as follows: "A body, when freely exposed in the open air, will ordinarily undergo as much decomposition in one week or month, as it would in two weeks or months if kept in water, or in eight weeks or months if buried in the earth after the usual manner. This, of course, is offered only as a general rule. In each individual case allowance must be made according to the circumstances."

§ 985. 6th. *External signs of decomposition.*—In describing these appearances, bodies which have been exposed, from the time of death, in the open air, may be taken as types.

(1) The first appearance, in order of time, is a greenish color upon the surface of the belly, accompanied with the smell peculiar to putrefaction. This discoloration arises between twenty-four and seventy-two hours after death, according to the condition of the body and the temperature of the medium in which it is kept.

(2) Within the same period the cornea becomes soft, yielding to the pressure of the finger.

(3) Within from three to five days after death, this green color spreads over all the lower part of the abdomen, including the genital organs, which, in the case of both sexes, assume rather a dirty, brownish-green color. In all cases of death from suffocation, bloody, frothy discharges from the nostrils will be observed, mingled with air-bubbles. Green spots of different sizes will now appear also on other parts of the body, as on the back, on the lower extremities, on the neck, and on the sides of the chest.

(4) Between eight and twelve days after death, the whole body presents this green appearance, which has become darker in color and is accompanied with a stronger smell. On some parts, as on the face and neck, the color is a reddish-green, owing to the exudation of blood through the pores of the

skin. Gases have now begun to form, and to swell up the body. These are generally inflammable, and a burning jet may be produced by applying a lighted taper to a small opening made in the abdomen. The color of the eyes may still be recognized, but the cornea is concave. The anus stands open. On some parts of the body, especially on the extremities, and on the neck and breast, dirty red streaks will be seen where the skin remains clear. The nails still adhere firmly to the skin.

(5) Between fourteen and twenty days after death, a bright green and reddish-brown color spreads over the entire body. The cuticle is raised in blebs of different sizes, many of them as large as the palm of the hand, and which in some places have burst open. Maggots now appear in great numbers, especially in the folds and orifices of the body. Owing to the continued formation of gases, the chest is dilated, the belly acquires the shape of a large ball, and in fact the cellular tissue of the whole body is enormously distended, so as to assume gigantic proportions. The features are distorted, and the entire physiognomy so changed as to make it impossible even for the nearest relatives to recognize the person. The color of the eyes is no longer discernible, for the distinction between pupil and iris can no longer be seen, and the whole sclerotica has assumed a uniform dirty red color. In men, the penis is greatly swollen, and the scrotum is as large as a child's head. The nails lie loosened at their roots. At this stage of decomposition the effect of difference of temperature is remarkable. Exposure for ten or twelve days at a temperature of 68° to 78° will produce as great changes in the condition of the body as would take place within twenty or thirty days if exposed at a temperature of from 32° to 50° . The body now swarms with maggots, and where it is left unprotected in the air or in water, may become the prey of numerous other animals, as dogs, cats, foxes, wolves, birds of prey, and land and water rats. Fresh-water fish (German) do not feed upon dead bodies. Where the body has thus served for food the marks will be found upon the breast and belly and on the extremities, the bones of which are often laid bare. The consequent opening of the cavities and the lesions of the

soft parts of the body may easily be distinguished, with a little attention, from traumatic injuries. When a body answers to the above description it may be safely concluded to be that of a person who has been dead at least so long as from fourteen to twenty days, not that this is the ultimate limit, for at this stage of decomposition the process is very gradual, several weeks and even months often making little difference in the appearance of the body.

(6) The stage of putrid colliquation arises within from four to six months after death, or, where the body has been kept in a warm and moist medium, earlier than this. Owing to the continued swelling the chest and belly have now burst open, and these cavities lie exposed. The skull has also yielded to the pressure, and the brain has exuded. The orbital cavities are empty. All the soft parts are in a state of dissolution and finally disappear, and entire bones, especially of the skull and of the extremities, are laid bare, and the latter separate from the trunk. No trace of features any longer remains. The breasts of females have disappeared, and of the genital organs nothing indicative of sex remains, unless perhaps the hair or the shape of its growth; for in man it ascends towards the navel, but in woman is confined to the pubis. But even at this stage the presence of a womb may indicate to which sex the dead person belonged.

§ 986. XI. *Saponification*. (*Adipocere*).—In cases where the body is exposed to the continued action of water, whether by lying in water itself or in very damp soil, the process of putrid decomposition proceeds no further than the stage above described, but is succeeded by saponification. It is difficult to say exactly how soon this process begins to take place. Devergie thinks that it requires a year for a body lying in water, and about three years for one lying in the earth, to become entirely saponified, or converted into adipocere. This process cannot reach any great extent in less than half a year where the body remains in water, or in less than a year where it lies in moist earth, although it may begin to appear earlier than this.^(m¹) The appearance is that of a homogeneous, pure or

(m¹) Casper relates a case where a new-born infant which had been buried in a cellar for a few weeks, was found, when exhumed, to have already

slightly yellowish-white, fatty substance, which is easy to be cut, which melts in flame, and has a smell somewhat like mouldy cheese, but by no means very disagreeable. The muscles first undergo this process, but it finally reaches all the organs of the body, which now become one shapeless mass, whose original appearance is no longer discernible. According to Guntz, the adipocere thus formed has more bulk than all the fat which belonged originally to the body. This fact is important to observe in reference to the weight of the dead bodies of infants.

§ 987. XII. *Mummification*.—This process, in which the body is dried up and assumes a rusty-brown color, is of little interest in connection with medical jurisprudence, since little is known of the influences necessary to produce it, as well as the time required for the process. Mummification occurs as well where the body is exposed in a vault to a drying wind, as where the atmosphere is entirely excluded. It also takes place often in the case of bodies buried beneath the burning sands of the desert. At what time the natural process of mummification begins to show itself where the existing circumstances are favorable, is not determined; we only know that, once perfected, the mummy will last thousands of years. Hence where a body is discovered already mummified, it would be impossible to decide, with any approach to accuracy, how long a time has elapsed since the occurrence of death.

§ 988. XIII. *Decomposition of internal organs, in its several stages*.—The great number of influences which combine to affect these organs, produce a much greater difference in the time of their decomposition than exists in the case of the external organs, and hence they furnish marks by which the time of death may be more accurately determined.

§ 989. 1st. The *windpipe* and *larynx* are the first of these organs which exhibit signs of decomposition. On bodies, which still appear quite sound upon the surface, or, at most,

undergone partial conversion into adipocere. This author says that he has never seen a whole body *completely* saponified.—*Forensic Medicine*, vol. i. p. 41. New Sydenham Soc.

show only a few green spots on the under parts, the thin mucous membrane of the *trachea* exhibits a remarkable paleness throughout its whole extent, except when death has been produced by suffocation or *laryngitis*. When the process of decomposition has advanced a little further, so that the whole under part of the body has become green, commonly in from three to five days after death in summer, and in from six to eight in winter, this thin mucous membrane has assumed a uniform dirty-red color, in which no vascular injection can be discovered even with a microscope. This appearance occurs before any marks of decomposition are visible upon other internal organs, and is not influenced by age, constitution, or manner of death. The inexperienced should be careful not to mistake this natural effect of decomposition for capillary injection or the effect of suffocating or of drowning. In the further course of decomposition, the mucous membrane of the windpipe becomes olive-green, the cartilages of the tube separate, until at last the whole organ disappears.

§ 990. 2d. The organ which next, in order of time, yields to decomposition, is the *brain of infants*, not more than a year old. The delicate texture of the organ at this age, and its comparatively slight protection from the atmosphere, render it an easy prey to decomposing influences, so that it will often be found to be quite destroyed when other organs are perfectly sound, and when no discoloration is to be seen, except upon the surface of the body. In decomposing, it changes to a thin pulpy substance of a rosy-red color, which discharges itself as soon as any opening is made in the skull, and leaves no trace of the several parts of the organ.

§ 991. 3d. The *stomach* decomposes at an early period. The first traces of the decomposition are certain irregular, dirty-red spots in the *fundus*; they vary much in size, being sometimes as large as a plate, and often have bluish-red streaks, or veins, running through them. These spots appear first on the posterior surface, where they are partly due to hypostatic congestion, but soon after show themselves on the anterior surface. They are described by some authors as inflammatory, or as evidences of asphyxia by hanging or drowning, but are really nothing more than the result of early decomposition. In case

of doubtful poisoning, it is very important to mark these changes. As the process of decomposition advances, the color changes from a dirty-red to a grayish-black.

§ 992. 4th. The *intestinal canal* follows next in order in the progress of decomposition. The peculiar color produced by bile, owing to the contact of a portion of the intestine with the gall-bladder, cannot be mistaken. In the course of decomposition the intestines assume a dark-brown color, they burst open and discharge their contents, become greasy, and are finally reduced to a dark, shapeless, pulpy substance.

§ 993. 5th. The *spleen*, when not diseased, commonly continues sound longer than the intestines, but belongs to the class of organs which decompose at an early period. It grows softer and softer and is easily crushed, and afterwards assumes a bluish-green color, and becomes so soft that it may be rubbed down with the knife-handle.

§ 994. 6th. The *omentum* and *mesentery*, if free from fat, may remain sound several weeks after death; but if fatty, not so long. These organs assume a grayish-green color and dry up.

§ 995. 7th. The *liver* in grown persons may remain sound for some weeks after death. In infants it begins to decompose earlier. The first appearance is that of a changeable green color seen first on the convex surface, and which afterwards spreads over the whole organ, and finally changes to a coal-black. The size of the liver is lessened in the same proportion as that of the other organs by the evaporation of its fluid constituents, and the parenchyma becomes pulpy. The texture of the gall-bladder, however, may be discerned at a later period.

§ 996. 8th. The first trace of decomposition in the *brain* of grown persons is a light-green color, seen first at its base, and which gradually spreads over the whole organ, from without inwards. In a medium temperature the brain softens within two or three weeks, but months may elapse before it changes into that reddish pulpy substance, into which, at so early a period, the brains of infants are converted. Where the brain is exposed by a wound in the skull, decomposition may take place much earlier.

All the above-mentioned organs belong to the class of those which decompose at an early period.

§ 997. 9th. The *heart*. This organ is often found still sound, although collapsed and quite empty of blood, for weeks after death, and after the decomposition of the liver, intestines, etc., has reached an advanced stage. It becomes soft, first in the columnæ carneæ and then in the walls, and assumes a greenish, then a grayish-green, and, finally, a black color. The small quantity of *liquor pericardii* which the heart contains disappears by evaporation, as the process of decomposition advances, and the pericardium becomes quite dry. This stage of decomposition, however, is not commonly reached until some months after death.

§ 998. 10th. The *lungs* begin to exhibit marks of decomposition about the same time as the heart. They are often found in such a state of preservation that their structure may be readily discerned, after the external portions of the body are far advanced in the process of decomposition. The first appearance upon these organs is that of little bladders, varying in size from a millet seed to a bean, which are occasioned by the formation of gas under the *pleura*. These bladders at first appear singly and on different parts of the lungs, but afterwards they increase to such an extent that they cover large portions of the organ, especially on its under surface. The color of the lungs remains for a while unchanged, but as decomposition advances they become of a dark, bottle-green color, and, finally, entirely black. They now become soft, collapse, and, at last, their characteristic structure is destroyed.

§ 999. 11th. The *kidneys* continue sound longer than the heart and lungs, and will never be found to have reached the putrid state in such bodies as are only half decomposed. These organs become soft, and of a chocolate-brown color, but even at this stage their granular texture may be easily discerned. Afterwards, but long after death, they become greasy, of a blackish-green color, and are easily torn.

§ 1000. 12th. The *urinary bladder* yields to decomposing influences still later than those organs which have been mentioned.

§ 1001. 13th. The *œsophagus* will often be found tolerably

firm, and only of a dirty grayish-green color, some months after death, when the stomach and intestines admit no longer of close examination.

§ 1002. 14th. The *pancreas* resists decomposing influences so strongly that one must have a body almost entirely putrid in order to observe the process in this organ.

§ 1003. 15th. The *diaphragm*. Green spots appear upon this organ within the first week after death, but after four or six months its muscular and tendinous structure may be distinguished from each other.

§ 1004. 16th. The *arteries* decompose among the last of all the soft organs. Devergie reports a case where the *aorta* was perfectly discernible fourteen months after death.

§ 1005. 17th. According to Dr. Casper, the *uterus* yields to decomposition last of all the internal organs. It is often found lying in its place, tolerably firm, though of a dirty-red color, and in such a state of preservation that it may be cut open and examined, when this would not be possible with any other organ. This statement is applicable even to newly-born female infants.

CHAPTER XIII.

MEDICO-LEGAL EXAMINATIONS.(n)

§ 1006. The physician who is called upon to make an examination of a person found dead under suspicious circum-

(n) The subject of medico-legal examinations in insanity has been already noticed, ante, § 90, etc. In addition to the cases already mentioned, we may here cite the following :—

On the trial of an indictment for selling unwholesome meat, it was held that physicians might be allowed to testify that the eating of unwholesome meat does not always cause apparent sickness, and to state their opinion, founded on what other witnesses had testified, as to the disease of which the cow died, and whether the disease would cause fever, and whether the flesh of animals sick of fever was unwholesome. *Goodrich v. People*, 3 Parker R. (N. Y.) 622.

Physicians who are not experts in analytical chemistry are admissible to

stances, has devolved upon him a task of no little gravity. He therefore should endeavor to come to it prepared to acquit him—form an analysis of the contents of the stomach in cases of poisoning. *State v. Hinkle*, 6 Iowa 380.

In a homicide trial in New York (*People v. Bodine*, 1 Denio 288), it appeared in evidence, that the dwelling-house occupied by the deceased had been discovered to be on fire; that after the fire was extinguished, her dead body was discovered amid the rubbish in one corner of the kitchen, where her bed had stood, and where she had been accustomed to sleep; that the fire had been in that part of the house, and that a hole had been burned through the floor in that corner of the room, and that the fire had extended up the side walls of the room, had consumed the bed and bedding, and partly destroyed the bedstead; that the heap of rubbish among which the body had been found consisted of bricks and mortar from the wall, of partially destroyed pumpkins and onions which had been kept under the bed, of the bedstead and of the cinders from the bed, bedding, and other articles which had been entirely consumed; that several physicians had made a post-mortem examination of the body, and had given it as their opinion that the body had been dead before it had been subjected to the action of fire, for the reason among others that portions of the body had been protected, and had not suffered at all from the action of the fire, which could not have happened unless the body had lain perfectly still during the continuance of the fire. Upon the cross-examination of one of these physicians, the counsel for the prisoner asked the following question: "Would not almost any protection and stillness of the body be accounted for, on the supposition that the bed-cords on the back of the bed were burned off and the body let down, and that then the bed had fallen upon it before life was entirely extinct?" which question was objected to by the counsel for the prosecution and excluded by the court, and exception was taken by the counsel for the prisoner and carried to the Supreme Court. That court held: "The question put to one of the physicians on his cross-examination by the prisoner's counsel, was in my opinion correctly overruled. This witness and other physicians had made a post-mortem examination of the person alleged to have been murdered, and they gave it as their opinion that the death had preceded the action of fire on the body. This opinion, as is stated in the bill of exceptions, was founded on the reason, among others, that portions of the body which had been protected by covering upon them had not suffered at all from the action of the fire."

If a surgical witness testify as an expert, he may, having examined a wound, give his testimony as to the nature of the instrument which inflicted it (*State v. Knights*, 43 Maine 11), and as to whether such wound was adequate to the production of death. (*Livingston's Case*, 14 Grattan 592.)

Evidence of scientific persons in a capital trial, as to any distinction evinced by scientific investigation between the appearance of stains of human blood and those of animals, is properly admissible. *State v. Knights*, 43 Maine 11.

Maps and diagrams may be used by scientific witnesses, to render intelligible their verbal testimony. *State v. Knights*, 43 Maine 11.

On a trial for murder, a medical witness testified that he saw defendant on

self of his duty in such a manner that he will afterwards not have to regret having imperfectly discharged it. Not only is familiarity with anatomical dissection required, but a far greater carefulness, and a more searching examination than in death from disease, since in the latter, the object of the investigation is into the nature of the morbid cause of death, and the acquisition of greater familiarity with pathological facts. Moreover his attention must be given to many circumstances which, in these, it is not necessary to observe, viz., all those matters which may throw light upon the mode of death, such, for instance, as the position of the body in relation to surrounding objects, and the locality in which it was found. The duties of the examiner, and the facts necessary to observe, may be arranged under the following heads:—

- I. Locality, § 1007.
- II. Identity, § 1008.
- III. Indications of violence or unnatural death, § 1009.
- IV. Manner of conducting the autopsy, § 1010.
- V. Natural aspect of the organs at different ages, § 1012.
- VI. Mode of drawing up reports, § 1022.

§ 1007. I. *Locality*.—The chief points for notice under this head are those which, by indicating the situation in which the body is found, may afford a clue to the detection of the manner in which it came there. Thus in cases of infanticide an accurate description of the locality in which the child's body is discovered is of the utmost importance in the subsequent investigation of the mode of death. Or, a person may be murdered and the body afterwards transported to a considerable distance for concealment, or the deceased may have had sufficient strength after receiving his mortal wound to follow the steps of the assassin, and yet finally perish at a point more

the evening of the day after the killing, conversed with him, and then thought him deranged; that he thought the insanity was *delirium tremens*; that he knew defendant's habit of drinking, and supposed drinking to be the cause of his insanity; and that he had been present and heard all the evidence. The witness then stated, under objection, how long he thought defendant had been in this state of delirium, but was not allowed to state whether, in his opinion, he was in this state on the night of the alleged killing. It was held here was no error. *People v. McCann*, 3 Parker, C. R. (N. Y.) 272.

or less remote from the place where he was attacked, and where the indications of a struggle will be found. It is proper also in case of exhumations, but here has a closer bearing on the determination of the next point, viz:—

§ 1008. II. *Identity*.—This subject we have treated in detail in another chapter. It is only necessary to state here that the knowledge of the identity of the deceased in cases of recent death, is as far as the medical evidence is concerned, secured by a careful notice of the clothing, the stature and apparent age, physical development, deformities, color of the hair, eyes, etc., scars, marks of tattooing and peculiarities indicating the habitual trade or occupation.

§ 1009. III. *Indications of violence or unnatural death*.—All indications of a struggle in the vicinity of the body should be carefully observed, such as traces of blood, fragments of clothing or hair upon the ground, and anything that may have served as a weapon, or been the accidental cause of death. The hands of the deceased should be carefully examined; if they hold a weapon it should be noted whether it is loosely or firmly grasped, and also if there are portions of hair or clothing contained in them. In many cases of poisoning from prussic acid, the vial from which the poison was taken will be found in the hands or pockets, or lying near the deceased; and in other cases, when poisoning is suspected, the room in which the body is found should be carefully searched for poisonous substances, or for vessels which may have contained them. If wounds are discovered upon the body, their nature and extent must be ascertained, and, if lacerated, incised, or punctured, the weapon, if any is found, carefully compared with them. The examiner should not omit to ascertain whether there are any fractures or dislocations present, and whether any foreign bodies are to be found in any of the natural openings of the body. In the case of females, in addition to the above, the signs of recent or previous delivery (as elsewhere detailed) must be observed, and the vulva should be examined for traces of injury which might otherwise go unnoticed.

§ 1010. IV. *Manner of conducting the autopsy*.—The physician should be assisted at the examination by one or more persons, the duty of one of whom should be to write down

the observations as they are dictated to him. The exterior of the body should be examined, if possible, before it is moved from the position in which it is found, and, in case circumstances permit, it is better that the examination should be made on the spot, than that the body should be transported elsewhere. The time elapsed since death should be approximately estimated by a consideration of the state of rigidity or flaccidity of the body, and the degree of putrefaction. The order in which the internal organs should be examined admits of some variety, although on the whole it is better, where time and circumstances allow, to commence with the head, and proceed therefrom to the other organs in regular succession.

To open the cranium, the best method is to begin by making an incision vertically from the root of one zygomatic process to that of the other; a few strokes of the scalpel will loosen the attachment of the scalp to the pericranium, and by a slight effort the two flaps may be inverted, the one over the face, the other over the occiput. After removing the temporal muscles from their attachments, the cranium may be opened speedily and safely by the saw, which should be used first on either side and then behind and in front. A chisel used carefully as a lever will then easily detach the calvarium. In young children a pair of strong scissors will suffice to cut the bone, with less risk of injuring the subjacent parts. A triangular block with rounded edges, placed under the neck, will much facilitate these operations. The integrity of the calvarium having been first noted, we then proceed to the examination of the contents of the cavity of the head. The dura mater may be divided around the edges of the skull, and then, being cut free from its connection with the *crista galli*, thrown over the occiput. The other membranes, after being examined *in situ*, may be observed with reference to their connections when the brain is itself examined. This should be done partly in and partly out of the cranium. The upper half should be removed on each side, by a horizontal incision which shall leave the thalami optici untouched while it lays open the lateral ventricles. Placing the fingers of the left hand under the anterior lobes of the brain, the remainder of the encephalon should be removed by cutting successively through the nerves,

the tentorium, and the medulla oblongata as far as the knife can conveniently penetrate. The various parts may be then examined by successive horizontal sections made regularly in parallel planes. The state of the sinuses should also claim attention.

Previous to the examination of the *neck*, the block should be removed and the head thrown back, in order to render the neck tense. An incision is then made in the trachea, and prolonged carefully upwards, with the precaution to hold the knife in such a manner as not to injure the posterior wall of the trachea or larynx. This done, the tongue, if it seem necessary, may be taken out by an incision following the inner circumference of the lower maxilla, and by dividing the posterior pillars of the fauces. The examination of the neck should not, however, be commenced until the cavities next to be examined have been prepared for inspection. A longitudinal incision, commencing at the top of the sternum, may be made and extended to the pubes, and a transverse one passing across the abdomen and intersecting the first at the umbilicus. These incisions should not penetrate more deeply than through the skin.

The *abdominal cavity* may now be opened by carefully dissecting in the epigastric region until the peritoneal cavity is reached; through the hole thus made, two fingers of the left hand may be introduced, and holding the edges of the incision stretched apart, the incision may be prolonged by the knife in the other hand down to the pubis, without injury to the intestines. The transverse incision is then made through the muscles, and the four flaps thrown back. Grasping the upper flap on the side on which the operator stands, and drawing it tensely back over the margin of the costal cartilages, an incision should be carried along the edge of the thorax a sufficient distance in order to separate the abdominal muscles from their attachments. The dissection should now be continued upwards, in order to expose the sternum and cartilages as far up as the clavicle, and laterally exposing an inch or two of the ribs. The same operation is to be repeated upon the opposite side. In case of wounds passing through any portion

of the parts thus noticed, they should be first circumscribed by circular incision, and thus isolated, so that their relations with the subjacent parts can be known.

It is not advisable to use much force in cutting through the cartilages of the ribs, on account of the risk of wounding the lungs or pericardium. The best plan is to begin with the fifth or sixth rib, and divide first those which lie below on each side; then taking hold of the fragment attached to the sternum, to divide the diaphragm between the two incisions of the costal cartilages and these up to the clavicle. In order to separate the sternum from the clavicle without wounding the large veins, take hold of the lower part of the sternum with one hand, and follow the articulation with the scalpel; *i. e.*, make the incision upwardly and outwardly, and then inwardly. The thoracic and abdominal cavities being now laid open, it is optional with which to begin.

It is perhaps better and more systematic to examine first the *thorax*. Having observed the relative position of the organs and of such of their qualities as may be judged of by the eye alone, the pleural cavities should be explored. In order to remove the lungs without injury, the safest mode, especially where pleural adhesions exist, is to detach the costal pleura—an operation which can be easily, although it must be slowly, done. In this way we preclude entirely the possibility of lacerating the pulmonary substance, and have subsequently no doubts to contend with as to whether certain lacerations of substance are the result of disease, injury, or our own mismanagement. The lung is less easily handled when separated from the body, than when it is left with its natural attachments. It is, therefore, always better in the beginning at least, after having drawn it out and laid it upon the thorax, to preserve its connections. Its roots may be afterwards divided, if it should be necessary to make a minute and protracted investigation. An incision, which will lay open as great a surface as possible of the interior of the lung, is to be preferred, and this is one commencing at the apex and dividing it completely through to its base. Afterwards, incisions at right angles with the first one will most probably reveal any struc-

tural disease or injury that may exist. The bronchia should be laid open with an appropriate pair of scissors, and an examination of the bronchial glands should not be omitted.

The *pericardium* should be opened in such a manner as to prevent the escape of the fluid contained within it until its quantity and character have been first ascertained. The examination of the heart for the purpose of detecting diseased structure need not here be dwelt upon. If gunshot or other wounds be found in its substance, their direction, extent, and character must be carefully examined, and search made here, or in the pericardial or pleural cavities, for any foreign bodies, such as balls, wadding, or fragments of weapons.

§ 1011. In the examination of the *abdomen*, where poisoning is suspected, it is better that the stomach and duodenum should be each separated by double ligatures and removed, with their contents, from the body, for subsequent anatomical and chemical examination. In this case they should be put into perfectly clean vessels of porcelain, glass, or wood, and without the addition of any preservative liquid. The vessels should then be closely sealed and put away in a secure place. In other cases these organs may be opened by the enterotome, the stomach along the lesser curvature, and the intestines close to their attachment to the mesentery. The liver, in many cases of poisoning, particularly by arsenical or mercurial preparations, must be reserved for chemical investigation. The state of the bladder should be also observed. In the female the internal organs of generation require particular attention, with a view to the determination of questions of abortion, rape, etc. Finally, the examiner should not forget, that, although there may be strong reason, from circumstances, to suppose that the individual has met with a violent death, yet he may unexpectedly meet with some lesion, such as strangulation of the intestines, rupture of an aneurism, intestinal perforation, etc., which is in itself sufficient to explain the symptoms which preceded the death of the individual. Hence he cannot be too careful in examining systematically and minutely every part of the body, and making accurate notes of all that he observes.

§ 1012. V. *Natural aspect of the internal organs.*—The fol-

lowing summary we have taken, with some alterations, from the valuable work of Professor Engel.^(o)

The *dura mater* is, in children and adults, drawn tensely over the surface of the brain; in old persons, however, it is wrinkled, and sinks in between the convolutions. It increases in its consistence with age; is in children semi-transparent, and of a pale bluish-gray color, white and less transparent in the adult, and assumes a yellow tinge in advanced life. The under surface is smooth and polished. In old age the *dura mater* is frequently perforated by the glands of Pacchioni, and contains often, especially over the falx major, needle-like spiculæ of bone. These phenomena are of no pathological importance, except in early life, and even then, when uncombined with distinct lesions, are of little significance.

The *arachnoid and pia mater* are, in infants, thin, easily torn, colorless, and transparent, their larger veins generally filled with dark blood; the amount of blood is in mature years relatively less, and in old age the membranes have become thick and tough, lose much of their transparency, and assume a white or yellowish-white color.

The turbidness or milky appearance of these membranes does not in advanced life deserve much attention, except when over a large surface, and is then naturally connected with other symptoms of disease. It is always accompanied with increased consistence, and appears first on the edge of the fissures and the upper surface of the cerebellum. In youth, however, it is a pathological sign of much importance. The arachnoid is chiefly concerned, the plexus choroides being the only part of the pia mater which is affected. The vascularity of these membranes is within the normal limits subject to very great variation, as it depends upon the general amount of blood in the circulation. But it would be certainly a symptom of disease if, in a case of general anæmia or general plethora, the amount of blood in these membranes should be such as is found in health. It can only then be considered in relation to the amount of blood in the rest of the body, and it ought to be remembered that in early life it is proportionally larger than

(o) Entwurf einer pathol.-anatomischen Propædeutik, Wien. 1845.

in its later periods. The quantity of blood should be determined, not by observation of the large vessels, but of the smaller ones; for the finer the vessels which are seen to be injected, the greater is the amount of blood, and the same remark may be made of their tortuosity.

The amount of watery secretion in the internal membranes is also subject to much variation, and depends upon the age of the individual and the condition of the blood. In infants it is comparatively more abundant than in adults, and in the latter less than in old persons. A large amount of watery effusion may have caused no symptom during life, if it depend upon general dropsy; if, however, it have occurred in the course of some acute general disease, it will have given rise to striking symptoms. When there is but a small quantity of water present, the arachnoid is not raised by it in its passage over the spaces between the convolutions; a large quantity will render it tense, and in cases of abundant effusion the space between the membranes is filled everywhere with it, and they become thickened and tumid. But the amount of effusion does not warrant, by itself, without the presence of other symptoms, any conclusion.

§ 1013. The *brain* in newly-born children is of a gelatinous consistence, and throughout of a gray or reddish-gray color. Some of its inferior portions—as, for example, the medulla oblongata—are white and firm. The lateral ventricles contain a few drops of clear, slightly yellowish fluid. It undergoes putrefaction very rapidly. The consistence of the *adult brain* is much greater; it can be broken up in the direction of its fibres, and there is a marked difference in color between the medullary and cortical portions. When a section is made through the substance of the brain, the blood contained in it appears upon the surface in red, watery points; more than this is generally indicative of disease. The normal amount of liquid in the ventricles varies from one-half of a drachm to four drachms, according to the greater or less consistence of the brain. It is clear and colorless, contains no albumen, and the lining membrane of the ventricles is generally not dissolved by it until the lapse of several days. In most cases where a softening of the cerebral substance around both ven-

tricles is found, it may be regarded as a cadaveric change. In old persons the volume of the brain is somewhat diminished, hence the dura mater will often be found in folds. The substance of the brain is tough and elastic, and the medullary portion has a yellowish-white color. The ventricles are dilated, and contain sometimes as much as an ounce and a half of clear, colorless, slightly albuminous liquid. There is but little blood in the brain, and the arteries at its base contain fibrinous clots.

§ 1014. In newly-born children the cartilages of the *larynx* are thin and elastic, its mucous membrane pale, smooth, and covered with a puriform epithelial coating, which is found in the most normal conditions, and particularly in the ventricles of Morgagni. The antero-posterior diameter of the larynx and trachea is less than the transverse. The bronchia are membranous and their mucous coat pale; they contain a whitish mucus, a circumstance which should not be supposed, as is too often done, to indicate catarrhal inflammation. After the age of puberty the air-passages acquire an increased volume and altered form, the antero-posterior diameter exceeds the transverse in length, the cartilages become firmer, the tracheal glands become prominent, and the posterior wall of the trachea often appears injected. No fluid is to be found except in the ventricles of Morgagni, which contain a thick whitish mucus consisting of the effete epithelium. The bronchial mucous membrane is wrinkled, of a pale gray color or reddish, the finer bronchia have a perfectly colorless and transparent wall, and contain only a small quantity of a colorless, watery fluid.

In old persons the cartilages of the larynx, trachea, and the larger bronchia are often found ossified; this is not the case in women, however, except sometimes the thyroid cartilage. The mucous membrane appears almost dry. The air-passages are more capacious than in adult life. Their contents are not always the result of the secretion from the mucous membrane itself, but from the deeper part of the lungs.

§ 1015. The *lungs in children* who have not breathed, are found in the posterior part of the thorax, the rest of this cavity being filled with a yellowish, glutinous, watery fluid. The edges of the lungs are rounded, and their length greater than

their breadth. They are dense, and resemble, in their granular structure and reddish-brown color, the liver. They are specifically heavier than water. To distinguish from hepatization those parts which, not having been dilated by the air, present this appearance, the inflation of the lungs will suffice, as it will not cause the first to disappear, but will do so with the latter. Again, to discover whether the fluid contained in the chest is a pleuritic exudation which may have so compressed the lungs as to cause them to resemble their foetal condition, we must be guided by the quantity of albumen and spontaneously coagulable constituents, and the form also of the lungs, which in pleuritic exudation are pressed flat against the vertebral column, and are not empty of blood, but rather, on the contrary, gorged with it.

The lungs of children *who have breathed* occupy the greater part of the thorax; their edges are sharp and slightly curved; here and there tongue-like processes project caused by a partial increased force of inflation; the surface retains the impression of the finger, and by strong pressure the air is all expelled and the lung falls together like a ribbon. The tissue is elastic, and if not containing much water or blood, tough. The vesicular structure is not visible to the naked eye on the incised surface, but, through the pleura, numerous very small air bubbles may be seen, corresponding to the pulmonary vesicles. The color is grayish-white at the edges, in the front and outer parts a spotted rosy-red, in the under and posterior parts an intense purple. The same differences are observable upon incision. But little blood exudes upon incision, and that chiefly in the posterior portions. The pleura is thin, colorless, and transparent, and but a few drops of watery fluid are found in its cavity.

The *lungs of adults* sink upon opening the thorax an inch or two from its anterior wall; their borders are somewhat inflated, pale, dry, containing but little blood, and the pulmonary vesicles are visible through the pleura; the middle part of the upper lobes is of an ashen or reddish-gray color, variegated with patches of white and blue, in some spots bright red, the parenchyma is tough, and frothy serum exudes upon pressure. Bloody serum is not found, but sometimes streaks of blood

from the larger vessels mix with the frothy serum which is pressed out. The lower part of the upper lobes, as well as of the under, with the exception of the borders of the latter, are more easily lacerated, denser, elastic, and have a purple hue on the surface, and when cut a brownish-red color; bloody serum mixed with bubbles of air exudes spontaneously upon the cut surface. Coagula are often found, but chiefly in the large vessels, but fibrous coagula only when the agony has been long, and in inflammations of the lung. The parenchyma is more lacerable and denser in proportion to its contents of blood or serum, and the greater the quantity of air contained in it the longer it retains the impression of the finger; its color depends in its varieties upon the amount and character of the fluids it contains. The pigment spots are a normal appearance, they are rarely found earlier than the tenth or twelfth year, but are constantly found in adults. The amount of blood contained in the lungs is proportional to that in the heart. The pleura is at this period clear, colorless, shining, and transparent. The normal amount of fluid in this sac varies within the normal condition between one and six ounces.

The lungs in *very old persons*, when the chest is opened, occupy only the posterior part of the thorax, so that their anterior portion is distant about a hand's breadth from the front of the chest. They have a peculiar feel, retain the impression of the finger, are tough, and easily deprived of the air contained in them by pressure, falling together into a thin, membranous, wrinkled form. The color is a dark gray, owing to the quantity of pigment, intermingled with bright red patches; the lower portions are of a dirty brownish-red color. The tissue is mostly dry, the posterior part alone moderately moist, with a pale, brownish fluid; in the pulmonary bloodvessels, a very small quantity of fluid blood is found. Any increase in the quantity of air, blood, or water, is at this age of more importance than in younger persons. The pleura is somewhat thicker and less transparent, and numerous deposits of pigment are found underneath it. The products of past diseases are frequently to be observed.

§ 1016. The *heart in children* is firm and of a darker color than the other muscles. The relative thickness of the right side

is greater than in adults, as also that of the auricles relatively to the ventricles. The endocardium is thin and transparent; the free edge of the ventricular valves soon becomes fringed in consequence of early commencing maceration. Both sides contain nearly the same amount of blood with a few coagula. The pericardium is transparent and more closely attached to the heart than in adults, containing from a few drops to a scruple of liquid of a yellow color, albuminous, dissolving soon the epithelium of the pericardium, and thus acquiring a turbid appearance, and rendering it possible to mistake it for an inflammatory exudation. The heart has a pyramidal shape in adults, but is more four-sided in old people. The endocardium in the former has a tendinous appearance; in the latter, particularly in the auricles, it is thick, wrinkled, opaque, and yellowish in appearance, and in spots marked with the so-called atheroma. The free edge of the valves is in them, also, involuted, thickened, almost cartilaginous, and there is but a small amount of blood found in the cavities, while in adults, and chiefly in the right ventricle, coagula of blood and fibrin are found (almost) constantly. The pericardium becomes opaque in adult life, and contains from one to two ounces of a yellowish serum. The pulmonary artery and aorta are of nearly equal calibre; *in children* the former being somewhat the largest, but in *old persons* the latter.

In young persons there is relatively a large amount of blood contained in the *veins*, and chiefly in those of a medium size; the longitudinal sinus of the dura mater contains in children a large amount of blood, but in adults generally only coagulated fibrin.

§ 1017. The *peritoneum* is characterized by the same differences in the three periods of life as have been mentioned of the pleura. A few ounces of serous fluid in the peritoneum are not pathological; on the other hand, the dryness of this membrane is doubtless a morbid symptom, as are also deposits of granular pigment in old age.

§ 1018. The *liver in young children* is relatively larger than in adults; the upper surface more convex, the under more concave; the parenchyma thick and tough, and indistinctly granular; its color is very dark, and it contains a large amount of

dark viscid blood. In anæmia the color is of a light yellow, the edges translucent, and the parenchyma contains a reddish serum. In adults, the structure is inelastic, distinctly granular, and in anæmia retains the impression of the finger. In old people the volume of the organ is diminished, the borders become sharper, the capsule becomes wrinkled, the tissue firmer, tougher, and drier, of a brownish or greenish-yellow, or soft and putty-like, containing a dirty reddish fluid, and an increased quantity of fat. In advanced age numerous vessels become obliterated, and the portion to which they belong atrophied.

The *bile* is, in *new-born children*, viscid, clear, or of a sap-green color; in adults thinner, and of a bright yellow, or viscid and reddish-brown, and in aged persons, scanty, but very thick and dark, and leaving a thick sediment.

§ 1019. The spleen, in the early years of life, is dense, granular, and of the consistence of liver, dark red in color, and when incised yields no fluid blood. But in *adults* it presents within the normal limits some important varieties. Its size is variable, depending upon the general amount of blood. It is easily lacerable, and its substance is thick, and in color grayish-red. In the increase of its volume depending upon augmentation in the amount of blood, it is softer in its substance, but harder under the opposite condition. In *old persons*, this organ is small, its surface wrinkled, it retains the impression of the finger, is broken down by pressure, and is of a clear reddish-brown color. The *pancreas* and other analogous glands are of a grayish-yellow color, firm, not easily lacerable, and granular in structure. Upon pressure a small quantity of a glutinous fluid exudes.

§ 1020. The *digestive canal* presents important differences at the different periods of life. Its mucous membrane is, in early life, delicate, transparent, without redness or injection, except that of the mouth, which is of a pale grayish-red; of the stomach, which is red in points, and of the ileum which is injected around the aggregated follicles. The stomach is without rugæ, and those of the small intestine are few and imperfect. The isolated follicles of the small intestine are numerous and well developed; also in the duodenum and stomach,

but fewer in number. The internal surface of the duodenum has a finely granular feel. The mucous membrane of the large intestine is smooth and white, its follicles prominent, opaque, and more numerous at its lower extremity. In the cavity of the mouth is found a scanty fluid secretion, and a little also in the œsophagus. The stomach contains a small quantity of a stringy, clear fluid, in the small intestine (after the meconium is passed) a bright yellow, flocculent muciform substance. In the large intestine, a greenish-yellow or brownish pasty fecal matter. Besides this the intestine always contains gas.

In *adults* the mucous membrane of the *stomach* is sometimes rugose, and covered with a thick, tough, pale-gray mucus, but at other times is quite smooth, and contains only a small quantity of thin mucus. The color is generally of a pale gray, but if there be present any ingesta, it will be red in points, or if irritating substances, such as pepper, tartrate of antimony, etc., there will be vascular injection. The mucous membrane of the fundus is often softened in a degree corresponding to the quantity of fluids contained in the stomach; but this softening does not penetrate into the deeper strata of the submucous cellular tissue. The lining membrane of the duodenum has a somewhat granular surface, owing to the projecting glands, it contains a thick and turbid liquid, tinged with bile. This membrane, through the whole of the small intestine, has a velvety appearance under water, is very thin, and cannot be stripped off in pieces of any size. The solitary and agminated glands may be seen with the unassisted eye in the ileum. The mucous membrane of the large intestine is white and polished, and covered with a layer of thick transparent mucus, which is very adherent. The transverse colon usually contains much gas, the rest of the large intestine is contracted. When fecal matter has been a long time in contact with the mucous membrane, it assumes a bluish-gray appearance, or sometimes is red and injected. The glands of the rectum may be prominent and opaque without necessarily being morbid. In old people the deposit of pigmentary matter in many parts of the intestine must be regarded as a normal appearance.

§ 1021. The *kidneys* of newly-born children are comparatively thick, their surface nearly uniform, and adherent to the

capsules; the color is of a dark grayish-brown, and the tubular only distinguished from the cortical substance by the direction of its fibres. In the *tubuli uriniferi* may be remarked sometimes a reddish sediment, and out of the papillæ may be expressed a turbid reddish urine. The mucous membrane of the pelvis of the kidney and the ureter is smooth and white. The bladder is generally contracted, its lining membrane of a rosy white, with here and there vascular injection. In *adults*, the kidney can be easily turned out of its capsule, the tissue is inelastic, the cortical substance is of a lighter color than the tubular. Vessels disposed in a stellated manner are seen upon the surface, and when cut, reddish points. The pelvis of the kidney is enveloped in a dark granular fat, the mucous membrane of this, the ureter, and urethra is smooth and polished. In old persons the kidneys are usually diminished in size, and surrounded with fat and a thick capsule, the surface is granular and uneven, the substance firm and tough, the color of the cortical substance is a pale reddish-brown or grayish-red. There are but few Malpighian bodies to be seen, but, on the other hand, minute vesicles filled with fluid. The tubular substance does not differ from the cortical in its color; hyperæmia and anæmia of the kidneys commence in the former, diminution of consistence in the latter.

§ 1022. VI. *Reports*.—It has been already stated, that careful notes should be taken during the progress of the autopsy. These should be preserved, and, as soon as possible afterwards, a report drawn up embracing all the medical facts resulting from the inspection. The utmost precision is requisite in these reports, and the avoidance as far as possible of technical terms is desirable. The report of the chemical analysis should be appended to the general report; and at the conclusion, the opinion as to the cause of death may be given, together with the general inferences resulting from the facts observed at the examination. Where written reports are not required, it is nevertheless advisable that the physician should prepare one for his own use, since by this means he cannot fail to gain a more intelligent view of the whole case.

The reader will find in the following remarks, selected from "Suggestions for the Medico-Legal Examination of Dead

Bodies, by Professors Traill, Christison, and Syme (with additions by A. Watson, M.D.)," more minute directions upon some points than we have thought necessary to give above:—

"It is desirable that the Medical Inspectors shall have an opportunity of viewing the body before it is undressed or moved from the spot where it was first found. If the body had been previously removed or meddled with, they ought to inform themselves accurately as to its original position. In many cases it is material that they personally visit the place where it was first seen; and they should inquire minutely into all the particulars connected with the removal of it.

"5. In cases where the body has been buried, and disinterment becomes necessary, it ought not to be removed from the coffin, except in presence of the inspectors.

"6. Where a considerable period has elapsed between death and disinterment, the inspection must in all cases be proceeded with, although the body be found in a state of decay, unless the inspectors can positively say that the progress of decay is such as to render the examination nugatory in relation to its special objects. The degree of decay which will justify such an opinion will differ with a variety of circumstances which cannot be properly specified here. It may be observed, however, that where the injuries of the bones are to be looked for, or the traces of certain poisons, it is scarcely possible to assign the limit at which an inspection must of necessity be fruitless. It is of moment to remember that the internal organs are often in a great measure entire, although the external parts are much decayed. The inspection, where the body is much decayed, will be rendered greatly less annoying to those present by frequently washing the parts successively exposed with a solution of chloride of lime, of the strength of one part in forty; but this must be carefully kept clear of any parts which may afterwards require to be examined for poison.

"7. No one should be allowed to be present at the examination out of mere curiosity. But especially every individual, not of the medical profession, ought to be excluded, who is likely to be a witness either in the recognition or trial; and consequently any one who attends to give information, if likely to be a witness, should remain in an adjoining room. The reason for this rule is, that the medical inspection often furnishes good tests of the value of otherwise doubtful evidence of a general nature; and it is therefore necessary that the general witnesses should not have an opportunity of knowing what is observed in the dissection of the body.

"8. The examination and dissection of the body should not be undertaken, if possible, except with sufficient daylight in prospect to allow the whole inspection to be made without artificial light.

"9. While the one inspector conducts the practical details of the examination, the other should take notes of its successive steps, indicating all the points inquired into, with the observations made and appearances presented, negative as well as positive, and stating simple facts only, without either

generalizations or opinions. These notes should be looked over by both inspectors before the body is sewed up, that omissions in the notes or in the inspection itself may then be supplied; and the notes, properly signed, dated, and sealed, must be lodged with the law authorities, a copy being preserved, if thought advisable by the inspectors.

“10. The inspectors must deliver to the same authorities, and within two days, where no further examination is required, a distinct report containing their opinion on the case, with the reasons succinctly and clearly stated. They must understand that they cannot found their opinions on any facts represented to have been ascertained by themselves during the inspection, which are not specified in their notes.

“11. Great attention must be paid not to express any premature opinion of the nature of the case from appearances presented on a partial examination, because the real cause of death often turns out very different from what it seems in the first instance to have been. In cases of injuries, or apparent drowning, hanging, strangling, burning, and the like, it should always be remembered that the appearances of such death may have been accidentally induced or purposely contrived after death, while the actual cause of death is different, and only to be detected by a careful and thorough inspection of the whole body.

“12. It is a good rule that all injured or diseased parts should be removed and preserved, wherever this is practicable. Soft parts, except what are to become the subject of analysis in the search for poison, are best preserved in a concentrated or strong solution of common salt.

“13. When any portions of the body, or any substances found in or near it, are to be preserved for further examination, they ought never to be put out of the custody of the inspectors, or of a special law-officer. They must be locked up in the absence of the person who keeps them. When they are to be transmitted to a distance, they should be labelled, and the labels signed by the inspectors; and, after being properly secured and sealed, they should be delivered by the inspectors themselves, or the special law-officer, at the coach-office by which they are to be forwarded.”

SECTION II.—*Necessary Implements.*

“14. Besides the ordinary instruments used in common dissections, the inspectors should be provided with a foot-rule, and an ounce-measure graduated to drachms, for measuring distances and the quantities of fluids; a few clean bladders for carrying away any parts of the body which it may be necessary to preserve for future examination; and, in cases of possible poisoning, three or four bottles, of 8, 12, and 16 ounces, with glass stoppers or clean corks, for preserving fluids to be analyzed. [It is also necessary to be provided with paper, pens, ink, and sealing-wax.]

“15. All distances, lengths, surfaces, and the like, whose extent may require to be described, ought to be actually measured; and the same rule ought to be followed in ascertaining the volume of fluids. Where large quantities of fluids are to be measured, any convenient vessel may be used whose capacity is previously ascertained by the ounce measure. Conjectural

estimates and comparisons, however common in medico-legal inspections, are quite inadmissible.

“16. The importance of the external examination, and the particulars of it to be chiefly attended to, will vary in different cases with the probable cause of death. It comprehends: 1. An examination of the position of the body when found. 2. Of the vicinity of the body, with a view to discover the objects on which it rested [might have fallen upon, or been suspended from], marks of a struggle, signs of the presence of a second party about the time of death, or after it, weapons or other objects the property or not the property of the deceased, the remains of poisons, marks of vomiting; and, where marks of blood are of importance, and doubts may arise as to their really being blood, the articles presenting them must be preserved for examination. 3. Of the dress; its nature and condition, stains on it of mud, sand, or the like, of blood, of vomiting, of acids, or other corrosive substances, in the case of suspected poisoning; marks of injuries, such as rents and incisions; and where injuries have been inflicted upon the body, care should be taken to compare the relative position of those on the body and those on the clothes; and where stains apparently from poison are seen, the stained parts are to be preserved for analysis. 4. Ligatures, their material and kind, as throwing light on the trade of the person who applied them, the possibility or impossibility of the deceased having applied them himself, their sufficiency for accomplishing their apparent purpose, etc.”

* * * * *

SECTION V.—*Examination in cases of Wounds and Contusions.*

“33. The most approved mode of examining injuries is, if they be not situated over the great cavities, to expose the successive layers of muscles in the manner of an ordinary dissection, observing carefully what injuries have been sustained by the parts successively exposed before they are divided. No advantage will be derived from previous injection of the bloodvessels, even supposing this were always attainable. Careful dissection, with a knowledge of the structure and relation of the parts, is a safer guide.

“34. The seat of wounds must be described by actual measurement from known points, their figure and nature also carefully noted, and their direction ascertained with exactness.

“35. Before altering by incisions the external appearance of injuries, care must be taken to consider what weapon might have produced them; and, if a particular weapon be suspected, it should be compared with them.

“36. Apparent contusions must be examined by making incisions through them; and the inspectors will note whether there be swelling or puckering of the skin, whether the substance of the true skin be black through a part or the whole of its thickness, whether there be extravasation below the skin, and whether the blood be fluid or coagulated, generally or partially; whether the soft parts below be lacerated or subjacent bones injured, and whether there be blood in contact with the lacerated surfaces. By these means the question may be settled whether the contusions were inflicted before or after death.

“37. In the case of wounds, too, the signs of vital action must be attended

to, especially the adhesion of blood to their surfaces, or the injection of blood into the cellular tissue around, or the presence of the signs or sequelæ of inflammation.

“38. Where large arteries or veins are found divided, care must be taken to corroborate the presumption thus arising by ascertaining, in the subsequent dissection, whether the great vessels and membranous viscera be unusually free of blood.

“39. In the course of the dissection of the wounds, a careful search must be made for foreign bodies in them. Where firearms have occasioned them, the examination should not be ended before discovering the bullet, wadding, or other article lodged; and whatever is found must be preserved. Where the article discharged from firearms, or indeed any other weapon, has passed through and through a part of the body, the entrance wound and exit wound must be carefully distinguished by their respective characters.

“40. When wounds are situated over one of the great cavities, they ought not to be particularly examined until the cavity is laid open; and in laying open the cavity, the external incisions should be kept clear of the wounds.

“41. The organs in the abdomen furnish the best source for information as to the sign of bloodlessness in presumed death by hemorrhage. [The state of the brain is also a good criterion.]”

SECTION VI.—*Examination in cases of Poisoning.*

“42. In examining a body in a case of suspected poisoning, the inspectors should begin with the alimentary canal, first tying a ligature round the cardiac end of the stomach, and two round its pyloric end; then removing the stomach and whole intestines; next, dissecting out the parts in the mouth, throat, neck, and chest, in one mass; and, finally, dissecting the gullet, with the parts about the throat, from the other organs of the chest. The several portions of the alimentary canal may then be examined in succession.

“43. In all their operations they ought to make sure that the instruments, vessels, and bladders used are quite clean.

“44. In cases of supposed poisoning, a minute inquiry must, in the first instance, be made into the symptoms during life—their nature, their precise date, especially in relation to meals or the taking of any suspicious articles, their progressive development, and the treatment pursued. It is impossible to be too cautious in collecting such information; and, in particular, great care must be taken to fix the precise date of the first invasion of the symptoms and of the previous meals. The same care is required in tracing the early history of the case, where the inspector happens to visit the individual before death; and if suspicion should not arise till his attendance has been going on for some time, he ought, subsequently to such suspicions, to review and correct the information gathered at first, especially as to dates. All facts thus obtained should be immediately committed to writing, and ought to form part of the narrative of the inspection to be delivered to the law authorities.—(See § 9, 10.)

“45. Before inspecting the bodies, the inspectors, after ascertaining the history of the case, should proceed, if they see cause, to search, in company with the proper law officer, for suspicious articles in the house of the deceased.

These are suspected articles of food, drink, or medicine; the vessels in which they had been prepared or afterwards contained, the family stores, or the articles with which suspected food, etc., appears to have been made. All such articles must be secured, according to rules in § 13, for preserving their identity. In this examination, the body, clothes, bedclothes, floor, and hearth should not be neglected, as they may present traces of vomited matter, acids spirted out or spilled, and the like.

“46. When a medical man is called to a case, during life, where poison is suspected, he ought as soon as possible to follow the instructions laid down for securing articles in which poison may have been administered.

“47. In the same circumstances, it is his duty to observe the conduct of any suspected individuals, were it for no other reason than to prevent the remains of poisoned articles from being put out of the way, and to protect his patient from further attempts.

“48. The whole organs of the abdomen must be surveyed, but particularly the stomach and whole track of the intestines, the liver, spleen, kidneys, and the bladder; and, in the female, the uterus and its appendages. The intestines should in general be slit up throughout their whole length; and it should be remembered that the most frequent seat of disease of the mucous membrane is in the neighborhood of the ileo-cæcal valve.

“49. In cases where the possibility of poisoning must be kept in view, the contents of the stomach should be preserved; also, sometimes, those of the great and small intestines, and occasionally even those of the gullet.

“50. It is generally necessary to ascertain whether any spirituous fluid [or opium] be contained in the stomach. This may sometimes be done by the odor of its contents, but oftener not; so that, where the point is one of evident consequence, it may be necessary to search for alcohol by distilling the contents [if any], and examining the distilled liquid as directed in works on poisons.

“51. The intestines may be examined at once by laying open their whole course. The parts, where appearances are most frequently found in poisoning, are the duodenum, upper part of the jejunum, lower part of the ileum, and rectum. Care should be taken to preserve their contents in a bottle, and the intestines themselves in a bladder, if they present any unusual appearance which will keep. The stomach should be taken out entire, and its contents emptied into a bottle. The smell proceeding from its contents should be observed when it is first laid open, as this often alters speedily. If the stomach present any remarkable appearance, its examination may be reserved, if convenient, till a future opportunity; but in every circumstance it must be preserved and carried away. The throat and gullet may be examined at once, and preserved with their contents, which, if abundant, may be kept apart in a bottle.

“52. No person ought to undertake an analysis in a case of suspected poisoning, unless he be either familiar with chemical researches, or have previously analyzed with success a mixture of organic substances, containing a small proportion of the poison suspected.

“53. The inspectors will learn from the law authorities, whether, in the event of the discovery of poisoning by them, it is probable that the opinion

of some other person practised in toxicological researches may be required ; and, in that case, they will take to use only one-half of the several articles preserved for analysis. They will remember that the stomach itself is one of the articles for analysis, because poison may be found there, though not present in the contents. The identity of the subjects of analysis must be secured by the rules of § 13."

SECTION VII.—*Examination in cases of Suffocation.*

"54. In cases of suspected drowning, the inspectors will observe particularly whether grass, mud, or other objects are clutched by the hands, or contained under the nails ; whether the tongue be protruded or not between the teeth ; whether any fluid, froth, or foreign substances be contained in the mouth or nostrils, in the trachea or bronchial ramifications ; whether the stomach contain much water ; whether the blood in the great vessels be fluid. When water, with particles of vegetable matter or mud, is found within the body, these must be compared with what may exist in the water in which the body was discovered. Marks of injuries must be compared diligently with the objects both in the water and the banks near it.

"55. In cases of suspected death by hanging, strangling, or smothering, it is important to attend particularly to the state of the face as to lividity, compared with the rest of the body ; the state of the conjunctiva of the eyes, as to vascularity ; of the tongue, as to position ; of the throat, chin, and lips, as to marks of nail scratches, ruffling of the scarf-skin, or small contusions ; the state of the blood, as to fluidity ; the state of the membranous organs in the abdomen and of the lungs, as to congestion. The mark of a cord or other ligature round the neck, must be attentively examined ; and here it requires to be mentioned, that the mark is often not distinct until seven or eight hours after death, and that it is seldom a dark livid mark, as is very commonly supposed, but a pale, greenish-brown streak, if made with a rope, representing in general no ecchymosis, but the thinnest possible line of bright redness at either edge, where it is conterminous with the sound skin. Nevertheless, effusions of blood and lacerations should be looked for under and around the mark, in the skin, cellular tissue, muscles, cartilages, and lining membrane of the larynx and trachea. Accessory injuries in other parts of the body, more especially on the chest, back, and arms, must be looked for ; as likewise the appearance of coagulated blood having flowed from the nostrils or ears, and discharge of feces, urine, or semen."

SECTION VIII.—*Examination in cases of Burning.*

"56. In supposed death from burning, the skin at the edge of the burns should be carefully examined for redness, or the appearance of vesicles containing fluid."

SECTION IX.—*Examination in cases of Infanticide.*

"57. In cases of suspected infanticide, certain peculiarities must be borne in mind. The cavity of the head should be laid open with a pair of scissors. In opening the abdomen the incision may be carried through the whole

parietes at once; and the navel should be avoided, so that the state of the vessels of the navel-string may be examined correctly.

“58. The inquiry in cases of infanticide should be conducted with a distinct reference to the following questions: 1. The probable degree of maturity of the child. 2. How long it has been dead? 3. Whether it died before, during, or after delivery, and how long after? 4. Whether death arose from natural causes, neglect, or violence? 5. Whether the suspected female is the mother of the child?

“59. The points to be attended to for ascertaining the probable degree of maturity of the child are the state of the skin, its secretions, and its appendages, the hair and nails; the presence or absence of the pupillary membrane; the length and weight of the whole body; the relative length of the body and its members; and the point on the abdomen corresponding with the middle of the length of the body; the relative size of the lungs and heart; the relative size of the liver, indicated by the position of its margin; the situation of the meconium in the intestines; the position of the testicles in the case of males.

“60. The points of chief importance, in reference to the period which has elapsed after death, are those specified in the last clause of section 17.

“61. The circumstances which indicate whether the child died before or during parturition, and how long after it, are the signs of putrefaction within the womb; the marks of the crown, feet, buttocks, shoulders, etc., indicating presumptively the kind of labor; the state of the lungs, heart, and great vessels, showing whether or not it had breathed; the nature of the contents of the stomach, and of the intestines; the presence or absence of urine in the bladder; the presence of foreign matters in the windpipe; the state of the umbilical cord, or of the navel itself, if the cord be detached.

“62. In order to examine properly the state of the lungs, heart, and great vessels, with a view to determine whether or not the child had breathed, the inspection should be made in the following order: Attend first to the situation of the lungs, how far they rise along the sides of the heart—to their color and texture—and whether they crepitate or not. Examine next, but without displacing them, the condition of the ductus venosus and umbilical vessels. Then secure a ligature round the great vessels at the root of the neck, keeping clear of the ductus arteriosus, and another round the vena cava above the diaphragm. Cut both sets of vessels beyond the ligatures, and remove the heart and lungs in one mass; which must be weighed and put in water to ascertain whether the lungs, with the heart attached, sink or swim. In the next place, put a ligature round the pulmonary vessels, close to the lungs, and cut away the heart by an incision between it and the ligature. Compare now the relation of the diameter of the ductus arteriosus to that of the pulmonary trunk and of the pulmonary branches, and look for any indication of partial contraction in the duct towards its aortal end. Lastly, ascertain the weight of the lungs; their relative weight to that of the whole body; whether they crepitate when handled; whether they sink or swim in water; whether blood issues freely or sparingly when they are cut into; whether any fragments swim in the instances where the entire lungs

sink ; and, in every instance of buoyancy, whether fragments of them continue to swim when well squeezed in a cloth.

“63. The points to be considered in relation to the cause of death, are the signs of natural death before parturition, and of natural, accidental, and violent death during parturition as well as after delivery. The most frequent forms of violent death during labor, are, puncture of the fontanelles, orbits, or nucha ; twisting of the neck after delivery of the head ; compression of the head ; detruncaion of the head ; strangling and smothering. The chief varieties of violent death after delivery are : smothering by overlaying or otherwise ; hemorrhage from the umbilical cord ; simple exposure ; starvation ; injuries of the head from falls, blows, or compression ; wounds of the throat ; puncture of the fontanelles, nucha, orbits, cribriform plate, spine, ears, or heart ; laceration of the great gut, or of the internal parts of the throat, by instruments thrust in the anus or mouth ; drowning ; poisoning ; burning ; strangling with the hand or a ligature ; choking by foreign bodies thrust into the back of the throat, or by dividing the frænum linguæ and doubling back the tongue.

“64. The circumstances noticed in §§ 59, 61, 62, compared with the signs of recent delivery in the female, will lead to the decision of the question, whether the suspected female be the mother of the child. These are the signs of the degree of maturity of the child ; the signs on the body of the kind of labor ; the signs which indicate the date of its death, and the interval which elapsed both between its birth and death, and between its death and the inspection.”—*Watson on Homicide*.

BOOK VI.

SURVIVORSHIP.

§ 1024. RECENT statutes have greatly reduced the cases in which questions of survivorship can come before the courts. In Prussia, for instance, it is provided, that, when two or more persons lose their lives in a common calamity, in such a way that it cannot be ascertained which has survived, then it is to be assumed that neither has survived the others.^(a) So effective has this been in Germany in quieting litigation of this character, that Liman (1871) tells us that cases where the courts are called upon to adjudicate as to survivorship now very rarely arise. Casper was called upon for an opinion in but a single case; Liman in but two. We usually assume, continues Liman, in showing the unsatisfactory character of the merely scientific tests that are invoked, that we can resolve questions of doubt by appealing to the distinctive individualities of the persons found dead; to their respective ages, sexes, and constitution; to the position in which they were found; to the degree of progress of decomposition. But all these tests are fluctuating; and the only general conclusion which we can reach is that each case is to be judged by its peculiar circumstances. Three men, for instance, to adopt the illustration given afterwards by Casper, are killed in a riot; A, by a sword wound on his head; B, by a bayonet thrust in his heart; and C, by a gunshot that has severed a jugular vein. Here we cannot hesitate to conclude that B died the first; that C may have resisted death a little longer before final exhaustion; and that A for a still longer period withstood the fatal effect of his wound. But who can decide who survived among several persons who by the same casualty encountered

(a) Pr. Allg. Landrecht, Th. i. tit. I. § 39.

death by drowning? When, by the burning of a house, a whole family, consisting of a father, mother, and three children, were destroyed, would it have been possible for us to determine who died first? It is, therefore, with great wisdom, continues Liman, that the Roman law, followed in this respect by subsequent European legislation, has concluded that in cases of this kind, in which absolute scientific conclusion by experts may be impossible, no positive judicial conclusion can be reached.(b) In this opinion now coincides the Anglo-American law, with certain qualifications, however, which may make an examination of the comparative strength of the parties of occasional importance. Suggestions as to such an examination will now be given.

I. AS TO THE PARTIES, § 1025.

1st. Sex, § 1025.

2d. Age, § 1027.

3d. Size and temperament, § 1028.

4th. Health, § 1030.

II. AS TO MODE OF DEATH, § 1031.

1st. Drowning, § 1031.

2d. Asphyxia, § 1046.

3d. Heat, § 1047.

4th. Cold, § 1048.

5th. Starving, § 1049.

6th. Poison, § 1052.

7th. Crushing or burying alive, § 1053.

8th. Childbirth, § 1054.

9th. Wounds, § 1056.

III. TESTS WHERE BODIES ARE FOUND DEAD, § 1057.

§ 1025. I. *As to the parties.* 1st. *Sex.*—Generally the male is supposed to survive the female, though in cases of suffocation Zacchias assumes the survivorship to be with the woman, on account of a less liability to asthma. This is verified by one or two cases. A girl and a young man were exposed in the same apartment to coal-gas. He was dead, but she, though she had been exposed ten hours, recovered.(c)

A very interesting narrative to the same effect is quoted by

(b) 2 Liman's Casper, 1871, 17.

(c) Henke's Zeitschrift, 1 Heft. B. 75, s. 99.

Dr. Krügelstein. In the Catacombs near Maestricht there is a labyrinth from which, when the way is lost in the dark, it is almost impossible to escape. Among the mummies which are found in the passage is one of a Leipsig student, whose name is not recorded. This much, however, is told of him. He was a man of much beauty and accomplishments, and was preparing for a professorship. An attachment sprang up between himself and the daughter of a rich merchant from Leipsig. The father refused his consent, and the young couple eloped and hid themselves in Maestricht. They were followed there, and finally took refuge in the Catacombs, thinking that they could readily conceal themselves there for a few days. Their track, however, was followed, and at the end of the third day they were discovered in a remote hole. The husband was dead, and his body is the mummy just mentioned. The wife was resuscitated, and lived to an extreme old age.

§ 1026. According to Dr. Guy, in cases where one of each sex perishes by the same accident, the probability is that the male, being stronger, is the survivor. This view has received a most melancholy confirmation in the wreck of the Atlantic, in April, 1873, in which, out of three hundred survivors from a steamer crowded with emigrants, there was not a single woman or child. This rule applies only where strength and courage are the best means of safety. In those cases, however, where the danger of death is increased by struggles and resistance, the probability of survivorship is said by Guy to be with the female, from the incapacity of action which would result from her greater liability to weakness and fainting.(d)

§ 1027. 2d. *Age*.—The body is in the possession of its maximum strength and vigor between the ages of 27 and 50. In cases, therefore, where adults between these ages perish by the same means and where strength and power of endurance only are concerned, no presumption of survivorship can be entertained between them. Before and after these ages the power of endurance is probably less, but still between the ages of 15 and 60 not enough difference can exist to establish any general rule. Where a middle aged person perishes with one under

(d) Guy's Medical Jurisprudence, 400.

puberty or above 60, the probability of survivorship is in favor of the adult. Where one under 15 and one over 60 perish together, according to the French law, the former is the survivor. The civil law assumes that in case the parent and child die by a common death, the child survives the parent if he is above puberty, and dies first if he is below that age.^(e) The particular rule in shipwreck will be hereafter given.^(e¹)

§ 1028. 3d. *Size and temperament.*—Hippocrates is quoted as saying *qui natura sunt valde crassi, subito moriuntur quam graciles.* The fat, in other words, die quicker than the slender. The older commentators on this passage make a still further distinction between those who are naturally stout, and those whose fat is the result of high living, the latter of whom they declare to be the more shortlived.^(e²)

§ 1029. *Temperament.*—Persons who are sanguine and choleric outlive those who are melancholy and phlegmatic. *Celui qui est doué d'un temperament pituiteux meurt le premier, vient ensuite le melaneholique, puis le sanguin et le bilieux.*^(f)

The timid die much more quickly than the courageous.

Dr. Gray says: "It is necessary, however, to understand that mere muscular strength and power of endurance are two very different things, and do not often meet in the same person. Muscular strength is often greatest in the so-called lymphatic temperament; power of endurance in the bilious."^(g)

^(e) The duration of human life is very different in different cases, but seldom exceeds 100 years. The average duration in Russia is 21.3, in Prussia 29.6, in Switzerland 34.6, in France 35.5, in Belgium 36.5, in England 38.5 years. The probable duration of life has latterly increased. The average length of life is greater with married persons than with those who remain single; this difference is more remarkable in the case of females than in that of males, but the former are more subject to fatal attacks during the period of child-bearing. Extreme old age is oftener reached by men than by women. The average duration of life is different in different professions. Among theologians it is 65.1, among merchants 62.4, among government officials 61.7, among farmers and foresters 61.5, among soldiers 59.6, among lawyers 58.9, among teachers 59.9, among physicians 56.8 years. (See Böcker's *Gericht. Med.*, ed. 1857, § 129.)

^(e¹) Post, §§ 1031, 1039.

^(e²) See Pauli *Zachiaë Quæstion Med. Leg.*, lib. v. tit. iii. Quæst. 12.

^(f) Orfila, *Leçons de Médecine Légale*, Paris, 1825, tom. ii. p. 271.

^(g) *Guy's Med. Jur.*, 400.

§ 1030. 4th. *Health*.—Disease, all other things being equal, supposes an earlier death.

§ 1031. II. *As to mode of death*. 1st. *Drowning*.—Many cases of great difficulty have arisen from doubt as to the priority of death, where persons have perished from drowning. Where shipwreck occurs, men are more apt to be saved than women. They are stronger, can endure more, and are more apt to know how to swim than women, and generally they are more apt to be upon the deck, and in favorable places to secure their safety, than are women.

When the comparison is between those of the same age and sex, it is to be considered which of them was the more exposed to cold from having his body only partly immersed. Investigation should also be made as to whether any injuries may have occurred to prevent a swimmer from using his strength.

§ 1032. When there is an explosion, those persons, according to Orfila, who are the lightest and weakest, will be presumed to have been the last who were precipitated into the water. When the water is reached, however, and in all cases of ordinary shipwreck, the presumption of survivorship is with those who have the greatest presence of mind and strength, and with those best acquainted with swimming. Besides this, the following considerations are to be noticed:—

§ 1033. *Dress* very much affects the power of keeping above water. Boots soon fill with water and interfere with swimming. A woman's clothes, as lighter, and often exposing a greater resistance to the water than those of a man, may act as floats to keep the body a few moments longer on the surface.

A power to hold in respiration, or a condition of the body that permits this, presumes a longer struggle.

It should be inquired, also, whether the death was by apoplexy or suffocation. Persons of apoplectic tendencies are very apt to be struck with the disease when suddenly precipitated into the water, and when this is the case, death is presumed to have been earlier than in the ordinary cases of suffocation. (*h*)

(*h*) According to Böcker, the stronger person will live longer—the mature man longer than the child or old man. In cases of poison, the person who

§ 1034. In 1766 General Stanwix and his daughter set sail from Ireland for England, and during the voyage both perished from shipwreck. Opposing claims were set up for the personal estate by the nephew of Gen. Stanwix and the maternal uncle of the daughter. It was argued, in favor of the general's survivorship, that he, being a soldier and man of courage, would be apt during tempestuous weather to be upon deck, while the daughter would probably be below, and hence it was supposed that the father would struggle much longer for his life than the daughter. It was contended, on the other hand, that the general was old and feeble, while the daughter was young and healthy, and hence able to resist such an attack longer than the father.

A second wife of the general perished at the same time, and her representatives put in a claim to the property. The difficulties were such that the judges were unable to decide, and advised a compromise, which was accordingly effected.(*i*)

§ 1035. In 1838 occurred the explosion, near Charleston, South Carolina, of the steamer Pulaski, from which two remarkable cases arose. In the first(*j*) it appeared that Hugh

is found to have taken the largest dose probably died soonest. In cases of suffocation, the person who has strong lungs has probably survived one with weaker, as a young child. In cases of drowning, a good swimmer has probably retained life longest. Persons upon whom traces of reactions are found have survived those upon whose bodies such marks are wanting. In cases of injuries the more important the organ affected, the sooner death follows. A sick person will die sooner than one in good health. Women bear loss of blood longer than men. If the fatal instrument must have reached the different persons at intervals, the one first reached has probably died first. Where one of the persons has died by the hands of another, and the other by his own hands, the latter has probably survived the former. In cases of starvation or of freezing, young, weak, lean persons perish sooner than others. Hunger and thirst combined produce death sooner than hunger or thirst alone. If a mother and a newly-born infant are found dead, it is probable that the infant, where it was evidently born alive, lived the longer. Some physicians hold the opinion that the birth of a child may be consummated after the death of the mother. The person whose body is most advanced in decomposition died first.

In some cases the circumstances will enable one to decide with a high degree of probability as to priority of death.

(*i*) *R. v. Hay*, 1 W. Bl. 640.

(*j*) *Pell v. Ball*; 1 Cheves's Ch. Cases.

Swinton Ball, with his wife and adopted daughter, were lost on board the steamer Pulaski, in June 14, 1838. By will he left certain portions of his estate to his wife in case she survived him. The facts are thus stated by Chancellor Johnson : "The Pulaski left Savannah on the 13th of June, 1838, and arrived at Charleston that evening. The next morning Mr. and Mrs. Ball, their adopted daughter, and a servant went on board, and she departed north on her course, until about 11 o'clock of that night, when, most of the passengers having retired to their berths, the starboard boiler exploded. By the explosion an extensive breach was made on the starboard side of the vessel. Her main deck was blown off, thus destroying the communication between the forward and after part of the steamer. The forward part of the upper deck (called the hurricane deck, in contradistinction to the after part, which is called the promenade deck) was blown off, carrying with it the wheel-house, in which the commander of the boat, Capt. Dubois, was sleeping at the time; the gentlemen's forward cabin was much torn, its floor ripped up, and its bulkhead driven in, and Major Twiggs, whose berth was there, gives us reason to suppose that many perished in that part of the vessel by the explosion. The gentlemen's after cabin (which was under the main deck and immediately beneath the ladies' cabin, which was on that deck) was also injured. Some part of the floor was ripped up, the bulkhead partly driven in, and the stairs communicating with the deck more or less shattered. The vessel was careened to the larboard, and as she dipped began to fill with water. In a very short time the hold was filled, and the water gained to the level of the floor of the gentlemen's cabin. It rose higher with great rapidity, the vessel settled to the centre, where the breach was, and all hope that she could hold together was abandoned. She parted amidships, and the forward and after parts pitched into the water toward the centre, at an angle of nearly thirty degrees. The gentlemen's after cabin was now entirely filled, and the forward cabin was certainly in as bad a condition. There were some persons on the forward part of the vessel, nearly all of whom speedily perished, but the greater number were in the after part, including one or two who had passed by swimming

from the forward to the after part. Of those on the after part, as many as could climbed to the promenade deck; but there were many, mostly ladies, among whom was Mrs. Ball, who remained on the main deck. These, as that deck sank deeper and deeper, retreated along the gangways, by the ladies' cabin, toward the stern. The promenade deck, by the action of the waves, was burst from the top of the boat and was submerged with all that were on it. Whether the stern of the boat was submerged at or after this time, is uncertain. Some of the witnesses think it was, even before the promenade deck, others, that it was not submerged at all. All these events had taken place, according to most of the witnesses, in about from forty to fifty minutes; according to others, in less time.

“Some few escaped in the boats, others on parts of the wreck, and others on rafts constructed by them as they could. Of Mrs. Ball, nothing is known, after the submerging of the promenade deck, nor for some time before. Before that event, her cries were heard by one witness, who had gained the promenade deck, as they proceeded from the place she still occupied on the deck below. No witness speaks of her afterwards.

“Within a few minutes after the explosion, according to one witness who knew her, she came out of the ladies' cabin and began to call upon her husband. The scene was one of terror, as may be supposed; and, although a crowd was instantly gathered at that part of the vessel, there was not much noise. The surrounding horrors seem to have subdued the sufferers, and in mute astonishment they contemplated the fate that awaited them. Even the wheels had stopped. Nothing but the sound of the waters, which were somewhat disturbed, and the hasty exclamations of friends, as they sought each other out, and the noise occasioned by such preparations as the more active and prudent felt themselves called upon to make for themselves and others under their charge, were heard. But the voice of Mrs. Ball was heard above all others, calling upon her husband. She ran forward to the chasm caused by the explosion, retraced her steps, and continued to traverse the starboard gangway in search of him, uttering his name in tones so elevated by her agony, that they reached most parts of the vessel, and seem to have made an indelible impression

upon all who heard them. Her cry, according to one witness, was a cry of bitter despair and anxious inquiry, and, according to all, it was lifted in shrill tones, carrying an irresistible appeal to all hearts.

§ 1036. "Mr. Ball was neither seen nor heard. Mrs. Ball was heard and seen by many, but no response was heard to her cries, nor was any one seen to approach her for her protection or consolation. Two witnesses, who knew Mr. Ball, saw her, but did not see him. One of them passed and repassed her, in a hurried manner to be sure, but did not discover him. He was neither seen nor heard after the explosion, unless he was the person referred to by two witnesses, who stated the following circumstances: Very shortly after the explosion, a boat was let down on the starboard side of the steamer, into which some persons descended. As the boat was lying below, a gentleman came to that side of the deck, and throwing a coat into the boat, called to those in it to hold fast a moment, and instantly disappeared. He never reappeared, but the next day the coat was found to be a black dress-coat of large size (such was the size of Mr. Ball), and in one of the pockets was discovered a shirt collar, on which was written the name of Ball with some initials, which the witnesses have forgotten.

"Now these are the circumstances of the case. It is not the case of an unknown calamity, nor of one withdrawn from observation, nor is it a case where the calamity was of instantaneous operation. It is a case for testimony, and to be decided on testimony."

§ 1037. Chancellor Johnston proceeds to say, that, as the right on the part of Mrs. Ball was derivative, the burden is on the plaintiffs to prove that she was the survivor. But although bound to prove this, it does not follow that they are to prove it to demonstration. We must take the best evidence that the case affords.

Although unwilling to rest on the fact that Mrs. Ball was the last person seen, yet he inclines to the opinion, that in cases of persons lost by a common accident, this should be the ground of decision. He prefers, in the present instance, "to put the case upon the ground of probability arising from the evidence, upon a belief engendered by a combination of cir-

cumstances, and upon the superiority of positive proof over conjecture, or even probability.

“The explosion produced its most fatal effects in the gentlemen’s forward cabin, and that was the first part of the vessel which sank. The after cabin was also much injured. From the forward cabin many persons never escaped. From the after cabin, so far as we know from the evidence, all did escape except Judge Cameron, an infirm old man. But from the description given of its condition, it is possible that some others may have been detained, either from being hurt or otherwise, until the cabin filled.

§ 1038. “It is *certain* that Mrs. Ball escaped the explosion. Is it certain Mr. Ball did? Mr. Ball engaged a berth in the after cabin. The probability is that he got it, but this is far from certain. The boat came with many persons from Savannah, which may have occasioned Mr. Ball to be displaced and transferred forward. I think, however, it is not probable he was so transferred, because, by an arrangement between the agents in Savannah and at Charleston, they were entitled to let berths, in alternate order, throughout the boat, and we know that some of the passengers who came from Savannah had not the advantage of pre-occupying the after cabin, and that some of the Charleston passengers were let into the cabin; Mr. Ball, therefore, was probably in that cabin. But there is a probability that he was in the forward cabin, and if so, in the greatest danger from the explosion. Mrs. Ball was cleared from that danger *certainly*, Mr. Ball only *probably*. Supposing that he was in the after cabin, still there are chances of his destruction there, from which, we know, Mrs. Ball was totally free on the deck. We know Mrs. Ball was there. *That is certain*. Is it certain that Mr. Ball had hitherto escaped, and was the person who threw the coat into the boat? It may be that he was the man. I think it hardly probable. I should have thought that he was the man if he had been seen at any time near his wife, or had answered to her heart-rending calls. But it is more probable that some one else in the hurry of the moment may have mistaken Mr. Ball’s coat for his own, and thrown it into the boat, than that an affectionate husband and brave man, as Mr. Ball is proved to have been, should have

heard such appeals as were made to him by his wife, and should at such a time have failed in his duty to her.

“We have indubitable evidence that she had so far escaped; the same evidence, with a moral force which cannot be resisted, convinces us that he must have already perished, or he would have been at her side. I have from all these considerations, formed the opinion that Mrs. Ball survived her husband.” On appeal (February, 1840), the above decision was confirmed.

§ 1039. In 1844, in Massachusetts, a question of survivorship arose as to a father, seventy years old, and a daughter, thirty-three years old, who also perished in the *Pulaski*, there being no evidence as to the time or mode of their particular deaths. It was held by the Supreme Court that there was no legal presumption that either survived the other.^(k) Yet the court did not go so far as to declare that there could be in no circumstances any decisive presumptions arising from disparity of age. “To a certain extent,” said Dewey, J., “we might well go, in applying the principle as to disparity of age. Thus it would be proper and reasonable to hold that one of middle age, and in full vigor of life, would ordinarily survive an infant or child of very tender years; and the same would be alike true as to such person and the man well stricken in years.”

§ 1040. In 1846, the same points were mooted in New York under the following circumstances: A married woman procured a policy of insurance on the life of her husband, for her own use, unless she died before him, and in that case to the use of her child. She sailed with her husband and child from New York, in 1841, in the steamer *President*, which was lost at sea, no intelligence being received as to the circumstances of the disaster. Upon the question of survivorship, Chancellor Walworth said: “The insurance money in this case, by the terms of the policy, was made payable to the children of the assured, in case she died before her husband. If her daughter survived her, therefore, it would have been necessary, perhaps, to inquire whether there is any legal presumption that the

(k) *Coye v. Leach*, 8 Metc. 371.

husband survived his wife, when they have both perished by the same disaster, and when there is no extrinsic evidence to guide the judgment of the court upon this matter of fact. In the cases of *Taylor v. Diplock* (2 Phill. Rep. 267), *Colvin v. King's Proctor* (1 Hagg. Ecc. Rep. 92), and in Selwyn's case (3 Idem, 748), it appears to have been supposed, in the absence of any evidence to justify a different conclusion, that the court would be bound to presume a survivorship of the husband, when the husband and the wife perish together at sea; upon the ground, I presume, that the greater strength of the male would probably enable him to sustain life the longest in such a calamity. But as there is no presumption of the survivorship of the daughter, in this case, after the death of her mother, and the probability is that they both perished at the same moment, it becomes immaterial to inquire whether it must be presumed that the husband survived his wife. It is sufficient for this case that there is no legal presumption that she survived him." (l)

As to these observations two remarks are to be made. *First.* They are mere *dicta*, so far as concerns the presumption of the husband's survivorship, the point not coming up in this case. *Secondly.* They are made on the basis of English cases, either misunderstood by Chancellor Walworth, or subsequently overruled. "Notwithstanding," says Mr. Best, in 1870,^(m) "some questionable *dicta*, the true conclusion from the authorities seems to be that it (the English law) recognizes no *artificial* presumption in cases of this nature; but leaves the real or supposed strength of one of the persons perishing by a common calamity, to its natural weight, *i. e.*, as a *circumstance* proper to be taken into consideration by a judicial tribunal, but which standing alone is insufficient to shift the burden of proof. Where, therefore, a party on whom the onus lies of proving the survivorship of one individual over another has no evidence beyond the assumption that from age or sex the individual must be taken to have struggled longer against death than his companion, he cannot succeed."

(l) *Mochring v. Mitchell*, 1 Barb. Ch. Rep. 269.

(m) Best on Evidence, 5th ed., § 410.

§ 1041. In 1854-55, in England, arose the following case: ⁽ⁿ⁾ A testator, by his will, gave all his real and personal estate to W., in trust for his wife absolutely, "and in case my said wife *shall die in my lifetime*, then in trust for such of them, my three children, C, F., and A., as shall attain the age of 21, etc., and in case all of them shall die under the age of 21, etc.," then he gave and bequeathed all his property to W. The testator and his wife, and two of the children, F. and A., were drowned at sea, in a shipwreck, having been washed off from the side of the vessel by the same wave. The other child, C., was also drowned, but had been seen alive, after the others were drowned. W., as executor, proved the will. A bill was filed by the administrator of C., as next of kin of the wife, under an asserted intestacy, against W. There was no direct evidence on the question of survivorship as between the husband and wife, but there was considerable medical evidence of a conflicting nature, with reference to the presumptions of the case. The case came up on an appeal from the Master of the Rolls, and was heard before CRANWORTH, Lord Chancellor, assisted by WIGHTMAN, J., and MARTIN, B. WIGHTMAN, J., in the course of his judgment, said: "The question of survivorship is the subject of evidence to be produced before the tribunal which is to decide upon it, and which is to determine it, as it determines any other fact. If there be satisfactory evidence to show that the one survived the other, the tribunal ought so to decide; and if there be no evidence, the case is the same as a great variety of other cases, more frequent formerly than at present, where no evidence exists, and consequently no judgment can be formed. On this point, we concur with the Master of the Rolls; we think there is no evidence to show whether the husband or the wife was the survivor. There may be surmise, and speculation, and guess, but we think there is no evidence. We have no doubt that the scientific gentlemen who were examined were perfectly sincere in their opinions, but it is obvious that their opinions were given, having reference to the case of two persons quietly

(n) *Underwood v. Wing*, 1 Jur., N. S., 169; 4 De G. M. & G. 633; 31 Eng. Law and Eq. 293.

submerged in water, and remaining there until drowned; or in the case of two persons, one being a swimmer, and the other not, and both thrown suddenly into the water, unincumbered, and acting on certain instinct. The present case is that of two persons clasped together, two boys clinging to one of them, and standing pretty high out of the water on the ship's side, swept off together by an overwhelming wave into a raging sea, and one or other, or both of them, may have been stunned by the violence of the blow from a wave, or they may have struck against a timber of the ship, and may, in fact, have been dead before he or she reached the water at all. How is it possible, under such circumstances, for any tribunal, sitting judicially, to say which of these two individuals died first? We may guess, or imagine, or fancy; but the law of England requires evidence, and we are of opinion that there is no evidence upon which we can give a judicial opinion that either survived the other. The Master of the Rolls is reported, in the report of his judgment, to have said: 'There is, therefore, no evidence to show who was the survivor, and the conclusion of law is that both died at the same moment.' According to our view this is not correct; we think there is no conclusion of law on the subject. In fact, we think it unlikely that both did die at the same moment of time, but there is no evidence to show who was the survivor. Our opinion, therefore, on the questions, with respect to which it was requested, is in favor of the plaintiff."

§ 1042. Lord Chancellor CRANWORTH, after adopting the views of WIGHTMAN, J., added:—

"Then we come to the question of fact. I entirely concur in what was said by the learned judges on that subject, that there is no evidence whatever which will justify anybody in coming to any such conclusion; because I take it in this case, as in all others where it is said that a person must show such and such a state of things to have arisen, that it is not sufficient to show a variety of circumstances on which it is very difficult to form your mind; that, if you had to lay a wager, you would rather lay a wager one way than the other. That is not what is necessary. The heir at law is not to be dispossessed unless the devisee or person claiming can show such

circumstances as displace him—not show that there is a confusion and an ignorance as to what happened, and that it may have so happened, that the greater probability may be that it has so happened, as to entitle him; but there must be evidence as to who was the survivor. I think it impossible to carry this evidence to anything like proof as to which was the survivor. I give the medical gentlemen most entire credit for speaking scientifically and, as we believe, quite accurately. I do not think that they themselves even are very confident. Indeed, it is idle, when you are calculating and reasoning *à priori* in this way, as to which of two people may have breathed a few seconds the longest at the bottom of the sea; for that is all it comes to. To think that one can take that as establishing the fact seems to me to be quite misunderstanding the nature of human testimony. The medical men may be quite right in the observations they have made of persons dying from asphyxia; that such and such results follow; that there is a small interval, of perhaps half a minute, after sensation has ceased, in which life still continues; and I think they say that that is, as far as their observation goes, uniform in all states of health and in all states of strength. I dare say that may be very learned and probably accurate, as far as science enables us to form such an opinion; but, happily, the instances of such events cannot have been sufficiently numerous to have enabled anybody to have formed at all an accurate and certain conclusion on such a difficult subject; and I confess that I rose from the perusal of their evidence utterly unconvinced that those gentlemen can tell us which of these two persons died first; that is to say, which of them died first if they had both been taken and quietly submerged to the bottom of the sea. But when you add to that, that they are all violently thrown by one blast from the side of the ship, and may have fallen against some spars (for from what we know that may have been so), and then in the whirlpool and confusion of the moment to pretend that you can come to any conclusion on which you can act, that these medical gentlemen are right in supposing the wife did die a few seconds before the husband, seems to me to be confusing and confounding the province of human testimony. I must say that I come to a conclusion upon the as-

sumption that we cannot tell which of these two persons died first. That is the conclusion at which the Master of the Rolls arrived. In the report certain words are attributed to the Master of the Rolls. I do not mean to say that reporters are not accurate in taking down judges' words. It may be that judges use inaccurate words, or that the words are not distinctly understood as used; but I have, from personal communication, ascertained what he meant to say. He is represented in one passage to have said, he must assume they both died together. All he meant was—and I know he was not aware he ever used such an expression, but, if he did, all he meant was—that the property must be distributed just as it would have to be distributed if they had both died at the same time, *punctum temporis*; that there was not a practical difference between them, not that any person may assume it to be proved or probable or possible. That two human beings should cease to breathe at the same moment of time is hardly within the range of imagination. I suppose that time, like space, is infinitely divisible; and if we are to speculate on such a subject, one can hardly suppose that the one did not breathe a millionth part of a second longer than the other. Therefore, to adjudicate on a principle that they did actually cease to breathe at the same moment would, I think, be proceeding on false data. The real ground to proceed on is, that it cannot be proved which died first; they both probably died within a few seconds of each other, but which died first it is impossible to say. That being so, what is the result? Why, here is a will made in which in one state of circumstances, namely, that if the wife died in the husband's lifetime, the property is given away. It is not proved that that state of circumstances existed, and in no other state of circumstances is it given away. Then it is not given away at all. Therefore, it is to be taken as upon an intestacy, and must be distributed amongst the next of kin."

§ 1043. In 1857 the Supreme Court of Florida accepted the doctrine of *Underwood v. Wing*, and declared, that, "as we understand the doctrine of the common law, it is this, that, when several individuals perish by a common calamity, and there is no circumstance other than that of age, sex, etc., from which it may be rationally inferred who was the longest liver,

no presumption arises upon which a conclusion can be predicated.”(o) But it was added, very properly, that, when there are a series of shocks, separated in point of time, age and capacity of endurance might be taken into consideration. The case was decided, however, on the ground that a daughter was shown to have been alive at a point of time subsequent to that at which her father must have perished.

§ 1044. In 1860, in a case where the evidence was that the husband and wife perished by a common calamity at sea, *Underwood v. Wing* was affirmed by the English House of Lords, Lord Campbell, Lord Cranworth, Lord Wensleydele, Lord Chelmsford, and Lord Brougham concurring. “The evidence,” said Lord Wensleydele, “leaves it in total uncertainty whether the husband died before the wife, or whether they both died at the same instant. Whoever has to maintain any one of these propositions must certainly fail.”(p) Still more emphatic are the comments of Lord Chelmsford. “With respect to the question upon the fact of survivorship when two persons are swept away by a calamity like that which happened in this case, it is possible that there may be evidence to prove distinctly which was the survivor, *as where one of them has been seen struggling with the waves after the other has sunk, and never again appeared above the surface, or as in this very case, where there can be no doubt that there is evidence to establish satisfactorily that Catharine, the eldest daughter, survived her parents for some short time, though she afterwards perished in the same shipwreck. But where two persons are at one and the same instant washed into the sea and disappear together, and are never seen any more, it is not possible for any tribunal, called upon judicially to determine the question of survivorship, to form any judgment upon the subject which can be founded upon anything but mere conjecture derived from the age, sex, constitution, or strength of body or mind of each individual, and as our law has not established any rules of presumption for these rare and extraordinary occasions, the uncertainty in which they are involved leaves no greater weight on one side or the other to incline the balance of evidence either way.*”(q)

(o) *Smith v. Croom*, 7 Florida 144.

(p) *Wing v. Angrave*, 8 H. of L. Cases 213.

(q) *Ibid.* p. 220.

§ 1045. *Summary of cases.*—The conclusions we may accept, after a scrutiny of the above cases, are as follows:—

(1) When persons ranging between infancy and extreme old age perish by a common shipwreck, and when there is no information as to either of them subsequent to the shock, no such presumption can be drawn from differences of age or sex as will enable a court to give judgment for a plaintiff seeking to recover on the claim of survivorship.

(2) When, however, one of the parties is in extreme infancy, or in very advanced and decrepid old age, we may assume, as a presumption of fact, that such person died before another not so disabled.

(3) The law only refuses to draw a presumption where there is no evidence at all as to the parties subsequent to the shock. If there is any evidence, no matter how slight, leading to the conclusion that one of the parties was seen alive subsequent to a period when the other was probably drowned, this is ground on which a jury can find survivorship. And in aid of such evidence, proof of the distinctions of age, health, and sex is admissible.

§ 1046. 2d. *Asphyxia.*—Where the parties are in the same circumstances, the female is presumed to have survived the male, from the fact that women consume less oxygen than men, and hence can exist longer on the same amount of air. In poisoning by carbonic acid gas, the chances of survivorship are with the female. In 19 out of 360 cases of asphyxia by carbonic acid, which took place in Paris during 1834 and 1835, a man and woman were asphyxiated together; of these, three only were saved; and these three were females.

§ 1047. 3d. *Heat.*—The young and old bear heat better than those in the prime of life. The difference between the sexes in the capacity to endure heat is not well ascertained. Fodéré relates a case where an Englishman and his daughter of seven years of age crossed the desert of Syria to the Persian Gulf, each being in precisely the same circumstances; the father perished, but the child reached her journey's end in safety.^(r)

§ 1048. 4th. *Cold.*—Middle aged men endure cold much

(r) Guy's Med. Jur. 401.

better than young children or old persons. Men bear cold better than women. The amount of clothing and state of health of the parties is to be taken into consideration. Where spirituous liquors are taken in excess, they make the cold more intolerable; but if taken in moderation, they help to resist its effects.

§ 1049. 5th. *Starving*.—The aged require less nourishment than adults, and adults less than children, so that the probability of survivorship is in favor of the more aged of different persons, where death is from starving. Corpulent persons also are apt to live longer than those of emaciated frames. Where one person has had access to water, this is presumed to have prolonged his life. Active exertion to escape from the perils of their situation hastens the hour of death, so that those who possess the most passive endurance are supposed to live the longest.

§ 1050. On Friday the 13th of April, 1856, the mines known as the Blue Rock Coal Mines, situated on the west bank of the Muskingum River, in Harrison township, Muskingum Co., Ohio, fell in. At the time of the catastrophe some twenty persons were at work, of whom all but four succeeded in making their escape. The names of the four who were imprisoned in the mine were William Edgell, James Pearson, James Gatwood, and Edward Savage. Edgell was twenty years old, Pearson thirty-three, Gatwood twenty-two, and Savage sixteen. They were working at the time in a well-defended portion of the mine, and consequently escaped any immediate injury. After satisfying themselves that there was no prospect of an early escape from their confinement, they established themselves in one of the compartments scarcely large enough to contain them all, and made preparations to die together, after their means for sustaining life should be exhausted. The only food they had with them were the dinners for two persons that had been left by some of the other hands. This was shared between them, and made two scanty meals. They were all thinly clothed, none of them having more than a shirt and pair of trowsers, and the sleeves of their shirts had been torn off, as is customary with miners, to prevent them from interfering with their work. Two of the men, however, succeeded in finding jackets that afforded some warmth to the upper

part of their bodies. They were well supplied with oil, but after their lamps had been replenished some nine or ten times, they ceased to burn, and the miners were left in total darkness. In this condition of things the men, huddled together upon a bed of dirt, forced to take turns in occupying the middle position as the only place of comfort, suffering intense anguish from hunger and cold, looked forward to death as their only escape. The water which they had with them soon gave out, when very fortunately they found not far off a reservoir of water strongly impregnated with copperas. The supplies of this, which they kept constantly by them, seemed to afford considerable nourishment, and were undoubtedly the means of preserving their lives. The intense pains of hunger which affected them the first two or three days afterwards in a great measure disappeared, attributable, as the men thought, to their liberal use of the copperas-water. They were all of them delirious at different times, experiencing the dreams and visions of tempting food that so often accompany starvation. The oil which they had with them was used on two occasions for nourishment, but proved so nauseating that it was not again tried. They remained in this condition, gradually growing weaker, but still all of them able to stir about, until after two weeks had elapsed, when they were rescued by their fellow workmen and neighbors, having been entombed in their prison fourteen days and thirteen hours.

§ 1051. As indicating one of the effects of the copperas water, and as one of the elements in this remarkable prolongation of life, it may be observed that the sufferers were "constipated during the entire time of their imprisonment. After their rescue a healthful action was restored by means of clysters, and with no great difficulty."

"Considering all things," is a statement made in a pamphlet report of the condition of the parties when brought out, "Edgell looks remarkably well; being a fleshy young man; he is not much emaciated. Pearson, and the boy Savage, are somewhat reduced; Gatwood very much so and very weak."

§ 1052. 6th. *Poison*.—Dissection alone gives here very little aid. The marks on the body are often the most unequivocal in cases where the suffering was the longest protracted. Cases

are well known in which one person gave another poison, and afterwards took it himself, and in which the giver survived.

§ 1053. 7th. *Crushing or burying alive.*—Here again we fall back on the general consideration of the age, the corporeal energy, the sex, and the position of the corpse. Younger persons, in this kind of death, survive the older. After the Calabrian earthquake, the children who were buried alive were found to have survived their parents. Where the question is of continued respiration, the presumption of survivorship is with children, with whom loss of breath can be longest borne. So also when the lungs are sound, in which case a longer living will be presumed than where the lungs are weak, so as to have difficulty in obtaining the necessary air. Men are supposed, from this reason, in such cases to survive women, though this has been much controverted.(s)

Signs of struggling at extrication indicate a longer continuance in life than where the deceased appears to have at once succumbed.

§ 1054. 8th. *Childbirth.*—Where the mother and child have both perished in childbed, the presumption is that the mother survived, for there is *prima facie* evidence of stillbirth, and a still stronger probability that the mother was unable to render the child any assistance towards its preservation, and hence the child would die first. A case is mentioned(t) where the succession to a large landed estate was thus involved. The mother and child both died during delivery. If the latter survived, the father was entitled to the property, but if the former, her relatives were entitled to it. It was proved, on trial, that the child was born alive, when the question was decided, that the child was the survivor.

When a mother died of a nervous attack, during, but before the birth, and when the child was in a good position, and there was no mechanical hindrance to the birth, the survivorship was ascribed to the child.(u)

That an unborn child can survive its mother, and even live when cut from her body after her death, is proved by many

(s) See Henke's Zeitschrift, B. 75, s. 117.

(t) Beck's Med. Jur., 11th ed., p. 638.

(u) Henke's Zeitschrift, B. 75, s. 109.

cases.(v) Cases even remain on record in which, after the execution, by hanging or otherwise, of pregnant women, children, at the distance of one day, were taken alive from their bodies.

§ 1055. *Children dying in childbirth.*—Dr. Liman(w) mentions a question of survivorship between two newly born twins, which was decided by the fact that one child remained, at the time of injury, attached to the mother by the umbilical cord, while the other had been severed.

§ 1056. 9th. *Wounds.*—Questions under this head very rarely arise. As an illustration, we may give the following:—

Dr. Casper, and after him Dr. Liman,(x) supposes the following case. A. is killed by the thrust of a sabre on the head, B. by that of a bayonet in the heart, and C. by a shot which has torn open the jugular vein. Here the presumption would be that B. died first; that C. bore the loss of blood a little longer; and that A. resisted the deadly influence of the blow the longest of the three.

§ 1057. III. *Tests where bodies are found dead.*—Where the wounds, in case of violence, are the severest, there the earlier death is presumed.

Stiffness, coldness, discoloration, degree of putrefaction, are all to be taken into account.

As to stiffness, there are many minor distinctions to be observed. The process of stiffening is greatly affected by the age of the deceased, and by the prior state of his body. Was he strong and muscular, or meagre and feeble? With persons of powerful muscles, this stiffness is far more rigid than with those of weaker frame. The stiffness gives way after very varied intervals to that suppleness and softness which is the preliminary of putrefaction. Generally, it is not observable after corruption is begun, which is mostly earlier in cases of poisoning, and death by drowning and lightning.

The process is hastened by lethal causes which act on the brain, and delayed by those which are accompanied by the loss of blood.

Where corruption has proceeded furthest, there the death can be presumed to have been earliest.

(v) Ibid.

(w) 2 Liman's Casper (1871), 17.

(x) Ante, § 1024.

BOOK VII.

MEDICAL MALPRACTICE.

CHAPTER I.

CIVIL LAW PRACTICE, § 1058.

CHAPTER II.

COMMON LAW PRACTICE.

I. In criminal prosecutions, § 1062.

II. In actions for torts, § 1086.

CHAPTER I.

CIVIL LAW PRACTICE.

§ 1058. ACCORDING to the civilians, where the practice of the attending physician is called in question the prosecution must show, 1st, that the injury to the health or body resulted from bad treatment of the case by the physician or surgeon in attendance; and 2d, that this evil result might have been certainly foreseen and avoided by a competent practitioner. The answer to this latter question will be affected by the position of medical science at the time, and often by the peculiar circumstances of the case.^(y)

§ 1059. Malpractice can only be affirmed where the physician has set aside established principles, and neglected to employ means which are universally held to be necessary in the given case. But before the physician can be reckoned guilty of malpractice on account of such deviation, it must be established—

1. That the following of the rules prescribed by medical science for the cure of the disease never proves detrimental.

(y) Böcker, Gericht. Med., § 58, etc.

2. That there is, at least, the greatest probability that the following of the rules would accomplish the desired end.

3. That the great majority of medical authorities approve the rules.

§ 1060. In the treatment of internal diseases, the physician, according to both Casper and Böcker, can never be held guilty of criminal carelessness for failing to use any particular remedy, since there is never any remedy upon which all authorities are agreed, and since it is always possible that the patient may recover without the use of such remedy. This uncertainty of remedies extends even to the antidotes recommended for various poisons. Even where the antidote produces a favorable effect, it can never be certainly determined how much of this effect is due simply to the action of the antidote. Besides, many antidotes have been recommended merely upon theoretical grounds, some of which are known to be actually injurious. But when it can be proven that there is great probability that the injurious effects of a poison might have been prevented by the use of a certain antidote, the physician is guilty of criminal carelessness when not employing it.

§ 1061. It is asserted by Casper that a physician "should be liable to punishment if in a given case he departs entirely from the treatment which the great majority of physicians of his time adopt in such cases, and which the great majority of medical authorities recommend for such cases." Great difficulty might arise from this test. It would be impossible, for instance, for a physician to stop to inquire, in any given case, what is the practice of the majority of his contemporaries; and if he should, he has often no means of answering the question.

This principle would also render all homœopathists liable to punishment. Besides, it would be impossible to collect the views of the great majority of authors upon the given case. Many may not have noticed the particular case in point, and much difference of opinion will be found among those who have. Hence the position now generally accepted is that a physician is not responsible for damages, if he acts in accordance with the views of his particular school, his patient employing him as belonging to such school.

CHAPTER II.

COMMON LAW PRACTICE.

I. *In Criminal Prosecutions.*

§ 1062. THE accountability of medical men has been a fruitful source of lego-medical discussion, and in early times was the subject of much variety of judicial, as it is still of popular, sentiment. At one time, so great was the rigor with which the courts were disposed to treat irregular practitioners, that it was held, that, while if a potion or plaster administered *bonâ fide* by a licensed physician or surgeon unexpectedly killed the patient, this was but misadventure, yet if the defendant was not a regular physician or surgeon he was guilty of manslaughter.^(z) Thus, where an old woman, who sometimes dealt in medicines, gave to a party asking for an emetic a solution of white vitriol which caused his death, Bayley, J., said: "I take it quite clear, that, if a person not of medical education, in a case where professional aid might be obtained, undertakes to administer medicine which may have a dangerous effect, and thereby occasions death, such person is guilty of manslaughter. He may have no evil intention, and may have a good one; but he has no right to hazard the consequence in a case where medical assistance may be obtained; if he does so, it is at his peril." The prisoner was convicted.^(a) But even as far back as Lord Hale, the distinction between regular and irregular practitioners began to be doubted, and that learned but quaint judge did not hesitate to ascribe to the doubt greater antiquity than the doctrine, since, as he said, it was clear that phisic and salves were in use before physicians and surgeons.^(b) And now, in England and in this country, the great weight of authority is that no such distinction exists.

(z) Brit. C. 5; 4 Inst. 251; Wilcock's L. Med. Prof. Append. 227.

(a) R. v. Simpson, 4 C. & P. 407.

(b) 1 Hale 429.

§ 1063. From the leading cases, which will be presently given in full, the following propositions may be extracted:—

1. If the defendant acted honestly, and used his best skill to cure, and it does not appear that he thrust himself in the place of a competent person, it makes no difference whether he was at the time a regular physician or surgeon or not.

2. To constitute guilt, gross ignorance or negligence must be proved.

3. A defendant who, with competent knowledge, makes a mistake in a remedy, is not answerable; but it is otherwise when a violent remedy, shown to have occasioned death, is administered by a person grossly ignorant, but with average capacity, in which case malice is presumed in the same way that it is presumed when a man *compos mentis* lets loose a mad bull into a thoroughfare, or casts down a log of wood on a crowd.

4. Where competent medical aid can be had, the application of violent remedies, by an ignorant person, though with the best motives, involves him in criminal responsibility.

5. Express malice, or an intent to commit a personal or social wrong, makes the practitioner criminally responsible in all cases of mischief.

§ 1064. In 1807, before Lord Ellenborough, Chief Justice of the King's Bench, John Williamson, a man midwife, seventy-five years of age, who was shown to have been in the habit of acting as such among the lower classes of people, though not a regularly educated *accoucheur*, was tried for the murder of Ann Delacroix, of Westminster. From the evidence of the female nurse, it appeared that the deceased had been delivered by the prisoner on Friday, September 17th, of a male child, and on the following Sunday was attacked with a *prolapsus uteri*. This was mistaken by the prisoner for a remaining part of the *placenta*, which had not been brought away at the time of delivery; and upon attempting to tear away the *prolapsed uterus* by force, he lacerated the uterus and caused the death of the patient. It was proved on the one hand, by a number of medical witnesses, that there must have been great want of skill in the prisoner, and on the other, by several women whom he had delivered, that he always acted with

kindness and attention, and, as far as they could judge, with skill. The prisoner, in his defence, said that he had acted according to the best of his judgment. Lord Ellenborough took from the jury the question of murder, and, in submitting to them that of manslaughter, said: "To substantiate that charge, the prisoner must have been guilty of criminal misconduct, arising either from the grossest ignorance or the most criminal inattention. One or other of these is necessary to make him guilty of that criminal negligence and misconduct which are essential to make out a case of manslaughter. It does not appear that in this case there was any want of attention on his part; and from the evidence of the witnesses on his behalf, it appears that he had delivered many women at different places, and from this he must have had some degree of skill.^(c) It would seem that, having placed himself in a dangerous situation, he became shocked and confounded. I think that he could not possibly have committed such mistakes in the exercise of his unclouded faculties; and I own that it appears to me, that if you find the prisoner guilty of manslaughter, it will tend to encompass a most important and anxious profession with such dangers as would deter reflecting men from entering into it." The result was an acquittal.^(d)

§ 1065. In 1829 an unlicensed practitioner, named Van Butchell, was indicted for manslaughter, by thrusting "a round piece of ivory into and up the fundament and against the rectum of the deceased, William Archer, thereby making one perforation, laceration, and wound, of the length, etc., in and through the rectum of the said William Archer." It was proved by Mr. Lloyd, an eminent surgeon, that he opened the body of the deceased, and found a portion of the *ileum* adherent to the rectum, and that on separating this adhesion, he discovered a small hole perforated through the rectum. Upon cross-examination he said that operations must sometimes fail, notwithstanding they might be skilfully performed; and he

(c) In a subsequent reference to this same case it is stated that he had attended the deceased in seven previous confinements with success, and that he attended in this instance at her request. 4 Car. & P. 398.

(d) R. v. Williamson, 3 C. & P. 635, note. See Lynch v. Davis, 12 How. Pr. 323.

added that he himself had operated in extracting an encysted tumor from the breast of a woman at a time when she was pregnant, and who soon afterwards died; and he and many other surgeons thought that correct practice, though he admitted that the propriety of the operation was doubted by others. The counsel for the defence offered to prove that the defendant had a regular medical education, when Hullock, B., said that this was not material, and in summing up said: "This is an indictment for manslaughter, and I am really afraid to let the case go on, lest an idea should be entertained that a man's practice is to be questioned whenever an operation fails. In this case there is no evidence of the mode in which this operation was performed; and even assuming for the moment that it caused the death of the deceased, I am not aware of any law which says that this party can be found guilty of manslaughter. It is my opinion that it makes no difference whether the party be a regular or an irregular surgeon. Indeed, in remote parts of the country many persons would be left to die, if irregular surgeons were not permitted to practise. There is no doubt that there may be cases where both regular and irregular surgeons might be liable to an indictment, as there might be cases when, from the manner of the operation, malice might be inferred. All that the law books have said has been read to you, but they do not state any decisions, and their silence in this respect goes to show what the uniform opinion of the lawyer has been upon this subject. As to what is said by my Lord Coke, he merely details an authority, a very old one, without expressing either approbation or disapprobation; however, we find that Lord Hale has laid down what is the law upon this subject. This is copied by Mr. Justice Blackstone, and no book in the law goes any further. It may be that a person not legally qualified to practise as a surgeon may be liable to penalties, but surely he cannot be liable to an indictment for felony. It is quite clear you may recover damages against a medical man for want of skill; but, as my Lord Hale says, 'God forbid that any mischance of this kind should make a person guilty of murder or manslaughter.' Such is the opinion of one of the greatest judges that ever adorned the bench of this country, and his proposition amounts

to this, that, if a person, *bona fide* and honestly exercising his best skill to cure a patient, performs an operation which causes the patient's death, he is not guilty of manslaughter. In the present case no evidence has been given respecting the operation itself. It might have been performed with the most proper instrument, and in the most proper manner, and yet might have failed. Mr. Lloyd has himself told us that he performed an operation the propriety of which seemed to have been a sort of *vexata questio* among the medical profession; but still it would be most dangerous for it to get abroad, that, if an operation performed by either a licensed or unlicensed surgeon should fail, that surgeon would be liable to be prosecuted for manslaughter. I think that in point of law this prosecution cannot be sustained; and I feel bound to say, that no imputation whatever ought to be cast upon the gentleman who is now at the bar in consequence of anything that has occurred." The prisoner was acquitted.(e)

§ 1066. In 1830 and 1831, John St. John Long, who had acquired great popular celebrity as a practitioner in cases of consumption, even among the more aristocratic and educated portions in London society, was tried on two successive indictments for manslaughter. In the first case the indictment charged him with sponging the back of Catharine Cashin with an inflammatory and dangerous liquid, which produced inflammation and consequently death.

It appeared from the evidence of Mr. Sweetman, a surgeon, that two of the family of Mrs. Cashin had died of consumption; but that Miss Cashin, who was twenty-four years of age, had enjoyed good health; and that Mr. Long told him that he (Mr. L.) had informed a young lady that unless Miss Cashin put herself under his care she would die of consumption in two or three months; and that, on this being communicated to Mrs. Cashin, she placed her daughter under Mr. Long's course of treatment, hoping to prevent her having consumption. Mr. Sweetman also stated, that Mr. Long told him that he rubbed a mixture on different parts of the bodies of his patients, and that this had been applied to Miss Cashin. It

(e) R. v. Van Butchell, 3 C. & P. 629.

was proved by Mrs. Roddis, who was also a witness for the prosecution, that she, on Friday, the 13th of August, went with Miss Cashin to Mr. Long's respecting a wound on her back, and that Miss Cashin then inhaled; and that on the next day Mr. Long examined Miss Cashin's back, and said it was in a beautiful state, and that he would give one hundred guineas if he could produce a similar wound on the persons of some of his patients. Mrs. Roddis stated that she directed Mr. Long's attention to a part of the wound which was of a darker appearance, and that he stated that this proceeded from the inhaling; and that, unless those consequences were produced, he could expect no beneficial result. The wound, at this time, was about five or six inches square. Mrs. Roddis further states, that Miss Cashin was suffering much from sickness, and that she mentioned this to Mr. Long, who said that it was of no consequence, but, on the contrary, a benefit; and that those symptoms, combined with the wound, were a proof that his system was taking due effect; and that on Sunday, the 15th, Miss Cashin having got worse, Mr. Long said that in two or three days she would be in better health than she had ever been in her life, and spoke very confidently that the result of his system would be to prolong her life; and that no person could be doing better than Miss Cashin was. At this interview Mrs. Roddis showed Mr. Long the wound on Miss Cashin's back, which had extended. Mrs. Roddis also stated that Mr. Long, on Sunday, the 15th, was desired to do something to stop the sickness of Miss Cashin, but that he said he had a remedy in his pocket which he would not apply, as he knew that the sickness had been beneficial; and he also stated on that day, and on Monday, the 16th, that Miss Cashin was doing uncommonly well. On Tuesday, the 17th, she died.

§ 1067. It was proved by Mr. Brodie, the surgeon, that he saw Miss Cashin on Monday, the 16th, and that her back was extensively inflamed, as large as a plate; and that, in the centre, was a spot as large as the palm of his hand, black and dead, which was in a sloughing or mortified state. Mr. Brodie stated that he did not consider Miss Cashin to be in any immediate danger, and that he thought that some very

powerfully stimulating liniment had been applied to her back. In his cross-examination, he said that it was very common to produce a counter-irritation, and that the things used to make that produce different effects on different constitutions; but, in re-examination, he stated that applying a lotion of a strength capable of causing the appearances he saw, to a person of the age and constitution of the deceased, if in perfect health, was likely to damage the constitution and produce disease and danger. Mr. Brodie also stated, that the appearances on Miss Cashin's back were quite sufficient to account for her death. Several medical men who had examined the body of the deceased stated that, on the most careful examination, they could not discover any latent disease, or seeds of disease. A servant of Mr. Long, named Ann Dyke, proved that, on the 3d of August, she, by the direction of Mr. Long, rubbed Miss Cashin's back with a liquid, but that she did not know what the liquid was. In her cross-examination, she stated that Mr. Long had a great many patients, many of them persons of rank, and that she rubbed Miss Cashin with the same liquid that was used for the other patients. The witness stated that the Marchioness of Ormond and Lady Harriet Butler were at Mr. Long's at the same time as Miss Cashin, and that the same lotion was applied to them, and also to Mrs. Ottley, and many others.

§ 1068. For the defence, twenty-nine witnesses were called, including the Marchioness of Ormond and Mrs. Ottley, who stated that they had been patients of Mr. Long, and that they were satisfied with his skill and diligence. One of the witnesses said, that he should never cease to pray for Mr. Long as long as he lived. Another (a lady) said, that she could never be sufficiently thankful to him for what he had done for her family. And another was a surgeon, who had lived in Jamaica for thirty-six years, and he expressed himself perfectly satisfied with Mr. Long's treatment and conduct.

§ 1069. Mr. Justice Park, in summing up, said: "The learned counsel for the prosecution truly stated, in the outset, that whether the party be licensed or unlicensed is of no consequence, except in this respect, that he may be subject to pecuniary penalties for acting contrary to charters or acts of

Parliament. But it cannot affect him here. For this I have the authority of that great and eminent person, Lord Chief Justice Hale, who has expressly said, that, though physicians and surgeons, if they are not licensed, may be subject to penalties, yet they are not answerable criminally on that account. His phrase is, 'God forbid that any mischance of this kind should make a person guilty of murder or manslaughter.' And, therefore, licensed or unlicensed, certainly does not signify. I agree with my learned brother, that what is called malapraxis in a medical person is a misdemeanor; but that depends upon whether the practice he has used is so bad that everybody will see that it is malapraxis. The case at Lancaster differs from this case. I have communicated with Lord Chief Justice Tindal, who tried that case, and he informed me that the man was a blacksmith, and was drunk, and was so completely ignorant of the proper steps, that he totally neglected what was absolutely necessary after the birth of the child. That certainly was one of the most outrageous cases that ever came into a court of justice. I would rather use the words of my Lord Ellenborough, in the case of *Rex v. Williamson*. He says, that 'a medical man is not to be charged with manslaughter unless he has been guilty of criminal misconduct, arising either from the grossest ignorance, or the most criminal inattention.' And this is important here; for, though he be not licensed, yet experience may teach a man sufficient; and the question for you will, by and by, be, whether the experience this individual acquired does not negative the supposition of any gross ignorance or criminal inattention. The case quoted from the institutes of Lord Coke, who lived upwards of two hundred years ago, occurred at a time when there were very few cases of the kind, and was deemed to be a case of manslaughter. But I do not derogate from his high and illustrious character, when, as far as criminal law is concerned, I set against it the authority of my Lord Chief Justice Hale, on whom, when authority is quoted, reliance is always placed. He says: 'If a physician gives a person a potion without any intent of doing him any bodily hurt, but with the intent to cure or prevent a disease, and, contrary to the expectation of the physician, it kills him,

this is no homicide; and the like of a chirurgeon;’ and he quotes the Year Book, 3 Edw. III. And he goes on to say: ‘And I hold their opinion to be erroneous’ (evidently alluding to my Lord Coke), ‘who thinks if he be no licensed chirurgeon or physician that occasioneth this mischance, that then it is felony; for physic and salves were before licensed physicians and chirurgeons.’ And he proceeds further, and says: ‘These opinions may serve to caution ignorant people not to be too busy in this kind with tampering with physic, but are no safe rules for a judge or jury to go by.’ I say the same, that the public weal is deeply interested in preventing ignorant persons from tampering with these subjects. It is true his next reason, about the want of surgeons in the country, does not apply here, because, in London, all persons can obtain the assistance of the best men, however poor they are. The question is, whether there was gross ignorance in this gentleman, or scandalous inattention in his treatment of this lady. The opinion of Lord Chief Justice Hale is recorded and adopted in Sir Edward East’s Pleas of the Crown, and in Mr. Justice Blackstone’s Commentaries. I come now to the case of Van Butchell, decided here only twelve months ago by Mr. Baron Hullock, of whom it may be said that a sounder lawyer or a stronger headed man never was known in the profession. I quote this case rather to show you what that learned person’s strong opinion was upon the general question, on the danger, not of punishing the man found guilty of gross negligence, but whether his practice can be questioned whenever an operation happens to fail. He says: ‘It is my opinion, that it makes no difference whether the party be a regular or an irregular surgeon.’ And also: ‘There is no doubt that there may be cases where both regular and irregular surgeons might be liable to an indictment, as there might be cases where, from the manner of the operation, even malice might be inferred.’ I agree with him that there may be such cases as those he has first mentioned; and you will have to decide, by and by, whether this case is one of them or not. I wish also to state to you what Lord Ellenborough said in the case of the *King v. Williamson*, which was the case of a man who acted as a man midwife. (His lordship here read the case as

reported in 3 C. & P. 635 (*a*), and observed): Lord Ellenborough there says, that, from the evidence, it appeared that the prisoner had delivered many women at different times, and, from this, he must have had some degree of skill. He goes along with me in thinking that skill may be acquired by practice. That is my opinion here, and there are twenty-nine witnesses all speaking to the prisoner's skill in their cases. (His lordship read the evidence, and then observed): There is clear proof that the prisoner did the act which shortened Miss Cashin's life. But that does not prove the case, unless you think that there was gross ignorance, or inattention to human life to be inferred from it. It is evident he had some information; whether he drew improper conclusions from it, is not for you or me to say. It seems, from Mr. Sweetman's evidence, that the disorder had been in the family; that a son was dead, and a daughter was likely to die. The prisoner always said that his remedy would cure consumption; and, if the disease had not been in the family, they would not have sent to him at all. The prisoner's counsel could not by law ask the defendant's witnesses any questions as to their respective disorders, and the mode of cure, as my brother and I were of opinion that it was not evidence. All that was evidence was, that he has displayed so much skill in other cases as to show that he was not that grossly ignorant or inattentive person who could be guilty of manslaughter according to my Lord Ellenborough's opinion in the case before mentioned. The refusal by the prisoner to apply the medicine in order to stop the sickness, although he had it with him, would, in my opinion, if wickedly done, amount to murder; but he mentioned a case in which sickness had been beneficial. Undoubtedly, the result proves a very erroneous opinion on his part; and it seems singular that the restlessness and other circumstances did not awaken apprehension and call for further measures. But the question again recurs, whether this was an erroneous judgment of a person who was of general competency, though he unfortunately failed in the particular instance. It appears that he said, on examining the wound on Miss Cashin's back, that he would give 100 guineas if he could produce a similar wound in some of his patients. This

seems to show his confidence in his proceedings. And there is this observation to be made of him throughout, that he seems to have been living in a fashionable part of the metropolis, and attended by right honorable persons; and it would be against his interest to act ignorantly and carelessly. It appears, with respect to Miss Cashin, that he did not go to seek her, and this will be for you to take into your consideration. With respect to the application of the mixture, if he commanded the woman to use it, it is the same as if he used it himself. Perhaps, from the evidence, you will think that the act caused the death; but still the question recurs, as to whether it was done either from gross ignorance or criminal inattention. No one doubts Mr. Brodie's skill, but that is not quite the question; it is not whether the act done is a thing that a person of Mr. Brodie's great skill would do, but whether it shows such total and gross ignorance in the person who did it, as must necessarily produce such a result. On the one hand, we must be careful and most anxious to prevent people from tampering in physic, so as to trifle with the life of man; and, on the other hand, we must take care not to charge criminally a person who is of general skill, because he has been unfortunate in a particular case. It is God that gives, man only administers medicine, and the medicine that the most skilful may administer may not be productive of the expected effect; but it would be a dreadful thing if a man were to be called in question criminally whenever he happened to miscarry in his practice. These are things for your consideration when you are considering whether a man is acting wickedly; for I call it acting wickedly when a man is grossly ignorant, and yet affects to cure people, or when he is grossly inattentive to their safety. With respect to the evidence on the part of the prisoner, all the witnesses that he has called have spoken of him as being perfectly satisfied with his skill, attention, and behavior in every respect. It is observable of several of them, that, after their families had been attended, they put themselves under his care, so satisfied were they with his conduct. One of them says, that he shall pray for him as long as he lives, and another, a lady, says, she can never sufficiently thank him for what he has done for her family. It is also to

be remarked, that one of these witnesses is himself a surgeon, who lived for thirty-six years in a hot climate, and he expresses himself perfectly satisfied. You will take the whole case into your consideration, and if you think there was gross ignorance or scandalous inattention in the conduct of the prisoner, then you will find him guilty; and if you do not think so, then your verdict will be otherwise."

The jury, after some deliberation, found the prisoner guilty, and he was subsequently sentenced to pay a fine of £250 to the king.(f)

§ 1070. Very shortly afterwards, Long was tried before Bayley, B., Bolland, B., and Bosanquet, J., for manslaughter in causing the death of Colin Campbell Lloyd, wife of Edward Lloyd, by causing her to inhale certain noxious and injurious vapors, and sponging her breast and chest with a corrosive and inflammatory liquid, which produced a gangrenous sore. The witnesses called on the part of the prosecution were Captain Lloyd, the husband of the deceased; Mrs. Campbell, a relation, at whose house she was staying; Mr. Campbell, Mr. Vance, Mr. Brodie, and Mr. Franklin, surgeons.

§ 1071. The examination of Captain Lloyd, as stated in the report, was as follows: The deceased had been for several years troubled occasionally, when she caught cold or anything excited her, with a choking sensation in the throat, for which she had about three years before her death consulted a medical man, and for which she was in the habit of applying a blister to the throat, and afterwards of healing the wound with a simple dressing of spermaceti ointment. A son of the deceased was under the care of Mr. Long; and on various occasions, when the deceased attended with her son, she mentioned, in conversation with Mr. Long, the complaint she had in her throat; and the conversations eventually led to her putting herself under his care on the 6th of October, 1830, at which time she was in very good general health. On the 3d of October she had applied a small blister to her throat, but the wound occasioned by it was nearly well on the 6th; on the 7th, 8th, 9th, and 10th, she went to Mr. Long's, and on

(f) R. v. Long, 4 C. & P. 398.

the evening of the 10th, complained to her husband of a violent burning across her chest, in consequence of which he looked at it, and found a great redness across her bosom, darker in the centre than at other parts; she also complained of great chilliness, and shivered with cold, and passed a very restless and uncomfortable night. On the 11th she was very unwell all day, and complained of great thirst, the redness was more vivid, and the spot in the centre darker, round the edges white and puffed up, and there was a dirty white discharge from the centre. Cabbage leaves had been applied, and when they were removed, they appeared slimy from the discharge; the night of the 11th was passed very uncomfortably. On the morning of the 12th, the redness on the breast and chest was, if anything, greater, and the spot in the centre more puffed up and darker; the redness was more spread round the edges, and, where it stopped, there were blisters in the skin, apparently from the discharge; the inner part of the arms also was very red where the discharge had run down on each side. On the 12th, she was very feverish and restless, and had no appetite, and in consequence of these symptoms, Capt. Lloyd went to Mr. Long about the middle of the day; Mr. Long asked why Mrs. Lloyd had not come to inhale, and go on with the rubbing; Capt. Lloyd replied, it was impossible, she was so very ill; that she had been constantly unwell since the night of the 10th, and was suffering a great deal of pain and sickness; Mr. Long said he dare say it would soon go off, it was generally the case. He was told of the shivering and chilliness, and that some hot wine and water had been given to relieve her; he said hot brandy and water would have been a better thing, and to put her under the bedclothes. He was told that the breast and chest looked very bad and very red; he said that was generally the case in the first instance, but it would go off as she got better, and that Capt. L. need not be uneasy about it, as there was no fear or danger; Capt. Lloyd requested him to call in the evening, and then told him where Mrs. Lloyd was, which it appeared he did not know before; in the evening he came and saw her; in the course of the day the cabbage leaves had been removed, and a dressing of spermaceti ointment put on the chest instead. He said he was very sorry

to see her so unwell, that she ought to have endeavored to get up and come to him, and he would have relieved her; she said it was impossible, she was in such pain and suffering, and with her breast open in that way it might be dangerous.

§ 1072. He desired to look at it, and, observing the dressing, said, those greasy plasters had no business there, and she ought to have continued the cabbage leaves. She said she could not bear the pain of keeping them on. He then took off his great coat, and said he would rub it out; he turned up the cuff of his coat as if for the purpose of doing so. She exclaimed very much with fright, and expressed her wonder that he should think of rubbing in the state her breast was in. She asked if there was no way of keeping the leaf on without touching the breast; and he asked her what she wished. She replied, "To be healed." He said it would never heal with those greasy plasters, that was not the way in which he healed sores. He then asked for a towel; and began dabbing it on the breast, particularly in the centre, where the discharge came from. He said that old linen was the best thing to heal a wound of that kind. She said her skin and flesh were very healthy, and always healed immediately with the simple dressing she had used. He said old linen was better, but she might use the dressing if she liked, he saw no objection, and when it skimmed over he would rub it again. She said no, she thought she could never submit to rubbing again, from what she was then suffering. He then went away. On the evening of the following day (the 13th), he called again, but Mrs. Lloyd would not see him, and begged her husband not to allow him to come up; and he never saw her afterwards. She died on the 8th of November, just a month and a day after she put herself under Mr. Long's care.

§ 1073. On the cross-examination of Capt. Lloyd he said, that his son continued to attend Mr. Long for several days after the commencement of the deceased's illness, and on one occasion was desired to tell Mr. Long that he need not come to see her, as she was better. He also added that a person, describing himself as a medical man, and saying that he was sent by Mr. Long, applied to see Mrs. Lloyd, and was not allowed. He also admitted that he had told Mr. Long that

he could not pay fees for his son until after Christmas, and that Mr. Long said that would not make any difference, he might send him and he would attend to him. Mrs. Campbell stated that Mrs. Lloyd was in a very good state of health, except that her throat was sometimes troublesome, that she complained of a stoppage in swallowing; that on the 10th of October, when the shivering came on, the bed was warmed and Mrs. Lloyd put in, and bottles of hot water were applied to her feet; and that when Mr. Long went away, after having seen her, he did not give any directions as to diet, or order her any internal medicine. It also appeared from her evidence that, previous to Mrs. Lloyd's putting herself under the care of Mr. Long, she had attended three days at the inquest held on the body of Mrs. Cashin.

§ 1074. From the examination-in-chief of Mr. Campbell, the surgeon, it appeared that he was the son of Mrs. Campbell, at whose house the deceased was on a visit, and that he first saw the deceased about four o'clock in the afternoon of the 12th of October, at his mother's desire; at which time he found a very extensive wound covering the whole anterior part of the chest, which in his opinion might be produced by any strong acid; that the skin was destroyed, and lay in folds on the chest, entirely separated; that the cellular tissue was partly destroyed, and there was a considerable discharge generally; that the wound extended nearly from one armpit to the other, and from the throat down to the pit of the stomach; that the skin was off both breasts, and the centre of the wound was darker and in a higher state of inflammation than other parts; that he removed the cabbage-leaves and applied the dressing of spermaceti ointment; that he saw the deceased on the 13th and afterwards daily, several times a day, till her death; that he considered the wound very dangerous to life when he first saw it, but only continued to apply the spermaceti dressing until the 21st of October, when he called in the assistance of Mr. Vanece, who continued at first to apply the same dressing, only adding to it a little calamine powder; that on the second or third day of his attendance Mr. Vanece applied a bread and water poultice; that he (Mr. Campbell) at first gave Mrs. Lloyd some saline aperient medicine, and when the centre spot

and upper part of the chest became gangrenous, which they did in about a week, in order to support nature she had bark, mineral acid and quinine. The witness added that in his opinion Mrs. Lloyd died of the wound which he at first saw; that according to his judgment it was not necessary or proper to produce such a wound to prevent any difficulty in swallowing; and that he did not know of any disease in which the production of such a wound would be necessary or proper. He further stated, that he informed Mr. Vance of the course he had pursued, and that nothing which he and Mr. Vance applied could possibly increase the danger of the patient. On his cross-examination he said that he had been in practice six or seven years; that in the course of his practice he had known a common blister often produce very injurious effects which the person who prescribed it never contemplated, and that a medical man must regulate his treatment as well by the statements of the patient as by external appearances; that he did not wish for any additional assistance till gangrene commenced, though he feared it would take place from the first; and that he stated the danger he apprehended, very soon after he was called in, to his mother and Capt. Lloyd and a sister of the deceased, but that twice they had some hopes of her eventual recovery. On his re-examination he said that he did not consider it a case of difficulty in the treatment; that he was present at the post-mortem examination; and that the wound did not present the appearances which he had ever seen produced by a common blister. In answer to questions from the judge he said, that he thought rubbing, on the 12th of October, when he first saw the wound, would have increased the inflammation, and could not have been in any respect beneficial.

§ 1075. Mr. Vance's evidence agreed in substance with the account of the appearances of the wound, as given by other witnesses. He stated also that he approved of the treatment pursued by Mr. Campbell. He added that he had attended Mrs. Lloyd about three years before her death for an affection of the throat, which he at first thought a case of narrow œsophagus, but afterwards ascertained to be globus hystericus, which he described as an inverted motion of the muscular fibres of the canal, very common among women in early life,

and of which he had seen many thousand cases, but never knew it produce death. He described the appearance of the body after death, and said it was internally and externally in perfect health, with the exception of a partial disease of the thyroid gland, and an inflammatory affection of the lining of the windpipe (occasioned by their contiguity to the ulcer), and a little narrowness at the entrance of the œsophagus, which he believed to be congenital, as there was no thickening of the part. He attributed the death of Mrs. Lloyd to the extent of the mortification caused by high inflammation, produced by some powerful application. On his cross-examination he said, that at one time he had hope, because he found the healthy and unhealthy parts were separating. In answer to questions from the judge he said, that the state of the wound, as described, on the 12th of October, might produce the result stated; that he thought a man of common prudence or skill would not have applied a liquid which in two days would produce such extensive inflammation; though all irritating external applications sometimes exceeded the expectations of the medical attendant; but he should say that such conduct was a great proof of rashness and ignorance. In answer to a question from a juror he stated that it was very difficult to say whether, if he had been called in on the 12th, he could have prevented the death; but, if he were to make a positive reply, he should say that it was not likely that he could, as it seemed to be a case of great peril from the beginning.

§ 1076. Mr. Brodie stated that he saw the deceased at the request of Mr. Vance on the 29th of October, and saw a large sloughing ulcer, which he believed might have been produced by rubbing a corrosive liniment into the parts on the 10th of October; that he did not know of any disease which should lead a person to apply a liniment with the intention of producing such an effect. On his cross-examination, he said: "It is and always has been the practice to produce counter-irritation, and the same application may be beneficial to one person and injurious to another, according to the habit and constitution. The effect of a liniment or blister, or any other external irritant, as we call them, sometimes goes beyond the effect we intend, and the most scientific practitioner may often

be deceived in his expectations; he cannot always calculate to a nicety. I do not recollect at this moment any instance in which death has ensued from a blister properly applied, but I suppose it may happen. I suppose over-exercise would produce over-irritation where a blister had been applied. In treating a wound, I should judge from the appearances and state of the patient; I think it would be desirable, under such circumstances, to know the nature of the application, but I do not think it would lead to any great difference in the treatment. In cases of poison, we do not apply the same remedy, especially when it has been taken into the stomach. As to external applications, I do not think a surgeon would judge so much from what had been applied, as from the appearances. Circumstances may occur in which, when a particular course is intended, a stranger's coming in and pursuing another and different course would produce mischief."

On his re-examination, he said: "In the case of such a wound as has been described and I saw, I should not have thought it necessary to resort to the person who had produced it; and I doubt whether, in this case, it would have led to any useful knowledge."

§ 1077. In answer to questions from the judge, he said: "Though I do not think it absolutely necessary, I should have got at the matter if I could. I should think that the spermaceti ointment would not certainly increase the danger of such a wound as that described on the 12th of October. I never saw such an effect produced by an ordinary medical application. There are some constitutions in which very slight remedies will produce dangerous consequences. I have seen one person die of the bite of a leech, and another by the sting of a bee. I had no means of knowing anything of this lady's constitution. I should believe, from the evidence I have heard of the way in which the inflammation made progress, that it proceeded rather from the nature of the application than from the constitution of the party; but it may have depended on both. It is usual to try to ascertain the nature of the constitution. We cannot always do it, but in using potent remedies we use great precaution. I cannot form a positive opinion whether the liniment was rashly used or not, but the impres-

sion on my mind is, that it was used without sufficient caution, and, therefore, either rashly or ignorantly. I have seen many instances of inflammation from external application, but I never saw so extensive effect produced as in this instance."

Mr. Frankum then proved that he saw Mrs. Lloyd about before her death, and was present at the post-mortem examination. His opinion was that she was very healthy, and there was not, as far as he could judge, any peculiarity of constitution which would account for the violent effects produced.

§ 1078. It was very ably argued by the counsel for the defendant, that, as the motive was to do good, and as there was no personal advantage to be gained, there was no responsibility, and the older cases were cited to show that the court should at this stage take the case from the jury, and direct an acquittal. But Bayley, B., said: "There are, in my mind, contradictory authorities, and I propose, with the assent of my learned brothers, to reserve the point for you, if the prisoner is convicted. I agree with my Lord Hale, and do not think there is any difference between a licensed and an unlicensed surgeon. It does not follow, that, in the case of either, an act done may not amount to manslaughter. There may be cases in which a regular medical man may be guilty; and that is all Lord Hale lays down. And that may be laid out of the question at this time. But the manner in which the act is done, and the use of due caution, seem to me to be material. Mr. Justice Foster, in his Criminal Law, p. 263, speaking of a person who happens to kill another by driving a cart or other carriage, says: "If he might have seen the danger, and did not look before him, it will be manslaughter *for want of due circumspection.*" But all that I mean to say now is, that, there being conflicting authorities, and the impression of our minds not being in your favor, I propose to reserve the point. As to the indictment not being supported by the evidence, one of the allegations is that the prisoner *feloniously* applied a noxious and injurious matter. And there is no doubt, if the jury should be of opinion against the prisoner, that the facts proved will be sufficient to warrant their finding that the prisoner *feloniously* did the act. For if a man, either with gross ignorance or gross rashness, administer medicine, and death ensue, it will

be felony." Upon the defendant's counsel urging that to make out the felony a trespass must have been affirmatively proved, and that here there was no evidence of trespass at all, Bayley, B., said: "I think that if the jury shall find a given fact in the way in which I shall submit it to them, it will constitute the crime of *feloniously* administering, so as to make it manslaughter. As, for instance, if I have the toothache, and a person undertakes to cure it by administering laudanum, and says: 'I have no notion how much ought to be taken,' and gives me a cupful, which immediately kills me; or, if a person presenting James' powder, says, 'I have no notion how much ought to be taken,' and yet gives me a tablespoonful, which had the same effect; such persons, acting with rashness, will, in my opinion, be guilty of manslaughter. With respect to what has been said about a willing mind in the patient it must be remembered, that a prosecution is for the public benefit, and the willingness of the patient cannot take away the offence against the public."

§ 1079. The defendant, being put upon his defence, said that the prosecution was in reality that of the medical gentlemen, who did not prosecute other medical men, but attacked him because his patients were the incurables of the faculty, and because he cured consumptions, which they were never able to do. He contended that it was not just to hold him responsible where the death occurred while Mrs. Lloyd was under the care of others, and neither he nor his medical friend was able to do anything for her. He also charged Mr. Campbell with unskilfulness in his treatment of the case, and argued that if the mixture had been of the injurious kind suggested, it must have produced mortification at a much earlier period than that in which, according to the evidence, it did. He also offered to prove that he had studied anatomy, and was acquainted with the constitution of the human frame. Of his skill and acceptableness as a practitioner very strong testimony was given, to the same effect as on the former trial.

§ 1080. Bayley, B., in summing up to the jury, said: "It matters not whether a man has received a medical education or not; the thing to look at is, whether, in reference to the remedy he has used, and the conduct he has displayed, he has

acted with a due degree of caution, or, on the contrary, has acted with gross and improper rashness and want of caution. I have no hesitation in saying, for your guidance, that, if a man be guilty of gross negligence in attending to his patient after he has applied a remedy, or of gross rashness in the application of it, and death ensues in consequence, he will be liable to a conviction for manslaughter. There is no pretence in the present case for saying that there was any degree of negligence after the application of the liquid, because it seems that the prisoner did not know where Mrs. Lloyd lived; and, when he was sent for, on the 12th, he went, but was almost immediately dismissed, and was not allowed to see her afterwards. If you shall be of opinion that the prisoner made the application with a gross and culpable degree of rashness, and that it was the cause of Mrs. Lloyd's death, then, heavy as the charge against him is, he will be answerable on this indictment for the offence of manslaughter. There was a considerable interval between the application of the liquid and the death of the patient; yet, if you think that the infliction of the wound on the 10th of October was the cause of the death, then it is no answer to say that a different course of treatment by Mr. Campbell might have prevented it. You will consider these two points: first, of what did Mrs. Lloyd die? You must be satisfied that she died of the wound which was the result of the application made on the 10th of October; and then, secondly, if you are satisfied of this, whether the application was a felonious application. This will depend upon whether you think it was gross and culpable rashness in the prisoner to apply a remedy which might produce such effects, in such a manner that it did actually produce them. If you think so, then he will be answerable to the full extent." The defendant was acquitted.(g)

§ 1081. Several subsequent cases occur in the English books, in which, down to a recent day, the doctrine was repeated that death resulting from grossly incautious or grossly unskilful conduct on the part of a medical practitioner, whether licensed or unlicensed, is manslaughter. In one case the prisoner, who

(g) R. v. Long, 4 C. & P. 423.

for nearly thirty years had carried on the business of an apothecary and man-midwife, with a very considerable practice—having, amongst others, attended the deceased on the birth of all her children—was tried for manslaughter, in having made use of a metal instrument, known as a *vectis* or *lever*, in such a way as to cause death; and it was proved by medical men, first, that the weapon was a dangerous one, and improper to be used at that stage; and, secondly, that it must have been used in a very improper way, and in an entirely wrong direction. Coleridge, J., told the jury that it was for them to say whether the instrument was the cause of death, and whether it had been used by the prisoner with due and proper skill and caution, or with gross skill or gross want of attention. “No man,” he said, “was justified in making use of an instrument, in itself a dangerous one, unless he did so with a proper degree of skill and caution.”^(h) In another case, where a child died in consequence of a corrosive plaster placed improperly on its head, Bolland, B., advanced a step further, saying: “If any person, whether he be a regular or licensed medical man or not, professes to deal with the life or health of his majesty’s subjects, he is bound to have competent skill to perform the task that he holds himself out to perform, and he is bound to treat his patient with care, attention, and assiduity.”⁽ⁱ⁾ And again, where the defendant, who was the agent of Morrison’s pills, administered a large quantity of them to the deceased, Lord Lyndhurst, C. B., after reiterating the position that in such cases there was no difference between the licensed and the unlicensed practitioner, said: “In either case, if a party having a competent degree of skill or knowledge makes an accidental mistake in his treatment of a patient, through which mistake death ensues, he is not thereby guilty of manslaughter; but if, when proper medical assistance can be had, a person totally ignorant of the science of medicine takes on himself to administer a violent and dangerous remedy to one laboring under disease, and death ensues in consequence

(h) R. v. Spilling, 2 M. & Rob. 107; S. P. Ferguson’s Cases, 1 Lew. 181.

(i) R. v. Spiller, 5 C. & P. 333.

of that dangerous remedy having been administered, then he is guilty of manslaughter.”(j)

§ 1081*a*. These same views have been subsequently frequently applied. Thus, where a person professing himself to be an herbalist administered arsenical ointment to a woman having a tumor, of which she died, but gave her no caution or directions as to the use of it; the judge directed the jury, that, if he administered the arsenic without knowing or taking the pains to find out what its effects would be; or if, knowing this, he gave it to the deceased to be used by her without giving her adequate directions as to its use, he would be guilty of culpable negligence, and, therefore, of manslaughter.(k)

§ 1082. It has also been ruled, that a mistake on the part of a chemist in putting a poisonous liniment into a medicine bottle, instead of a liniment bottle, in consequence of which the liniment was taken by his customer internally, with fatal results, the mistake being made under circumstances of sudden confusion, which threw the prisoner off his guard, does not amount to such a criminal negligence as will warrant a conviction for manslaughter.(l)

And it is said that on an indictment for manslaughter against a medical man, for administering poison by mistake for some other drug, the prosecution is bound to show that the poison got into the mixture in consequence of his gross negligence, and it is not sufficient to show merely that the prisoner, who dispensed his own drugs, supplied a mixture which contained a large quantity of poison. The jury must be satisfied that there was such gross and culpable negligence as would show an evil mind. And these facts must affirmatively appear in the prosecution's case.(m)

§ 1083. Varying in no essential degree from the English doctrine on the main point, is that determined by the Supreme Court of Massachusetts in the trial of Samuel Thomson, the

(j) *R. v. Webb*, 1 M. & Robb. 405.

(k) *R. v. Chamberlain*, 10 Cox C. C. 486. See also *R. v. Markuss*, 4 F. & F. 356.

(l) *R. v. Noakes*, 4 F. & F. 920. See *Thomas v. Winchester*, 6 Comstock, 397; *McDonald v. Snelling*, 14 Allen, 290.

(m) *R. v. Spencer*, 10 Cox C. C. 525; *R. v. Markuss*, 4 F. & F. 356.

founder of the Thomsonian system. The report states that on the trial it had been proven that the prisoner, some time in the preceding December, came into Beverly, where the deceased then lived; announced himself as a physician, and professed an ability to cure all fevers, whether black, gray, green, or yellow; declaring that the country was much imposed upon by physicians, who were all wrong, if he was right. He possessed several drugs which he used as medicines, and to which he gave singular names. One he called *coffee*, another *well-my-gristle*, and a third *ram-cats*. He had several patients in Beverly and in Salem, previous to Monday, the 2d of January, when the deceased, having been for several days confined to his house by a cold, requested that the prisoner might be sent for as a physician. He accordingly came, and ordered a large fire to be kindled to heat the room. He then placed the feet of the deceased, with his shoes off, on a stove of hot coals, and wrapped him in a thick blanket, covering his head. In this situation he gave him a powder in water, which immediately puked him. Three minutes after, he repeated the dose, which in about two minutes operated violently. He again repeated the dose, which in a short time operated with more violence. These doses were all given within the space of half an hour, the patient in the mean time drinking copiously of a warm decoction, called by the prisoner his *coffee*. The deceased, after puking, in which he brought up phlegm, but no food, was ordered to a warm bed, where he lay in a profuse sweat all night. On Tuesday morning the deceased left his bed, and appeared to be comfortable, complaining only of debility; and in the afternoon he was visited by the prisoner, who administered two more of his emetic powders in succession, which puked the deceased, who, during the operation, drank of the prisoner's coffee; and complained of much distress. On Wednesday morning the prisoner came, and, after causing the face and hands of the deceased to be washed with rum, ordered him to walk in the air, which he did for about fifteen minutes. In the afternoon the prisoner gave him two more of his emetic powders, with draughts of his *coffee*. On Thursday the deceased appeared to be comfortable, but complained of great debility. In the afternoon the prisoner caused him to be again sweated, by placing

him, with another patient, over an iron pan with vinegar heated by hot stones put into the vinegar, covering them at the same time with blankets. On Friday and Saturday the prisoner did not visit the deceased, who appeared to be comfortable, although complaining of increased debility. On Sunday morning, the debility increasing, the prisoner was sent for, and came in the afternoon, when he administered another of his emetic powders, and in about twenty minutes repeated the dose. This last dose did not operate. The prisoner then administered pearl ash mixed with water, and afterwards repeated his emetic potions. The deceased appeared to be in great distress, and said he was dying. The prisoner then asked him how far the medicine had got down. The deceased, laying his hand on his breast, answered *here*: on which the prisoner observed that the medicine would soon get down and unscrew his navel; meaning, as was supposed by the hearers, that it would operate as a cathartic. Between nine and ten o'clock in the evening, the deceased lost his reason, and was seized with convulsive fits, two men being required to hold him in bed. After he was thus seized with convulsions, the prisoner got down his throat one or two doses more of his emetic powders, and remarked to the father of the deceased, that his son had got the *hyps* like the devil, but that his medicines would fetch him down; meaning, as the witness understood, would compose him. The next morning the regular physicians of the town were sent for, but the patient was so completely exhausted that no relief could be given. The convulsions and the loss of reason continued, with some intervals, until Tuesday evening, when the deceased expired. From the evidence it appeared that the *coffee* administered was a decoction of *marsh-rosemary*, mixed with the bark of *bayberry bush*, which was not supposed to have injured the deceased. But the powder, which the prisoner said he chiefly relied upon in his practice, and which was the emetic so often administered by him to the deceased, was the pulverized plant commonly called *Indian tobacco*. A Dr. French, of Salisbury, testified that this plant, with this name, was well known in his part of the country, where it was indigenous, for its emetic qualities; and that it was gathered and preserved by some families, to be

used as an emetic, for which the roots, as well as the stalks and leaves, were administered; and that four grains of the powder was a powerful puke. But a more minute description of this plant was given by the Rev. Dr. Cutler. He testified that it was the *lobelia inflata* of Linnæus;(n) that many years ago, on a botanical ramble, he discovered it growing in a field not far from his house in Hamilton; that, not having Linnæus then in his possession, he supposed it to be a nondescript species of the lobelia; that, by chewing a leaf of it, he was puked two or three times; that he afterwards repeated the experiment with the same effect; that he inquired of his neighbor, on whose ground the plant was found, for its trivial name. He did not know of any, but was apprised of its emetic quality, and informed the doctor that the chewing of one of the capsules operated as an emetic, and that the chewing more would prove cathartic. In a paper soon after communicated by the doctor to the American Academy, he mentioned the plant, with the name of the *lobelia medica*.(o) He did not know of its being applied to any medical use until the last September, when, being severely afflicted with asthma, Dr. Drury, of Marblehead, informed him that a tincture of it had been found beneficial in asthmatic complaints. Dr. Cutler then made for himself a tincture, by filling a common porter bottle with the plant, pouring upon it as much spirit as the bottle would hold, and keeping the bottle in a sand heat for three or four days. Of this tincture he took a tablespoonful, which produced no nausea, and had a slight pungent taste. In ten minutes after he repeated the potion, which produced some nausea, and appeared to stimulate the whole internal surface of the stomach. In ten minutes he again repeated the potion, which puked him two or three times, and excited in his extremities a strong sensation like irritation; but he was relieved from a paroxysm of the asthma, which had not since returned. He had since mentioned this tincture to some physicians, and

(n) Lobelia. Class Pentandria. Order Monogynia. Capsule 2 or 3-celled, corol. irregular, cloven; antheræ united; stigma simple; species inflata; stem erect; leaves ovate, slightly serrate, longer than the peduncle; capsules inflated.—*Turt. Lin.* vol. iv. pp. 259, 330.

(o) Ibid.

has understood from them that some patients have been violently puked by a teaspoonful of it; but whether this difference of effect arose from the state of the patients, or from the manner of preparing the tincture, he did not know. The solicitor-general also stated, that, before the deceased had applied to the prisoner, the latter had administered the like medicines with those given to the deceased to several of his patients, who had died under his hands; and to prove this statement he called several witnesses, of whom but one appeared. He, on the contrary, testified that he had been the prisoner's patient for an oppression at his stomach; that he took his emetic powders several times in three or four days, and was relieved from his complaint, which had not since returned. And there was no evidence in the cause that the prisoner, in the course of his very novel practice, had experienced any fatal accident among his patients. The defence stated by the prisoner's counsel was, that he had for several years, and in different places, pursued his practice with much success, and that the death of the deceased was unexpected, and could not be imputed to him as a crime. But, as the court were satisfied that the evidence produced on the part of the commonwealth did not support the indictment, the prisoner was not put on his defence.

§ 1084. The chief justice charged the jury: and the substance of his direction, and of several observations which fell from the court during the trial, is condensed by the reporter as follows:—

“As the testimony of the witnesses was not contradicted, nor their credit impeached, that testimony might be considered as containing the necessary facts, on which the issue must be found. That the deceased lost his life by the unskilful treatment of the prisoner, did not seem to admit of any reasonable doubt: but of this point the jury were to judge. Before the Monday evening preceding the death of Lovett, he had by profuse sweats, and by often repeated doses of the emetic powder, been reduced very low. In this state, on that evening, other doses of this *Indian tobacco* were administered. When the second potion did not operate, probably because the tone of his stomach was destroyed, the repetition of them, that

they might operate as a cathartic, was followed by convulsion fits, loss of reason, and death. But whether this treatment, by which the deceased lost his life, is or is not felonious homicide, was the great question before the jury. To constitute the crime of murder, with which the prisoner is charged, the killing must have been with malice, either expressed or implied. There was no evidence to induce a belief that the prisoner, by this treatment, intended to kill, or to injure the deceased; and the ground of express malice must fail. It has been said that implied malice may be inferred from the rash and presumptuous conduct of the prisoner, in administering such violent medicines. Before implied malice can be inferred, the jury must be satisfied that the prisoner, by his treatment of his patient, was wilfully regardless of his social duty, being determined on mischief. But there is no part of the evidence, which proves that the prisoner intended by his practice any harm to the deceased. On the contrary, it appears that his intention was to cure him. The jury would consider whether the charge of murder was, on these principles, satisfactorily supported. But, though innocent of the crime of murder, the prisoner may, on this indictment, be convicted of manslaughter, if the evidence be sufficient. And the solicitor general strongly urged that the prisoner was guilty of manslaughter, because he rashly and presumptuously administered to the deceased a deleterious medicine, which, in his hands, by reason of his gross ignorance, became a deadly poison: The prisoner's ignorance is in this case very apparent. On any other ground consistent with his innocence, it is not easy to conceive, that, on the Monday evening before the death, when the second dose of his very powerful emetic had failed to operate, through the extreme weakness of the deceased, he could expect a repetition of these fatal poisons would prove a cathartic, and relieve the patient; or that he could mistake convulsion fits, symptomatic of approaching death, for an hypochondriac affection. But, on considering this point, the court were all of opinion, notwithstanding this ignorance, that, if the prisoner acted with an honest intention and expectation of curing the deceased by this treatment, although death, unexpected by him, was the consequence, he was not guilty of manslaughter.

To constitute manslaughter, the killing must have been the consequence of some unlawful act. Now, there is no law which prohibits any man from prescribing for a sick person with his consent, if he honestly intends to cure him by his prescription. And it is not felony, if, through his ignorance of the quality of the medicine prescribed, or of the nature of the disease, or of both, the patient contrary to his expectation should die. The death of a man, killed by voluntarily following a medical prescription, cannot be adjudged felony in the party prescribing, unless he, however ignorant of medical science in general, had so much knowledge, or probable information of the fatal tendency of the prescription, that it may be reasonably presumed by the jury to be the effect of obstinate wilful rashness at the least, and not of an honest intention and expectation to cure. In the present case there is no evidence that the prisoner, either from his own experience or from the information of others, had any knowledge of the fatal effects of the *Indian tobacco*, when injudiciously administered: but the only testimony produced on this point proved that the patient found a cure from the medicine. The law, thus stated, was conformable, not only to the general principles which governed in charges of felonious homicide, but also to the opinion of the learned and excellent Lord Chief Justice Hale. He expressly states, that, if a physician, whether licensed or not, gives a person a potion, without any intent of doing him any bodily hurt, but with intent to cure or prevent a disease, and, contrary to the expectation of the physician, it kills him, he is not guilty of murder or manslaughter. If in this case it had appeared in evidence, as was stated by the solicitor-general, that the prisoner had previously, by administering this *Indian tobacco*, experienced its injurious effects, in the death or bodily hurt of his patients, and that he afterwards administered it in the same form to the deceased, and he was killed by it, the court would have left it to the serious consideration of the jury, whether they would presume that the prisoner administered it from an honest intention to cure, or from obstinate rashness and fool-hardy presumption, although he might not have intended any bodily harm to his patient. If the jury should have been of this latter opinion, it would have been reasonable

to convict the prisoner of manslaughter at least. For it would not have been lawful for him again to administer a medicine of which he had such fatal experience. It is to be exceedingly lamented, that people are so easily persuaded to put confidence in these itinerant quacks, and to trust their lives to strangers without knowledge or experience. If this astonishing infatuation should continue, and men are found to yield to the imprudent pretensions of ignorant empiricism, there seems to be no adequate remedy by a criminal prosecution, without the interference of the legislature, if the quack, however weak and presumptuous, should prescribe with honest intentions and expectations of relieving his patients." The prisoner was acquitted.(p)

§ 1085. The more recent American cases follow the views of Chief Justice Parsons, in Thomson's case.(q)

II. *In Actions for Torts.*

§ 1086. Where a medical man is sued in a civil court for damages for malpractice, the law as held by the English and American courts may be stated as follows:—

§ 1087. *a.* A physician or surgeon is only responsible for ordinary care and skill, and for the exercise of his best judgment in matters of doubt. He is not accountable for a want of the highest degree of skill,(r) or for an erroneous though honest conclusion according to his best lights.(s) And in determining whether the practitioner possesses ordinary skill, regard must be had to the advanced state of the profession at the time.(t) He is bound to consult the attainable literature on the subject, and to use due diligence to gather in, in every case he undertakes to treat, the experience of his profession.(u)

Where the physician's general skill is at issue, he may ad-

(p) *Com. v. Thomson*, 6 Mass. 134; and see also *Fairlee v. People*, 11 Ill. 1.

(q) See *Rice v. State*, 8 Mo. 561; *Fairlee v. People*, 11 Ill. 1; *Holmes v. State*, 23 Alab. 17; Wh. C. L. § 1015.

(r) *Leighton v. Sargent*, 7 Fost. 460; *Simonds v. Henry*, 39 Maine 155; *Hancke v. Hooper*, 7 C. and P. 81; *McCandless v. McWha*, 22 Penn. St. 261; *Carpenter v. Blake*, 60 Barbour 488.

(s) *Heath v. Glison*, 3 Oregon 64.

(t) *Slater v. Baker*, 2 Wils. 359; *McCandless v. McWha*, 22 Penn. St. 261.

(u) *Carpenter v. Blake*, 60 Barbour 488, *post*, § 1092, *note (h)*.

duce evidence to prove the existence of such general skill, irrespective of the particular case.(v) "That a physician or surgeon possesses skill, may be shown by those of the same profession, who can speak from personal knowledge of his practice."(w)

§ 1088. *b.* A *volunteer* is held to much more strict responsibility. Thus, when medicine was administered to a slave without the owner's consent, the practitioner was held responsible for all the evil consequences which resulted.(x) And this rule is still more strictly applied when the volunteer excludes a competent practitioner, otherwise attainable.(y) But, when the services are *gratuitous*, they are to be viewed as a mere benevolence, and the attendant is held to a less strict accountability than when they are based on an implied contract. In the latter case there is an agreement to apply ordinary professional skill and care; in the former case no such agreement can be alleged.(z) If extraordinary skill were required, no medical man could dare to act, unless he had that high degree of skill which can be secured only by large city and hospital practice; and the great body of cases would have to be left without treatment.(z¹)

§ 1089. *c.* Where the law prescribes no absolute system, a physician is expected to practise according to the system he professes and avows.(a) It was accordingly held admissible for a defendant, in an action for malpractice, to prove that his treatment of the case was according to the *botanic* system of practice, which he professed, and was known to follow.(b) And so as to homœopathic treatment.(c)

§ 1090. *d.* Only nominal damages should be awarded when

(v) *Mertz v. Detweiler*, 8 W. and Serg. 376; *Seare v. Prentice*, 8 East 348; *Carpenter v. Blake*, 60 Barbour 488.

(w) *Mullin, P. J.*, in *Carpenter v. Blake*, 60 Barb. 518.

(x) *Hood v. Grimes*, 13 B. Monr. 188.

(y) See *Ruddock v. Lowe*, 4 F. and F. 519; *R. v. Simpson*, 4 C. and P. 407, *note*.

(z) *Shearman and Redfield on Negligence*, 2d ed. 1870, § 432.

(z¹) *Shearman and Redfield on Negligence*, 2d ed. 1870, § 436.

(a) *Carpenter v. Blake*, 60 Barbour 488.

(b) *Bournan v. Woods*, 1 Iowa 441.

(c) *Corsi v. Maretzek*, 4 E. D. Smith 1.

it appears the plaintiff refused to co-operate with the practitioner, and conform to his prescriptions,(c¹) even though it appear that the latter's treatment was objectionable; and, if the injury was due to the plaintiff's fractiousness and disregard of the defendant's orders, the latter being judicious, no action at all lies. But the court will not permit this question to go to the jury unless there is evidence of such misconduct by the plaintiff.(d)

§ 1091. *e.* The defendant is not liable unless damages ensue. The implied liability of a surgeon, retained to treat a case professionally, extends no further, in the absence of a special agreement, than that he will indemnify his patient against any injurious *consequence* resulting from his want of the proper degree of skill, care, or diligence in the execution of his employment. The plaintiff, in an action for malpractice, will only recover nominal damages if he shows no *injury* resulting from the surgeon's negligence or want of due care.(e)

There is an implied obligation, on a man holding himself out to the community as a surgeon or physician and practising his profession, that he should possess the ordinary skill requisite for reasonable success, and that he should attend the case with due care;(f) and the practitioner is liable where the patient suffers from such want of skill, although the carelessness of those nursing the patient may have aggravated the case and rendered the ultimate condition of the patient worse than it otherwise would have been. This latter fact would go in mitigation of damages, but not to bar the action.(g)

Similar rules apply in the case of druggists.(h)

§ 1092. *f.* The question whether the defendant possessed adequate skill, and exercised adequate care, is for the jury.

(c¹) *Leighton v. Sargent*, 7 Fost. 460; *McCandless v. McWha*, 22 Penn. St. 261.

(d) *Carpenter v. Blake*, 60 Barb. 488.

(e) *Craig v. Chambers & Wife*, 17 Ohio St. 253.

(f) *Wilmot v. Howard*, 32 Vt. 447; *Long v. Morrison*, 14 Ind. 595; *Wood v. Clapp*, 4 Sneed 65; *Patten v. Wiggin*, 15 Maine 594; *Howard v. Grover*, 28 Maine 97; *Simonds v. Henry*, 3 Maine 155; *Bellinger v. Craigue*, 31 Barb. 534; *Carpenter v. Blake*, 60 Barb. 480.

(g) *Wilmot v. Howard*, 39 Vt. 447.

(h) See authorities cited, *ante*, § 1082.

Thus, in an action against a physician and surgeon, to recover damages for negligence and malpractice in the setting and treatment of a dislocated limb, it was held by the Supreme Court of New York, that it is for the jury to say whether, upon the evidence, it is established to their satisfaction that the defendant did not use the means which experience has shown to be proper and necessary in order to justify a surgeon in assuming that he has restored the bones to their places. (i)

(i) *Carpenter v. Blake*, 60 Barbour 488. In this case the following additional points were ruled:—

Where the surgeon setting a dislocated limb did not use a sling after the operation, and medical witnesses differed as to the necessity of a sling in such a case, it was held, that it was for the jury, after weighing the reasons assigned for and against the use of it, to say whether it was negligence in the surgeon to omit the sling, or not.

If writers on the treatment of dislocations, or if, in the absence of such authority, practical surgeons, prescribe a mode of reducing them, and of treating the joint after the bones are replaced, it is incumbent on surgeons called to treat such an injury to conform to the system of treatment thus established; and if they depart from it they do it at their peril.

If, in case of dislocation of the elbow-joint, it is enough for the physician to replace the bones and to put the arm on a pillow, with the part below the joint at a right angle with that above it, and directing the application of cold water, it would seem proper, if not necessary, that the attending surgeon should inform the patient, or those in charge, of the necessity of maintaining that position; and, if there is a tendency in the limb to become straight, or if there is great pain, rendering the patient nervous and restless, the danger should be disclosed, to the end that all proper precaution may be taken to prevent it. An omission to give the warning, in such a case, is culpable negligence.

Although it is the right of a surgeon to give up the care of a dislocated limb at any time, especially with the patient's assent, yet, if he insists upon that assent as a shield from liability for any negligence of which he may have been guilty, or for any malpractice committed, it is competent for the plaintiff to show, if she can, that her consent was obtained by representations that were false, and, if shown to be false, the consent is no protection to the defendant against liability for damages that had occurred before the consent was given.

In an action against a surgeon for malpractice, it would be error to instruct the jury that it is not material whether the defendant was or was not skilful in his profession.

One holding himself out as a surgeon is liable as well for want of skill as for negligence; and the injured party may bring his action to recover for damages resulting from both, and recover on proving damages resulting from either.

Where the judge charged the jury, in an action for malpractice, that it was immaterial to the inquiry before them whether the defendant, at the time, was or was not reputed to be, or was or was not, a skilful surgeon; that the question was, did he bring to the treatment of the particular case that reasonable degree of skill ordinarily possessed by the members of the profession to which he belonged—the average skill of his profession; it was ruled by the Supreme Court, that by this language the judge must be understood to mean, that, if a surgeon does not bring to the treatment of an injury, or of a disease, the ordinary amount of skill possessed by those in the same profession, it is immaterial how high his standing may be; that, if he has the skill and does not apply it, he is guilty of neglect; that, if he does not have it, then he is liable for want of it; and that whether a surgeon possesses ordinary skill may be material in an action for malpractice, but not whether he possesses a higher degree of skill; and that, so construed, there was no objection to the charge. It would have been otherwise, however, had the plaintiff sought to recover on the ground that the defendant did not possess ordinary skill.

In such a case, the questions to be decided are: 1st, whether the defendant possessed the ordinary skill of persons acting as surgeons; and, 2d, if he did, whether he was chargeable with negligence in not applying it in his treatment of the plaintiff. Whether he possessed greater skill, or had been successful in the treatment of other patients, is wholly immaterial.

Where the judge charged the jury that it was impossible to show that a surgeon possessed the skill required, except by showing what skill he applied in the treatment of the particular case; it was held, that, if this part of the charge was construed by itself, without reference to other parts of it, the proposition could not be supported; but that, if construed (as the context warranted) as an instruction that the defendant was required to have an ordinary degree of skill, and whether he had any more was wholly immaterial, it was correct.

When the point in issue is, whether skill was applied in a given case, the possession of skill, without proof that it was applied, would be no defence to an action for malpractice.

When it is proved that the surgeon has omitted altogether the established mode of treatment, and has adopted one which has proved to be injurious, evidence of skill, or of reputation for skill, is wholly immaterial, except to show (what the law presumes) that he possesses the ordinary degree of skill of persons engaged in the same profession. In such a case it is of no consequence how much skill he may have; he has demonstrated a want of it in the treatment of the particular case.

The failure to use skill, if the surgeon has it, may be negligence; but, when the treatment adopted is not in accordance with the established practice, but is positively injurious, the case is not one of negligence, but of want of skill.

Where the judge charged the jury that a surgeon "contracts that he will bring to the case that ordinary and reasonable degree of skill which is possessed by the average of his profession;" that "he undertakes to bring to the case the exercise of that reasonable degree of skill ordinarily possessed by the members of the profession,"—adding the remark—"I think it is the reasonable rule that he is required to exercise the *average skill* of his pro-

fession ;" it was held by the Supreme Court, that, the judge having first laid down the rule correctly, a change of phraseology, in the latter part of the instruction, did not change the rule ; it being obvious that in the last sentence he did not intend to modify or vary the rule previously stated.

If the case is a new one, the patient must trust to the skill and experience of the surgeon he calls. So must he if the injury or disease is attended with injury to other parts, or other diseases have developed themselves for which there is no established mode of treatment. But, when the case is one as to which a system of treatment has been followed for a long time, there should be no departure from it, unless the surgeon who does it is prepared to take the risk of establishing, by his success, the propriety and safety of his experiment.

Per Mullin, P. J. Carpenter v. Blake, 60 Barbour 488-90.

BOOK VIII.

LEGAL RELATIONS OF HOMICIDE, FŒTICIDE, AND INFANTICIDE.

PRELIMINARY ANALYSIS.

A. ELEMENTARY DEFINITIONS, § 1093.

I. MURDER, § 1095.

General definition of, § 1095.

Malice the essential ingredient, § 1096.

Malice either express or implied, § 1096.

When malice to be presumed, § 1096.

1st. Murder from general malice, § 1096.

When homicide is committed from general malevolence it is murder, § 1096.

But when from wantonness, but manslaughter, § 1096.

2d. Murder from individual malice, § 1097.

(1) In reference to the party killed, § 1097.

How such malice to be proved, § 1097.

In what it consists by the civil and common law, § 1097.

(a) Intent to kill, § 1099.

In this case the offence is always murder, § 1099.

How such intent may be proved, § 1099.

Declarations and acts of defendant admissible for this purpose, §§ 1099, 1161.

(b) Intent to do bodily harm, § 1100.

In this country such homicide generally is murder in the second degree, § 1100.

The grade therefore depends on the intent, § 1100.

(2) In reference to the party killed, when the blow falls on the deceased by mistake, § 1101.

When in an attempt to produce abortion, the mother is unintentionally killed, § 1101.

3d. From collateral malice, § 1102.

This includes those cases where the malice is directed to an object other than that of human life or limb, § 1102.

II. MANSLAUGHTER, § 1103.

General definition of, § 1103.

Involuntary manslaughter, § 1104.

III. EXCUSABLE HOMICIDE, § 1105.

1st. Where a man doing a lawful act, without any intention of hurt, by accident kills another, § 1105.

2d. Where a man kills another in self-defence, § 1105.

The distinction between excusable and justifiable homicide, is in this country merely theoretical, § 1106.

IV. JUSTIFIABLE HOMICIDE, § 1107.

1st. When committed by unavoidable necessity, § 1107.

2d. When committed in advancement of public justice, § 1107.

V. MURDER IN THE SECOND DEGREE, § 1108.

Object of distinction is the restriction of capital punishment to these cases only in which there is an intent to take life, §§ 1108-9.

The distinguishing feature between the two degrees is a specific intent to take life, §§ 1108-9-10.

Homicide by poisoning not necessarily murder in the first degree, § 1110.

Homicide collateral to rape, robbery, etc., is necessarily murder in the first degree, § 1111.

Homicide of A., when the intent was to kill B., is murder in the second degree, § 1112.

Specific intent to take life to be inferred from circumstantial evidence, and from declarations, etc., § 1113.

B. CORPUS DELICTI.

I. THAT A DEATH TOOK PLACE, § 1114.

Universal rule of civil and common law, that the fact of death should be proved, § 1114.

Cases of conviction of innocent parties, from neglect of this precaution, §§ 1114-6.

Exceptions to the rule, § 1117.

1st. Possession of body is unnecessary when deceased is proved by eye-witnesses, § 1117.

2d. And so where it is proved that the body was destroyed by chemical or mechanical agents, § 1118.

II. THAT THE DEATH WAS FROM VIOLENCE.

1st. Poisoning.

(a) Measures to be taken by the prosecution when poisoning is suspected, § 1119.

(b) Chemical proof of poison in stomach not essential, § 1127.

Importance of chemical examination of stomach and its contents, § 1128.

When, however, this is prevented by the accused, he cannot set up the want of it, § 1128.

On the other hand, neglect by the prosecution to procure it, if in its power, is a powerful presumption in favor of the accused, § 1128.

(c) Facts on which a verdict of guilty can be supported, § 1130.

(d) Duties of counsel for prosecution and defence, § 1135.

2d. Wounds and blows, § 1137.

a. Legal definition of wounds, § 1137.

b. Under what circumstances wounds imply criminal agency, § 1140.

a¹. Character of the wounds themselves, § 1140.

a². Adaptation to a particular instrument, § 1140.

b². Shape and direction, § 1143.

c². Particular class, § 1144.

a³. Gunshot, § 1144.

b³. Punctured, § 1145.

c³. Incised, § 1146.

d³. Contused, § 1147.

d². Number, § 1148.

e². Situation, § 1150.

b¹. Expression of countenance, § 1151.

c¹. Inferences from surrounding objects, § 1152.

a². Clothing, § 1152.

b². Agent commensurate to the effect, § 1153.

c². Place where found, § 1154.

d¹. Position and appearance of the body, § 1155.

a². Attitude, § 1155.

b². Marks of blood, § 1156.

c². Bruises, § 1157.

e¹. Probability of infliction of injury before death, § 1159.

f¹. Connection of the wound with the death, § 1160.

C. INTENT AND DESIGN, FROM WHAT TO BE INFERRED, § 1161.

I. PRIOR ATTEMPTS, PREPARATIONS, AND THREATS, § 1161.

Evidence of such admissible, §§ 1161-2.

II. MARKS OF VIOLENCE, § 1166.

Presumptions to be drawn from such, § 1167.

It must appear that the alleged violence was the cause of death, either in part or in whole, § 1167.

III. INSTRUMENT OF DEATH, § 1169.

The use of a lethal instrument leads to the presumption that death was intended, § 1169.

Suicide may be inferred from the position of the weapon, § 1170.

Other presumptions to be drawn from instrument of death, §§ 722, 1171-2.

- IV. LIABILITY OF DECEASED TO ATTACK, § 1174.
 1st. Possession of money, § 1174.
 Avarice and ambition, § 1175.
 2d. Old grudge, § 1178.
 3d. Jealousy, 1179.
- V. POSITION OF DECEASED, §§ 717, 722, 1151, 1180.
 Presumption to be drawn from this as to suicide, §§ 717, 722.
 In cases of hanging, § 1180.
 In cases of drowning, § 1180.
 In cases of poisoning, § 1180.
- VI. MATERIALS APPROPRIATE TO BE CONVERTED INTO INSTRUMENTS OF CRIME, § 1182.
 Importance of indicatory evidence in this respect, § 1182.
 Purchase of poison and powder ; preparation of other materials, § 1182.
- VII. DETACHED CIRCUMJACENT BODIES, § 1183.
 Dress of deceased. Footprints. Presumptions to be drawn from the latter, §§ 1183-5-7.
 Detached articles of clothing, § 1186.
 Wadding of gun, etc., § 1186.
 Cases illustrative of the importance of this species of evidence, § 1190, etc.
- VIII. POSSESSION OF FRUITS OF OFFENCE, § 1198.
 Illustration of the general value of indicatory evidence, § 1199.
- D. INFANTICIDE AND FŒTICIDE, § 1200. (See, for the Medical view of this subject, §§ 84-107, 108-178.)
- I. HOW FAR FŒTICIDE IS AFFECTED BY THE DEGREE TO WHICH GESTATION HAS PROCEEDED, § 1200.
 At common law destruction of an unborn infant is a misdemeanor. Late differences of opinion as to whether there must be a quickening. Better opinion is, that all attempts of this character are misdemeanors, no matter what be the stage of gestation, § 1200-2.
- II. HOW FAR THE OFFENCE IS AFFECTED BY THE FACT OF BIRTH, § 1207.
 When a child dies *after* birth, from a wound inflicted before, the offence is murder ; when the death takes place *before* birth it is at common law but a misdemeanor, §§ 1207-8.
- III. TESTS OF VIABILITY RECOGNIZED BY THE COURTS, § 1209.
 Viability medically considered, §§ 41-61-7, 128.
 Difference of opinion as to actual degree of birth which is requisite to constitute the legal offence, § 1210.
 General propositions of law bearing on this topic :—
 (1) Where there is a malicious wound inflicted on an infant, with intent to produce death, and death ensues *after birth*, the offence is murder, § 1210.

- (2) Where there is a malicious exposure of an infant, with intent to produce death, and death ensues after birth, it is murder, § 1210.
- (3) Where there is a wanton exposure of an infant, without the intent to procure death, but with the expectation of shifting the support of the infant upon some third person, and death ensues after birth, it is manslaughter, § 1210.
- (4) Where there is an exposure resulting from necessity, ignorance, or insanity, and death ensues after birth, the offence is excusable homicide, in which, in accordance with American practice, the defendant is entitled to an acquittal, §§ 1210-13.

IV. CORPUS DELICTI IN INFANTICIDE, § 1213.

Difficulties arising in this respect from—

- (1) The uncertainty of the fact of pregnancy, § 1213. (See §§ 18, 1115.)
- (2) The uncertainty of the time of death, § 1213.
- (3) Uncertainty of presumptions, § 1213.
- (4) Casualties of gestation and delivery, § 1213. (See this subject medically considered, §§ 37-128.)

A. ELEMENTARY DEFINITIONS.

§ 1093. THE learning of the law of homicide has been elsewhere abundantly set forth,^(a) and neither the object nor the compass of the present treatise requires its exhibition in anything more than outline. Homicide may, in this light, be considered as follows:—

I. MURDER:

II. MANSLAUGHTER:

III. EXCUSABLE HOMICIDE:

IV. JUSTIFIABLE HOMICIDE:

V. MURDER IN THE SECOND DEGREE.

§ 1094. The distinction between excusable and justifiable homicide, as will presently be seen, is one which, however well marked in theory, is, in this country, obliterated in practice, since here the uniform course is to acquit wherever either an adequate excuse or a justification is proved.

I. MURDER.

§ 1095. Murder is where a person of sound memory and discretion unlawfully kills any reasonable creature in being, in

(a) See Wharton on Homicide, and Wharton's Criminal Law, § 884 et seq.

the peace of the commonwealth, with malice prepense or aforethought, either express or implied. The distinguishing feature in this definition, as will at once be seen, is that of *malice*. By this term, at common law, is meant to include not only special malevolence to the individual slain, but a generally wicked, depraved, and malignant spirit—a heart regardless of social duty, and deliberately bent on mischief. And, in general, says Sir Wm. Russell, any formed design of doing mischief may be called malice; and, therefore, not such killing only as proceeds from premeditated hatred or revenge against the person killed, but also, in many other cases, such killing as is accompanied with circumstances that show the heart to be perversely wicked, is adjudged to be of *malice prepense*, and consequently murder. Malice is *express* or *implied*. When one person kills another with a sedate, deliberate mind, and formed design, it is said to be *express*. Of this the usual evidence is circumstantial; such, for instance, as lying in wait, antecedent menaces, former grudges and concerted schemes to do the party some bodily harm, and, in general, any deliberate, cruel act committed by one person against another, however sudden; as where a man kills another suddenly, without any or without a considerable provocation, and where a man wilfully poisons another. And where one is killed in consequence of such a wilful act as shows the person by whom it is committed to be an enemy to all mankind, the law will infer a general malice from such a depraved inclination to mischief. Where the act is committed deliberately, and is likely to be attended with dangerous consequences, the malice requisite to murder will be presumed; for the law infers that the natural or probable effect of an act deliberately done is intended by its actor. The killing proved, even though nothing else be shown, it has been repeatedly held in Massachusetts that the offence is murder; the burden of extenuation being then thrown on the defendant—and such is undoubtedly the general rule. In Ohio, the presumption of killing alone is that of murder in the second degree, and so also is held to be the law in Virginia. In the latter State, however, it is said that where the mortal wound is given with a deadly weapon in the slayer's previous posses-

sion, there being no evidence of provocation, the case is *prima facie* murder in the first degree: and so also is the rule in Pennsylvania. Malice once ascertained is presumed to continue down to the fatal act. Thus, where it appeared that the deceased had threatened the prisoner about three weeks before that he would kill him, that they met in the street on a starlight night, when they could see each other, that the deceased pressed for a fight, but the prisoner retreated a short distance, that when the deceased overtook him the prisoner stabbed him with some sharp instrument which caused his death, and that at the time of this meeting the deceased had no deadly weapon; it was held, that, in such a case, to mitigate the offence from murder, it must appear, from the previous threats and the circumstances attending the rencontre, that the killing was in self-defence—the presumption being that the killing was malicious. Malice may be exerted against a party in his absence: as where A. lays poison for B. in his victuals, which B. afterwards takes, and dies. So where A. procures an idiot or lunatic to kill B., which he does. In both instances, A. is guilty of the murder as principal.

There may be a class of cases, to use the words of Chief Justice Shaw, “when, if reasonable doubt arises as to the matter of malice, the court will properly instruct the jury to find manslaughter; as where a mother exposed her infant child in a garden, and it was devoured by a kite, or where the death of a pauper was produced by constant shifting, on the part of the overseers of the poor, from parish to parish.”^(b)

§ 1096. Malice is either *general*, *individual*, or *collateral*, and will be considered successively in each relation.

1st. *General*.—When an action, unlawful in itself, is done with deliberation, and with intention of mischief or great bodily harm to particulars, or of mischief indiscriminately, fall where it may, and death ensue against or beside the original intention of the party, it will be murder. But if such an original intention does not appear, which is a matter of fact, and to be collected from circumstances given in evidence, and the fact was done heedlessly and incautiously,

(b) See Wharton on Homicide, 35, and cases cited.

it will be manslaughter, not accidental death; because the act upon which death ensued was unlawful. Thus, if a person breaking in an unruly horse, wilfully ride him among a crowd of persons, the probable danger being great and apparent, and death ensue from the viciousness of the animal, it is murder. For how can it be supposed that a person wilfully doing an act so manifestly attended with danger, especially if he showed any consciousness of such danger himself, should intend any other than mischief to those who might be encountered by him? So, if a man mischievously throw from a roof in a crowded street, where passengers are constantly passing and repassing, a heavy piece of timber, calculated to produce death on such as it might fall, and death ensue, the offence is murder, at common law. And upon the same principles, if a man, knowing that people are passing along the street, throws a stone likely to do injury, or shoot over a house or wall with intent to do hurt to people, and one is thereby slain, it is murder on account of previous malice, though not directed against any particular individual: it is no excuse that the party was bent upon mischief generally. The line of this species of homicide is very important to preserve intact; for as has been lately pointedly observed, "particular malice has the limited bounds of the person who is the object of it, and who may be on his guard against it: but general malice has a wider scope, and falls on the unsuspecting. Is a man who fires a pistol at an individual against whom he has ill-will, less criminal than one who fires a pistol at a crowd of an hundred people, against whom he has ill-will as a body, or as a part of the community? The absence of the personal animosity really aggravates the crime. In cases of particular malice, the sophistry of the passions often gives the act the character of a wild retribution, and the assassin persuades himself that he is getting rid of a monster who is a curse to society. This reasoning is perverse and dangerous; but is the state of mind less detestable in which no wrongs, real, exaggerated, or imaginary, inflame the passions against the individual, but in which the knife is driven home to his heart simply because he wears the form of a brother man? Which would argue the higher degree of depravity, the resolution—"I will kill A. and B., who have

insulted or injured me," or "I will kill the first man I meet, be he who he may?"

§ 1097. 2d. *Individual*, which may be considered (1) in reference to the party killed, and (2) to a third party when the blow falls on the deceased by mistake.

(1) *In reference to the party killed.*

So far as concerns the individual killed, malice is either express or implied. Express malice is defined to be, where one person kills another with a sedate, deliberate mind, and formed design. Such formed design may be evinced by external circumstances, discovering the inward intention: as lying in wait, antecedent menaces, former grudges, and concerted schemes to do the party some bodily harm. And malice is implied by law from any deliberate cruel act committed by one person against another, however sudden: thus, where a man kills another suddenly without any or without a considerable provocation, the law implies malice; for no person, unless of abandoned heart, would be guilty of such an act upon a slight or no apparent cause. And, as will be seen presently, where one is killed in consequence of such a wilful act as shows the person by whom it is committed to be an enemy to all mankind, the law will infer a general malice from such a depraved inclination to mischief. It may be indeed treated as a general rule, that all homicide is presumed to be malicious where an instrument, likely to cause death, is used.^(c) It should not be forgotten in this connection, that the legal meaning of the term *malitia*, or malice, is different from its popular meaning, which makes it synonymous with spite. Thus, Lord Holt says: "Some have been led into mistakes by not well considering what the passion of malice is; they have construed it to be rancor of mind, lodged in the person killing for some considerable time before the commission of the fact: which is a mistake, arising from the not well distinguishing between *hatred* and *malice*. *Envy*, *hatred*, and *malice* are three distinct passions of mind."^(d) Amongst the Romans, and in the civil law, *malitia* appears to have imported a mixture of fraud, and of that which is opposite to simplicity and honesty. Cicero

(c) Wh. C. L. §§ 930-950.

(d) Kel. 127.

speaks of it as, (e) “*versuta et fallax nocendi ratio* :” and in another work (f) he says: “*Mihi quidem etiam veræ hæreditates non honestæ videntur si sint malitiosis* (or, as sometimes read, *a malo animo profectis*), *blanditiis officiorum; non varetate sed simulatione quæsita*.” And in the Pandects, (g) in speaking of a banker or cashier giving his accounts, it is said: “*Ubi exigitur argentarius rationes edere tunc punitur cum dolo malo non exhibit. Dolo malo autem non edit, et qui malitiose edidit et qui in totum non edit*.” At common law, malice is a term of law importing directly wickedness, and excluding a just cause or excuse. Thus, Lord Coke, in his comment on the words *per malitiam*, says: “If one be appealed of murder, and is found by verdict that he killed the party *se defendendo*, this shall not be said to be *per malitiam*, because he had a *just cause*.” (h) And, where the statute speaks of a prisoner on his arraignment standing *mute of malice*, the word clearly cannot be understood in its common acceptation of anger or desire of revenge against another. Thus, where the 25 Hen. VIII. c. 3, says, that persons arraigned of petit treason, etc., standing “*mute of malice or froward mind*,” or challenging, etc., shall be excluded from clergy, the word *malice*, explained by the accompanying words, seems to signify a wickedness or frowardness of mind, in refusing to submit to the course of justice: in opposition to cases where some just cause may be assigned for the silence, as that it proceeds from madness, or some other disability or distemper. And in the Statute 21 Edw. I., *De malefactoribus in parcis*, trespassers are mentioned who shall not yield themselves to the foresters, etc., but who, “*malitiam suam prosequendo et continuando*,” shall fly or stand upon their defence. And, where the question of malice has arisen in cases of homicide, the matter of consideration has been, whether the act was done with or without just cause or excuse: so that it has been suggested, that what is usually called malice implied by law would, perhaps, be expressed more intelligibly and familiarly to the understanding, if it were called *malice in a legal*

(e) De Nat. Deor. Lib. 3, s. 30.

(g) Dig. Lib. 2, Tit. 13, Lex. 8.

(f) De Offic. Lib. 3, s. 18.

(h) 2 Inst. 384.

sense. Malice, in its legal sense, denotes a wrongful act, done intentionally, or without just cause or excuse.

§ 1098. Malice in this intent may be considered under the following heads:—

- (a) Intent to kill.
- (b) Intent to do bodily harm.(i)

(a) *Intent to Kill.*

§ 1099. This head admits of no question in its primary sense. Of course, where there is a deliberate intent to kill, unless it be in the discharge of a duty imposed by public authorities, the offence must be murder at common law.(j) And it should be observed that an intermediate provocation, immediately after the happening of which the offence occurred, forms no defence.(k) The reason of this is obvious, for, if all that is necessary for a man to do to relieve himself from the guilt of murder is such provocation, there would surely not be a case of homicide without it.

In a leading case on this point, the prisoner, with the deceased and another brother, and some neighbors, were drinking in a friendly manner at a public house, till, growing warm in liquor, but not intoxicated, the prisoner and deceased began in idle sport to pull and push each other about the room. They then wrestled—one fell; and soon afterwards they played at cudgel by agreement. All this time no token of anger appeared on either side, till the prisoner, in the cudgel play, gave the deceased a smart blow on the temple. The deceased thereupon grew angry, and, throwing away his cudgel, closed in with the prisoner, and they fought a short space in good earnest; but, the company interposing, they were soon parted. The prisoner then quitted the room in anger, and when he got into the street was heard to say, “Damnation seize me if I do not fetch something and stick him;” and, being reproved for using such expressions, he answered, “I’ll be damned to all eternity if I do not fetch something and run him through the body.” The deceased and the rest of the company continued

(i) See Wharton on Hom. 39.

(j) Wh. C. L. § 944.

(k) Ibid.; Russell on Crimes 515.

in the room where the affray happened ; and in about half an hour the prisoner returned, having put off a thin, slight coat he had on when he quitted the room, and put on one of coarse, thick cloth. The door of the room being open into the street, the prisoner stood leaning against the door-post, his left hand in his bosom, and a cudgel in his right, looking in upon the company, but not speaking a word. The deceased, seeing him in that posture, invited him in to the company ; but the prisoner answered, "I will not come in." "Why will you not?" said the deceased. The prisoner replied, "Perhaps you will fall on me and beat me." The deceased, assured him he would not ; and added, "Besides, you think yourself as good a man as me at cudgel ; perhaps you will play at cudgels with me." "I am not afraid to do so, if you will keep off your fists." Upon these words the deceased got up and went towards the prisoner, who dropped the cudgel as the deceased was coming up to him. The deceased took the cudgel, and with it gave the prisoner two blows on the shoulder. The prisoner immediately put his right hand in his bosom, and drew out the blade of a tuck sword, crying, "Damn you, stand off, or I'll stab you ;" and immediately, without giving the deceased time to step back, made a pass at him with the sword, but missed him. The deceased thereupon gave back a little, and the prisoner, shortening the sword in his hand, leaped forward towards the deceased, and stabbed him to the heart, and he instantly died. The judges unanimously agreed that there were in this case so many circumstances of deliberate malice and deep revenge on the defendant's part, that his offence could not be less than wilful murder. He owned that he would fetch something and stick *him*—to run *him* through the body. Whom did he mean by *him*? Every circumstance in the case showed that he meant his brother. He returned to the company, provided, to appearance, with an ordinary cudgel, as if he intended to try skill and manhood a second time with that weapon ; but the deadly weapon was all the while carefully concealed under his coat, which, most probably, he had changed for the purpose of concealing the weapon. He stood at the door, refusing to come nearer, but artfully drew on the discourse of the past quarrel ; and, as soon as he saw his

brother disposed to engage a second time at cudgels, he dropped his cudgel, and betook him to the deadly weapon, which, till that moment, he had concealed. He did, indeed, bid his brother to stand off, but he gave him no opportunity of doing so before the first pass was made. His brother retreated before the second; but he advanced as fast, and took the revenge he had vowed. The circumstance of the blows before the sword was produced, which probably occasioned the death, did not alter the case, nor did the preceding quarrel, because, all circumstances considered, he appeared to have returned with a deliberate resolution to take a deadly revenge for what had passed.^(l)

Malice can never or rarely be directly proved, and, the evidence of it therefore being circumstantial, any facts which go to afford an inference of its existence are admissible. But it would seem that the malice proved must be directed to the particular act for which the prisoner is tried, as otherwise the issue might become much encumbered. Thus it was held in Tennessee that, on a trial of an indictment for murder, evidence that the prisoner, a short time before the murder, had set fire to the house of the deceased in the night-time, was inadmissible for the purpose of proving that the prisoner had committed the murder; where, however, there is established a settled purpose of revenge on the part of the prisoner, such evidence would seem to be admissible if it appeared to indicate a manifestation of such spirit. Evidence that the prisoner had beaten his wife, and forced her to abandon the house and seek refuge under the protection of the deceased, has been held proper proof of malice prepense on the part of the prisoner. Malice of this kind, it is well stated by Mr. Greenleaf, may be shown from the circumstances attending the act—such as the deliberate selection and use of a lethal weapon, knowing it to be such; a preconcerted hostile meeting, whether in a regular duel with seconds, or in a street fight mutually agreed upon, or notified or threatened by the prisoner; privily lying in wait; a previous quarrel or grudge; the preparation of poison, or other means of doing great bodily harm or the

(l) Wharton on Homicide, p. 40.

like.(*m*) The giving to another poison, sufficient to produce death, knowing it to have this effect, is from the same reasoning proof of malice.(*n*)

(*b*) *Intent to do Bodily Harm.*

§ 1100. At common law the intent to do bodily harm, followed up by homicide, constitutes murder; though such an offence falls in this country, in those States where the distinction exists, under the head of murder in the second degree. Homicides of this kind are numerous, and it is easy to suppose of homicide in a duel that may be so ranked, *e. g.* where the intention is to *maim*, and not to *kill*. The distinction in a case of this kind is undoubtedly very delicate; and, where a positive line must be drawn, it would perhaps be wiser to say, that, when the damage intended was such as would probably result in death, it is murder in the first degree, even though death may have been but incidental to the offender's purpose. Although A. intends only to beat B. in anger, from preconceived malice, and happens to kill him, it will be no excuse that he did not intend all the mischief that followed; for what he did was *malum in se*, and he must be answerable for its consequences. He beat B. with an intention of doing him some bodily harm, and is therefore answerable for all the harm he did. So if a large stone be thrown at one with a deliberate intent to hurt, though not to kill him, and by accident it kill him, or any other, it is murder. But the nature of the instrument, and the manner of using it as calculated to produce great bodily harm or not, will vary the offence in all such cases. In a more recent case it appeared that the deceased, being in liquor, had gone at night into a glass-house, and laid himself down upon a chest, and that while he was there asleep the prisoners covered and surrounded him with straw, and threw a shovel of hot cinders upon his belly, the consequence of which was that the straw ignited, and he was burnt to death. There was no evidence of express malice, but the conduct of the prisoners indicated an entire recklessness of

(*m*) Wharton on Homicide, p. 41.

(*n*) *State v. Leak*, Phillips L. (N. C.) 450.

consequences, hardly consistent with anything short of design. Patteson, J., adverted to the fact of there being no evidence of express malice, but told the jury, that, if they believed the prisoners really intended to do any serious injury to the deceased, although not to kill him, it was murder; but, if they believed their intention to have been only to frighten him in sport, it was manslaughter.(o)

§ 1101. (2) *In reference to a third party when the blow falls on the deceased by mistake.*—Where an injury, intended for one person, mortally affects another, as where a blow aimed at one person alights upon another, and kills him, the inquiry will be whether, if the blow had killed the person against whom it was aimed, the offence would have been murder or manslaughter. For, if a blow intended against A. and lighting upon B. arose from a sudden transport of passion, which in case A. had died by it would have reduced the offence to manslaughter, the fact will admit of the same alleviation if it shall have caused the death of B.(p) And, on the same principle, A., having malice against B., strikes at and misses him, but kills C.; this is murder in A.: and, if it had been without malice under such circumstances that, if B. had died, it would have been manslaughter, the killing of C. also would have been but manslaughter.(q) Again, A., having malice against B., assaults him and kills C., the servant of B., who had come in aid of his master; this is murder in A.; for C. was justified in attacking A. in defence of his master who was thus assaulted. So, where A. gave a poisoned apple to B., intending to poison her, and B., ignorant of it, gave it to a child, who took it and died, this was held murder in A. but no offence in B.; and this, though A., who was present at the time, endeavored to dissuade B. from giving it to the child.(r) So where Plummer and seven others opposed the king's officers in the act of seizing wool. One of those persons shot off a fusee and killed one

(o) See Wharton on Homicide, p. 42.

(p) Fost. 262.

(q) 1 Hale, 379, 439, 466; Dyer, 128; Bd. 111, 112, 117; Pult de Pace, 1246; Foot, 261; 1 Hawk. C. 31, 542; State v. Cooper, 1 Green, N. J. R.; State v. Benton, 2 Dev. and Bat. 196; and other cases cited Wh. C. L. § 965.

(r) 1 Hale, 230; 2 Plowden's Com. 474; State v. Fulkerson, 1 Phillips, L. (N. C.) 233.

of his own party. The court held, in giving judgment upon a special verdict, that, as the prisoner was upon an unlawful design, if he had in pursuance thereof discharged the fusee against any of the king's officers that came to resist him in the prosecution of that design, and by accident had killed one of his own accomplices, it would have been murder in him. As if a man, out of malice to A., shoot at him, but miss him and kill B., it is no less a murder than if he had killed the person intended. And, again, where the prisoner had fired a loaded pistol at a person on horseback, and declared that he did so only with the intention to cause the horse to throw him, and the ball hit another person and killed him, it was held that the crime was murder. If a man have a sudden quarrel and fight with A., by which his passions are strongly excited, and, while his passions are thus excited, he, without any real or supposed provocation, kill B., who is an utter stranger to the whole affair, and has not interfered in the quarrel nor been in any way connected therewith, even in the party's own suppositions, it will be murder. So, where the prisoner, having had a quarrel with his wife, aimed a blow at her with an axe, which fell on the head of his infant son then in her arms, by which it was instantly killed, it being shown that the prisoner was ignorant of his child's position, and was at the time in the heat of blood, seeking to avenge himself on his wife for a supposed injury, it was held, that, as the case was to be considered as if the wife had been the victim, the same grade of homicide would attach to the killing of the child as it would have done to that of the wife, had she been killed. But in this, as in cases of malice prepense and express, if the blow intended for one would in law have amounted to manslaughter, it will still be the same, though by mistake or accident it kill another. Thus, in an old case, a quarrel arising between some soldiers and a number of keelmen at Sandgate, a violent affray ensued, and one of the soldiers was very much beaten. The prisoner, a soldier who had before driven a part of the mob down the street, with his sword in his scabbard, on his return, seeing his comrade thus used, drew his sword and bid the mob stand clear, saying he would sweep the street; and on their pressing on him he struck at them with the flat side, and

as they fled pursued them. The other soldier in the mean time had got away, and when the prisoner returned he asked whether they had murdered his comrade; and, being several times again assaulted by the mob, he brandished his sword and bid them keep off. At this time, the deceased, who from his dress might be mistaken for a keelman, was going along about five yards from the prisoner; but, before he passed, the prisoner went up to him and struck him on the head with his sword, of which he presently died. This was holden manslaughter: it was not murder, because there was previous provocation, and the blood was heated in the contest; nor was it self-defence, because there was no inevitable necessity to excuse the killing in this manner.^(r)

A widow, finding that one of her sons had not prepared her dinner as she had directed him to do, began to scold him, upon which he made her some very impertinent answers, which put her in a passion, and she took up a small piece of iron used as a poker, intending to frighten him, and, seeing she was very angry, he ran towards the door of the room, when she threw the poker at him, and it happened that the deceased was just coming in at the moment, and the iron struck him on the head and caused his death. Parkes, J. A. J., said to the jury, "No doubt this poor woman had no more intention of injuring this particular child than I have, but that makes no difference in the law. If a blow be aimed at an individual unlawfully—and this was undoubtedly unlawful, as an improper mode of correction—and strikes another and kills him, it is manslaughter; and there is no doubt, if the child at whom the blow was aimed had been struck and died, it would have been manslaughter; and so it is under the present circumstances."^(s)

Under this head may be classed the cases where medicine is administered or an operation performed with an intent to produce an abortion, and where the mother dies under the process. At common law this has been held to be murder.^(t) If there is mixed up in the offence an intent to do bodily harm to the

^(r) Wharton on *Hom.* 43.

^(s) *R. v. Cowner*, 1 C. & P. 438.

^(t) 1 Hale 90; *Com. v. Chauncy*, 2 Ashmead 227; *Smith v. State*, 3 Redding 48; *State v. Moore*, 25 Iowa 728.

mother, the same result follows.^(u) In a case in Maine it has been said, that, as the general principle of law is that homicide with an intent to commit a misdemeanor is but manslaughter, so in this case, if the destruction of the *fœtus* be but a misdemeanor, the offence is only manslaughter.^(v) This, however, is not the received doctrine,^(w) by which the offence is treated as murder, the destruction of an infant *en ventre sa mere* being, even at common law, in some aspects felonious, and the act in its nature malicious and deliberate, and necessarily attended with great danger to the person on whom it is practised.

§ 1102. 3d. *From collateral malice.*—Malice may be said to be collateral when it is directed to an object other than that of human life or limb; as, for instance, when the object is to commit a felony or a misdemeanor, in the pursuit of which human life is incidentally taken. At common law, when a party in the attempt to perpetrate a felony takes life, he is guilty of murder, though the taking of life was the result of mere accident—*e. g.*, where he shoots a tame fowl with the intention of killing it, and the ball aimed at the fowl strikes a child and kills it. By statutes which obtain in most of the States this principle, so far as concerns the higher grade of felonies, has been definitely established, it having been enacted that all murders committed in the perpetration of, or the attempt to perpetrate, any burglary, rape, robbery, or arson, shall be murder in the first degree. Where, at common law as well as under these statutes, the unlawful act to which death is incidental is a mere misdemeanor, the homicide is but manslaughter. Thus, if the attempt is to poach on another man's premises for the purpose of shooting wild game, and a stranger is accidentally killed, this is but manslaughter; and so if death ensue in the prosecution of an unlawful game.

^(u) Ibid.

^(v) *Smith v. State*, 3 Redding 48.

^(w) Wh. C. L. § 965; 1 Hale 90; *Com. v. Chauncy*, 1 Ashmead 227.

II. MANSLAUGHTER

§ 1103. Is the unlawful and felonious killing of another, without any malice either express or implied.(x) Manslaughter differs from murder in this, that, though the act which occasions the death be unlawful, or likely to be attended with bodily mischief, yet the malice either express or implied, which is the very essence of murder, is presumed to be wanting, the act being imputed to the infirmity of human nature; and the punishment is proportionately lenient.(y) It is no defence to an indictment for manslaughter that the homicide therein alleged appears by the evidence to have been committed with malice aforethought, and was therefore murder; but the defendant in such a case may notwithstanding be properly convicted of the offence of manslaughter.(z)

Manslaughter at common law is of two kinds: 1st. Voluntary manslaughter, which is the unlawful killing of another without malice, on sudden quarrel or in heat of passion. Where, upon sudden quarrel, two persons fight, and one of them kills the other, this is voluntary manslaughter, and so if they, upon such occasion, go out to fight in a field; for this is one continued act of passion. So, also, if a man be greatly provoked by any gross indignity, and immediately kills his aggressor, it is voluntary manslaughter, and not excusable homicide, not being *se defendendo*; neither is it murder, for there is no previous malice. In these and such like cases, the law, kindly appreciating the infirmities of human nature, extenuates the offence committed, and mercifully hesitates to put on the same footing of guilt, the cool deliberate act and the result of hasty passion.

§ 1104. 2d. Involuntary manslaughter, where a man doing

(x) Wh. C. L. § 931; 1 Hale 499; 1 Hawk. c. 30, s. 3; Parker, J. Selfridge's Trial 158; State v. Norris, 1 Hay. 429.

(y) Wh. C. L. §§ 931-2; King v. Com., 2 Ma. Cas. 78; Com. v. Bob, 4 Dall. 125; State v. Lorkey, 2 Kell. 8 C. Dig. 104; Penn v. Levin, Addison 279; State v. Travers, 2 Wheel. C. C. 506; Com. v. Mitchell, 1 Va. Cas. 716; Parker, J., Selfridge's Trial 158; 1 Hale 449, 450, 466; 3 Inst. 55; 1 Hawk. c. 30, s. 2, *vide* R. v. Mawgridge, Kel. 124; Fost. 290, *vide* Lord Cornwallis' case, Dom. Proc. 1678; 2 St. Tr. 730.

(z) Com. v. McPike, 3 Cush. 18.

an unlawful act, not amounting to felony, by accident kills another. It differs from homicide excusable by misadventure, in this: that misadventure always happens in the prosecution of a lawful act, but this species of manslaughter in the prosecution of an unlawful one. Where a person does an act lawful in itself, but in an unlawful manner, this excepts the killing from homicide excusable *per infortunium* and makes it involuntary manslaughter. In general where an involuntary killing happens in consequence of an unlawful act, it will be either murder, or manslaughter, according to the nature of the act which occasioned it: if it be in prosecution of a felonious intent, or in its consequences naturally tended to bloodshed, it will be murder; but if no more was intended than a mere civil trespass, it is manslaughter.(a)

§ 1105. III. EXCUSABLE HOMICIDE is of two kinds: 1st. Where a man doing a *lawful* act, without any intention to hurt, by accident kills another; as, for instance, where a man is hunting in a park, and unintentionally kills a person concealed. This is called homicide *per infortunium*, or by misadventure. 2d. *Se defendendo*, or in self-defence, which exists (to adopt the definition of Mr. Greenleaf)(b) where one is assaulted upon a sudden affray, and in the defence of his person, where certain and immediate suffering would be the consequence of waiting for the assistance of the law, and where in such case, there being no other means of escape, he kills the assailant. To reduce homicide in self-defence to this degree, it must be shown that the slayer was closely pressed by the other party, and retreated as far as he conveniently or safely could, in good faith, with the honest intent to avoid the violence of the assault. The jury, as will be presently seen more fully, must be satisfied that, unless he had killed the assailant, he was in imminent and manifest danger of either losing his own life, or of suffering enormous bodily harm.(c) By the older text-

(a) 4 Bl. Com. 191.

(b) 3 Greenleaf Ev. § 116.

(c) Bl. Com. 182; 1 Russ. on Crimes 666, 661; Whart. Am. Crim. Law, § 1019, etc. Qui cum, aliter tueri se non possunt, damni culpam diderint, innoxii sunt. Vim enim vi defendere omnes leges omniaque jura, permittant. —Dig. lib. 9, tit. 2, l. 45, § 4. Is, qui aggressorem vel quemcumque alterum

writers, this species of homicide is sometimes called chance medley, or *chaud medly*, words of nearly the same import; and closely borders upon manslaughter. In this case, as well as that of manslaughter, the theory is, that passion has kindled on each side, and that blows have passed. The distinction, however, is, that in manslaughter it must appear, either that the parties were actually in mutual combat when the mortal stroke was given, or that the slayer was not at that time in imminent danger of death; but that in homicide excusable in self-defence it must appear, either that the slayer had not begun the fight, or that, having begun, he endeavored to decline any further struggle, and afterward, being closely pressed by his antagonist, he killed him to avoid his own destruction. (d) The same right of self-defence is extended to the relations of master and servant, parent and child, and husband and wife; and to those cases where homicide is unavoidably committed in the defence of the possession of one's dwelling-house, against a trespasser, who, having entered, cannot be put out otherwise than by force; and where no force is used, and where no instrument or mode is employed other than is necessary and proper for that purpose. Under the same general head of excusable homicide may also be enumerated that class of cases, where two persons are reduced to the alternative, that one or the other or both must certainly perish, as, where two shipwrecked persons are on one plank which will not hold them both, and one thrust the other from it, so that he is drowned, the survivor is excused.

§ 1106. The distinction, in result, between justifiable and excusable homicide is now practically exploded. In former times, in the latter case, as the law presumed that the slayer was not wholly free from blame, he was punished, at least by forfeiture of goods. But in this country, this rule is not known ever to have been recognized; it having been the uniform practice here, as it now is in England, where the grade

in dubio vitæ discrimine constitutus occiderit, nullam ob id factum calumniam meruere debet.—Cod. lib. 9, tit. 16, l. 2.

(d) 4 Bl. Com. 184; 1 Russ. on Crimes 661; State v. Hill, 4 Dev. & Batt. 491.

does not reach manslaughter, for the jury, under the direction of the court, to acquit.

§ 1107. IV. JUSTIFIABLE HOMICIDE(*e*) is that which is committed either, 1st. By unavoidable necessity, without any will, intention, or desire, or any inadvertence or negligence in the party killing, and, therefore, without blame; such as, by an officer, executing a criminal pursuant to the death-warrant, and in strict conformity to the law in every particular; or, 2dly. For the advancement of public justice; as, where an officer, in due execution of his office, kills a person who assaults and resists him; or where a private person or officer attempts to arrest a man charged with felony and is resisted, and in the endeavor to take him kills him; or if a felon flee from justice, and in the pursuit he be killed, where he cannot otherwise be taken; or, if there be a riot, or a rebellious assembly, and the officers or their assistants, in dispersing the mob, kill some of them, where the riot cannot be otherwise suppressed; or if prisoners in jail, or going to jail, assault or resist the officers, or their aids, and they, in repelling force by force, kill the party resisting; or, 3dly. For the prevention of any atrocious crime, attempted to be committed by force; such as murder, robbery, house-breaking in the night time, rape, mayhem, or any other act of felony against the person.(*f*) But in such cases, the attempt must not be merely suspected, but apparent, and the danger must be imminent, and the opposing force or resistance necessary to avert the danger or to defeat the attempt.(*g*)

(*e*) *United States v. Wiltberger*, 3 Washburn 515. And see *State v. Rutherford*, 1 Hawks. 457; *State v. Roane*, 2 Dev. 58.

(*f*) 4 Bl. Com. 183; 1 Russ. on Crimes 657-660. Wh. C. L. § 1030.

(*g*) The above definition is taken from Mr. Greenleaf (3 Greenl. on Evid. 315), who refers to 4 Bl. Com. 178-180; 1 Russ. on Crimes 660; Whart. Am. Crim. Law, § 1026, etc. The Roman law recognizes the same principles. Qui latronem (insidiatorem) occiderit, non tenetur, utique si aliter periculum effugere non protest.—Inst. lib. 4, tit. 3, § 2. Furem nocturnum, si quis occiderit, ita demum impune feret, si parcere ei sine periculo suo non potuit.—Dig. lib. 48, tit 8, l. 9. Qui stuprum sibi vel suis per vim inferentem occidit, dimmittendum.—Dig. lib. 48, tit 8, l. 1, § 4. Si quis percussorem ad se venientem gladio repulerit, non ut homicida tenetur; quia defensor propriæ salutis in nullo pecasse videtur.—Cod. lib. 9, tit 16, l. 3. In the cases mentioned in the text, if the homicide is committed with undue precipitancy, or

V. MURDER IN THE SECOND DEGREE.

§ 1108. As already observed, statutes exist in most of the United States, dividing murder as it stood at common law into two degrees, to the first of which is attached the penalty of death, and to the second imprisonment. The origin of this distinction was the reluctance felt to attach death to any other offences than those in which death was intended. The *Lex Talionis*, as well as the necessities of human society, would require, it was thought, a continuance of capital punishment in cases of deliberate homicide; but it seemed hard, as well as unnecessary, to take the life of the offender where the offence for which he was tried was one which he had never premeditated. To obviate these difficulties the statutes were passed, which, while they differ among themselves in phraseology, unite in the general principle that where murder is *intentional*, or where it is committed in the perpetration or the attempt to perpetrate any burglary, arson, rape, or robbery, or where it is by poison, it is murder in the *first* degree; when not falling under either of these heads, murder in the *second* degree.

§ 1109. By judicial interpretation the following propositions may be considered as established:—

1st. *A specific intent to take life* is the distinguishing test by which murder in the first degree, under the Pennsylvania and cognate codes, may be determined. Where it exists the capital offence is consummated. Where it is wanting, no matter how long may have been the premeditation, how decided the wilfulness, or how pointed the malice, it is but murder in the second degree. Thus, if a man designedly beat another to a jelly, from which death results, this is but murder in the second degree, if it appear that the intent was merely to inflict bodily harm. And so if in a riot, in the wildness of collision, firearms are discharged with intent merely to maim an antagonist, or to do some public wrong, and life is taken, it is but murder in the second degree.^(h)

the unjustifiable use of a deadly weapon, the slayer will be culpable.—See Alison's Crim. Law of Scotland, p. 100; Id. 132-139.

(h) Wharton on Hom. 386; Wh. C. L. § 1084.

Deliberation is the requisite under the statute of New York and statutes similarly constructed. Under these statutes, some degree of deliberation must be proved or inferred.

§ 1110. 2d. Homicide by poison is not necessarily murder in the first degree. The statutes, it should be recollected, use the term, all "*murder*" (not all "*homicide*"), by poison, etc., is murder in the first degree. Hence, if the poisoning would have been manslaughter or misadventure at common law, it will not be raised to murder in the first degree by the mere force of the statute. Thus, if poison be laid for the purpose of unlawfully killing game, or for the purpose of effecting any other misdemeanor, or if a poisonous drug be negligently administered by a quack, and death result, this would be manslaughter at common law; and, not being "*murder*," is not affected by the statute, which applies to "*murder*" alone.⁽ⁱ⁾ Hence, a verdict of murder in the second degree will not be disturbed, even though it appear that the case was one of deliberate poisoning.^(j)

§ 1111. 3d. When the murder is collateral to any arson, rape, robbery, or burglary—and in Tennessee, larceny—it is necessarily murder in the first degree.

§ 1112. 4th. When in the pursuit of the life of A., B. is unintentionally killed, the general opinion is, this is murder in the second degree, though as to this there has been some doubt.^(k)

§ 1113. 5th. The specific intent to take life, which is the distinguishing feature of murder in the first degree, may be inferred from the same circumstances from which design in other cases is presumed. If one man shoot another through the head with a musket or pistol ball—if he stab him in a vital part with a sword or dagger—if he cleave his skull with an axe or the like—it is almost impossible for a reflecting and intelligent mind to come to any other conclusion than that the perpetrator of any such acts of deadly violence intended to kill. Where the defendant deliberately procured a butcher's knife, and sharpened it for the avowed purpose of killing the

(i) Wharton on Homicide, 359.

(j) *Ibid.*, 359, 360.

(k) *Ibid.*, 362, 463.

deceased; where he concealed a dirk in his breast, stating shortly before the attack that he knew where the seat of life was; where he thrust a handspike deeply into the forehead of the deceased; the presumption was held to exist that the killing was wilful. But it is not necessary, to warrant a conviction of murder in the first degree, that the instrument should be such as would necessarily produce death. Thus, where the weapon of death was a club, not so thick as an axe-handle, the jury, under the charge of the court, rendered a verdict of murder in the first degree, it appearing that the blow was induced by a deliberate intention to take life. The same presumption of intention is drawn with still greater strength from the declared purpose of the defendant, which is always admissible in evidence for such a purpose. Thus, where the prisoner, a negro, said he intended "to lay for the deceased, if he froze, the next Saturday night," and where the homicide took place that night; where it was said: "I am determined to kill the man who injured me;" where the prisoner declared, the day before the murder, that he would certainly shoot the deceased; where, in another case, the language was: "I will split down any fellow that is saucy;" where the prisoner rushed rapidly to the deceased, and aimed at a vital part; where a grave had been prepared a short time before the homicide, though the deceased was not ultimately placed in it, the whole plan of action being changed; in each of these cases it was held murder in the first degree.^(l)

B. CORPUS DELICTI.^(m)

§ 1114. I. THAT A DEATH TOOK PLACE.

"I would never," said Lord Hale, "convict any person of murder or manslaughter unless the fact were proved to be done, or at least the body found dead."⁽ⁿ⁾ The civilians are no less emphatic. "Diligenter cavendum est iudici, ne supplicium præcipitet, antequam de erimine consteterit."^(o) "De

^(l) See Wh. C. L. § 1084.

^(m) See as to identification of Dead Body, ante, § 287, etc.

⁽ⁿ⁾ 2 Hale, P. C. 290, and see *Tyner v. State*, 5 Humph. 383.

^(o) Matth. de Crim. in Dig. lib. 48, tit. 16, ch. 1.

corpore interfecti necesse est ut constet.”(p) Numerous cases attest the necessity of this check.(p¹) Thus we are told of a Frenchman who was convicted on his own confession of the murder of a widow, who two years afterwards returned to her home, and had never received any injury whatever. And as Bunyan tells us: “Since you are entered upon stories, I also will tell you one, the which, though I heard not with my own ears, yet my author I dare believe. It is concerning one old *Tod* that was hanged about twenty years ago, or more, at *Hartford*, for being a thief. The story is this: At a summer Assize, holden at *Hartford*, while the judge was sitting upon the bench, comes this old *Tod* into the court, clothed in a green suit, with his leathern girdle in his hand, his bosom open, and all in a dung sweat, as if he had run for his life; and being come in he spake aloud as follows: *My Lord*, said he, *here is the veryest rogue that breathes upon the face of the earth; I have been a thief from a child; when I was but a little one, I gave myself to rob orchards, and to do other such like wicked things, and I have continued a thief ever since. My Lord, there has not been a robbery committed this many years, within so many miles of this place, but I have either been at it or privy to it.* The judge thought the fellow was mad; but, after some conference with some of the justices, they agreed to indict him, and so they did, of several felonious actions; to all of which he heartily confessed guilty, and so was hanged with his wife at the same time.” And yet, in this case, the guilt, if not imaginary in fact, was so in law, so far as concerned all the purposes of the trial.(q)

§ 1115. A case occurred at Ratisbon, in 1849,(r) of which the following is a brief abstract: A girl 20 years of age was arrested on the supposition that she had committed infanticide. Being brought before the examining magistrate, a few days after the alleged commission of the crime, she made the following statement: “I was a domestic in the house of the

(p) Matth. Probat., ch. 1, n. 4, p. 9.

(p¹) See vol. i., § 200 b, §§ 782-799.

(q) See for other cases, Wh. C. L. § 683.

(r) Henke's Zeitschrift, E. H. 41.

brewer L., but was dismissed from his service on account of being far gone in pregnancy, and near my confinement. After returning to my home in the country, I came back to the town to get my clothes. But on the way, as I came near the bridge, I felt severe pains, and soon became sure that labor had commenced. My situation was distressing; I was entirely alone and helpless. Meanwhile it became dark, the pains became more and more severe, and about midnight I was delivered of a boy. The child was living when it came into the world, for it cried, and when I put my finger in its mouth it sucked; in truth, at first, I had great joy over the child; soon, however, I could not bear to look at it; the fear of shame and exposure, and the thought that perhaps I would never be able again to obtain a situation, got the better of me; I ran without further hesitation to the bridge, with the child in my arms, and threw it over into the deepest part of the river, where it soon disappeared." She afterwards gave still more minute details, relative to her pregnancy and the birth of the child, all of which were perfectly consistent and natural. Upon the physical examination (which is directed by the Bavarian penal code), it was discovered that she had not been pregnant. She was taken to the hospital and leeches freely applied to her head, under which treatment she soon recovered her reason and her usual bodily health. Very probably the delusion might have become a fixed one, had this rational treatment not been adopted at the proper time.(s)

(s) See ante, § 18, post, § 1214. I am indebted to Mr. Wm. B. Reed for the following note: In the case of Margaret Shreves, tried for infanticide in the Oyer and Terminer of Philadelphia, in October, 1855, there was a striking illustration of the rule as to the *corpus delicti*, and of the necessity of accurate observation on the part of the coroner on the inspection of doubtful remains. The daughter of the prisoner was delivered of a female illegitimate child on 7th June, at 10 A. M. The infant was handed to the grandmother (the prisoner) on its birth. It was neither washed nor dressed. At 6 P. M., the prisoner was seen in the street at some distance from her home with the infant, still undressed, wrapped in a shawl. It was raining heavily. The child was blue, and moaned, making a noise as if in a spasm. The prisoner said laudanum had been given, which was proved to be false. At a late hour the prisoner was again seen with the child alive but moaning. She tried to leave it at the Foster Home, but was refused. The child was never again seen alive. Two weeks afterwards, the conduct of the prisoner being in the

§ 1116. An equally singular case in this country is that of two brothers, named Boorn, who, on being charged with the murder of another, were convicted and sentenced to death, chiefly on their admissions, but were fortunately relieved from execution by the reappearance of their alleged victim. To the same effect is a case in Illinois, in 1841, where three brothers, named Traylor, were arrested on the charge of murdering a man named Fisher, who, when last seen, had been in their company. Strong circumstantial evidence was produced, showing the traces of a death struggle, where the homicide was alleged to have been committed; and the case was fortified by expressions alleged to have been subsequently used by one of the brothers as to his having become legatee of the deceased's property. The examination had scarcely finished before one of the three defendants made a confession, detailing circumstantially the whole transaction, showing the previous combination, and ending with a direct statement, under oath, of the homicide. To the amazement of the whole country, however, the deceased made his appearance in just time enough to intercept a conviction; the only way of accounting for the confession which had been produced was, that the party who made it, in the desperation of impending conviction, took this method of cutting short suspense.(t)

mean time very mysterious, and she being detected in many falsehoods, on the 14th, the body of a female new-born infant was found in the prisoner's privy, very much decomposed. The identity of the remains was in question. The attending physician testified he had at the delivery tied the cord with common sewing thread. The string around the cord of the infant found in the privy *was said* to resemble thick twine rather than thread, but there was difference of opinion about it. It may have swelled and altered by the action of liquid. The production of the string would have determined this, *but this the coroner failed to preserve*. The court (Thompson, P. J.) held it necessary to establish—1. The identity of the remains beyond doubt. 2. That the infant had not died accidentally, possibly by neglect, and was not merely concealed in the privy. The jury properly acquitted the prisoner. Here no element of proof as to the corpus delicti was clear.

(t) See vol. i. § 793, for an interesting letter of Mr. Lincoln on this case.

In the Philadelphia Evening Bulletin for July 4, 1860, appeared the following communication:—

MESSRS. EDITORS: An article in your issue of the second inst., from the Cleveland Plaindealer, entitled, "False Personation at a Critical Moment,"

§ 1117. To the general rule, however, two qualifications may be recognized. In the first place, when the decease is proved

attracted my attention. It purports to be a confession of a notorious counterfeiter, by the name of Boorn, that he killed a man by the name of Cobley, forty years ago, in Vermont, and escaped by producing a man from New Jersey so much resembling Cobley as to induce the belief that he was the very man, and so cleared him from the gallows, and let him and his brother go free.

Perhaps I can cast some light upon this most singular transaction. More than forty years since, a deranged man came to my father's house, near Tuckerton, New Jersey, hungry, ragged, and dirty. He was cared for during the night. He said that he had been murdered in Vermont, and never would return there again. It was winter, and extremely cold. He walked across the bay on the ice, and lounged about the neighborhood for weeks; said his name was Russell Colvin, and his people lived in Vermont. He travelled up shore a few miles above Toms River, to the house of a Mr. Polhamus. The family so pitied him as to give him a home with them during the balance of his life. I have been there several times, and always have seen him attending to pigs and poultry about the farm. A number of years after he came there—say some fifteen years or less, I can't recollect—two men were tried, I think it was in Burlington, Vermont, for the murder of this same man. One was found guilty of murder in the first degree, and sentenced to be hanged; the other was sentenced to imprisonment for life.

A lawyer, connected with the trial, deemed the case a most singular one, and inserted a notice in the paper inquiring if any one knew the said Russell Colvin, giving withal a description of the man. This caught the eye of a brother of Mr. Polhamus, at whose house the man Colvin was living. He forthwith wrote to said lawyer, detailing the above facts. Polhamus and the lawyer were soon on the way to New Jersey to see the murdered man. They found him there, and Colvin knew the lawyer, and called him by name at first sight. After some persuasion, his reluctance to go to Vermont was overcome, and all three started north. When they arrived in Burlington, the court-house was soon filled with an excited community, all anxious to see the dead man. Officers were soon collected, the prisoners were brought in, and they, as well as the community, recognized Colvin at once. The prisoners were discharged of course. Colvin's wife and two sons came to see him, and used every endeavor to induce him to go home and remain with them. All entreaty proved useless and vain; return to New Jersey he would and did, and lived many years after at the house of Mr. Polhamus.

A pamphlet was published of the trial and all the facts therein stated, which I was reading one evening at the house of Mr. Polhamus, and in the presence of Mr. Colvin. He muttered all the time I was reading, until I had to lay it aside, as he was getting angry at the sight of it. Mrs. Polhamus said the sight of the book always enraged him.

* * * * *
A Newspaper Account of the Affair.—Mr. Barna Boorn, and his aged partner, were respectable inhabitants of Manchester, in the State of Ver-

by eye-witnesses, inspection of the body is unnecessary. Thus, in a case in England, the prisoner, a seaman on board of the

mont. They were the parents of a son and two daughters, besides the unhappy Stephen and Jesse, who figure in the story we are about to narrate.

Sally, one of the daughters, became the mother of several children, all of whom were dispersed among their relatives, owing to the mental derangement of their father, which rendered him incapable of attending to his family concerns, and of providing for them a necessary support.

Mr. Colvin was in the habit of frequently absenting himself, without giving any previous information, and rambling in various parts of the country. At one time he was absent as long as nine or ten months, after which he was found in the State of Rhode Island.

About eleven years after his marriage to Miss Boorn, he was again missing; which at the time caused little or no alarm, as it was expected that he would return as on former occasions. But after a lapse of several years, nothing having been heard of him, surmises were circulated that he had been murdered; and suspicion rested upon his brothers-in-law, Stephen and Jesse Boorn, as his murderers. This suspicion was created by a reference to the frequent altercations that had taken place between Colvin and the Boorns previous to the disappearance of the former, and to some unguarded expression of the latter afterwards intimating that Colvin was dead, and by their occasionally showing some signs of compunction.

A Mr. Boorn, uncle to Stephen and Jesse, a gentleman of respectability and unimpeachable character, dreamed that Russell Colvin came to his bedside and told him that he had been murdered, and he must follow him and he would lead him to the spot where he was buried. This was repeated three times. The deposit was a place talked of previous to the dream, which was where a house had formerly stood, and under it was a hole about four feet square, which was made for the purpose of burying potatoes, and then filled up. This pit was opened, and nothing discovered but a large knife, a penknife, and a button. Mrs Colvin, anterior to their being presented to her, described them accurately, and, on seeing them, said they belonged to her husband, excepting the small knife.

A lad walking from Mr. Barna Boorn's, a small distance, with his dog, a hollow stump standing near the path engaged the notice of the spaniel, which ran to the place and back again several times, lifting up his feet on the boy, with whining notes, as though to draw the attention of his little master to the place, which had the effect. A cluster of bones were drawn from the roots of the stump by the dog's paws. Further examination was made, and in the cavity of the stump were found two toe-nails, to appearance belonging to a human foot; others were discovered in a crumbled state, which to appearance had passed through the fire. It was now concluded by many that some fragments of the body of Russell Colvin were found. The cluster of bones was brought before the Court of Inquiry. They were examined by a number of physicians, who thought them to be human; one of the profession,

ship Eolus, was charged with the murder of his captain. The first count of the indictment alleged the murder to

however, thought otherwise. A Mr. Salisbury, about forty years previous, had his leg amputated, which was buried at the distance of four or five miles. The limb was dug up, and, by comparing, it was universally determined that the bones were not human. However, it was clear that the nails were human, and so appeared to all beholders. The bones were in a degree pulverized, but some pieces were in a tolerable state of preservation. Suspicions were excited that the body was burnt, and some part not consumed cast into the stump, and other bones put among them for deception. Some time after the departure of Colvin, a barn belonging to Mr. Barna Boorn was consumed by fire, accidentally; it was conjectured that the body was taken up and concealed under the barn, and mostly consumed. About that time a log heap was burnt by the Boorns, near the place where the body was supposed to be deposited; it was thought by some that it was consumed there.

The subject occupied the attention of almost every mind in the neighborhood.

Previous to the general excitement, Stephen Boorn, with his family, moved to Denmark, County of Lewis, in the State of New York, about two hundred miles from the place of his nativity, where they were comfortably settled; while Jesse remained in Manchester, where he was arrested and frequently brought before a Court of Inquiry. He at first boldly asserted his innocence; but after several days' confinement, and after every art made use of to induce him to criminate himself and his brother, and being told that a confession would probably be the means of obtaining his liberty, as strange and unaccountable as it may appear, he did confess that his brother Stephen had told him that he (Stephen) had given Colvin a blow, and laid him aside where no one could find him. Upon this, the authority issued a warrant to apprehend Stephen. Capt. Truman Hill, grand juryman for the town of Manchester, Squire Raymond, and Mr. R. Anderson, set out for Denmark, and arrived there in three days. They called on Mr. Eleazer Sylvester, inn-keeper, who, in the night, together with a Mr. Orange Clark and Mr. Hooper, belonging to the town, accompanied them to the house of the supposed criminal. Mr. Clark went in first, and began some conversation about temporal concerns; the others surrounded the house, and he was easily taken. The surprise and distress of Mrs. Boorn on this occasion are not easily described; they excited the compassion of those who had come to take away her husband, and they made her some presents. The prisoner was put in irons and brought to Manchester. He peremptorily asserted his innocence, and declared that he knew nothing about the murder of his brother-in-law. The prisoners were kept apart for a time, and assigned to separate cells. Nothing material transpired, and they were afterwards confined in one room.

Stephen denied the evidence brought against him by Jesse, and treated him with severity. Both the prisoners were repeatedly admonished to pay the strictest regard to truth. Many days were taken up in public examinations of the reputed criminals. Circumstantial evidence was brought forward,

have been committed by a blow from a large piece of wood, and the second by throwing the deceased into the sea. It ap-

which was much against them, and they were bound over to await their trial at the sitting of the Supreme Court, to be held at Manchester on the third Tuesday of September, 1819.

Jesse Boorn, after an interview with his brother, denied that Stephen ever told him that he killed Colvin, and that what he reported about him was false. For some time they both continued to assert their innocence; but being told that they would undoubtedly be convicted upon the testimony already against them, and hopes of pardon being held out if they would confess the crime, at last Stephen wrote a statement of what he said were facts, in which he acknowledged he killed Colvin, deposited him in the place where the knife and button were found; that he took the bones from that place and put them under his father's barn, which was soon after burned, and the body principally consumed.

A person in jail with them for perjury testified to a full confession of the murder, made to him by Stephen and Jesse, and it was so artfully framed, so corroborated by other facts, that it had great weight with the court and jury, though it was wholly false. But he had his ends answered—he got bail by this means, and went off.

During the interval, the prisoners were frequently visited by the Rev. Mr. Haynes, in his official capacity, but they did not discover any symptoms of compunction, persisting in declaring their innocence, with appeals to Heaven. Stephen particularly, at times, appeared absorbed in passion and impatience. One day Mr. Haynes introduced the example of Christ under suffering as a pattern worthy of imitation. He exclaimed, "I am as innocent as Jesus Christ!" for which extravagant expression he was reproved. He replied, "I don't mean that I am as guiltless as he was; I know I am a great sinner; but I am as innocent of killing Colvin as he was." The court sat in September, and a judicious and impressive charge was given to the grand jury by his honor Judge Doolittle, and a bill of indictment was presented against Stephen and Jesse Boorn; but, as it was not a full court, the trial could not commence.

The court was accordingly adjourned to the 26th of October, 1819. It was with much difficulty that a jury was obtained.

The court ruled that Stephen and Jesse Boorn should be jointly tried for the murder of Russell Colvin.

About fifty witnesses were successively examined, but they were only corroborative of each other, all tending to prove the leading facts, and too voluminous for this brief sketch.

The jury retired, and within about one hour returned, and, in compliance with a request of Mr. Skinner, they were severally inquired of whether they had agreed upon a verdict, and each agreed that they had found both of the prisoners guilty of the murder charged against them. The verdict was then publicly read by the clerk. After a short recess his honor Judge Chase pronounced the sentence, that the prisoners be remanded back to prison,

peared in evidence that, while the ship was lying off the coast of Africa, where there were several other vessels near, the prisoner was seen one night to take the captain up in his arms

and that, on the 28th day of January, between the hours of 10 and 2 o'clock, they should be hung by the neck until they were dead!

Mr. Taber Chadwick, of Shrewsbury, Monmouth County, N. J., brother-in-law of Mr. William Polhamus, of Dover, in the same State, where Colvin had lived ever since April, 1813, seeing the account of the trial of the Boorns, at Manchester, wrote that Colvin was still alive, and with his brother-in-law, Polhamus, in Dover, about forty miles from Shrewsbury. When the letter came to town, every one was struck with consternation. A few partly believed, but the main doubted.

"It cannot be that Colvin is alive," was the general cry. Mr. Chadwick's letter was carried to the prison and read to Stephen; the news was so overwhelming, that, to use his own language, "nature could scarcely sustain the shock;" but, as there was some doubt as to the truth of this report, it tended to prevent an immediate dissolution. He observed that he "believed, had Colvin then made his appearance, it would have caused immediate death; even now a faintness was created that was painful to endure." Soon a letter was received from New York, stating that the man who was supposed to be murdered was probably still alive.

Mr. Whelply, formerly of Manchester, and who was intimately acquainted with Colvin, had actually gone to New Jersey in quest of him. Thus there was increasing evidence in confirmation of the letter. As soon as Mr. Whelply had returned to New York, he immediately wrote that he "had Colvin with him." A New York paper announced his arrival also, and that he would soon set out for Vermont. Notwithstanding all this, many gave no credit to the report, but considered it a mere deception. Large bets were made. Colvin was unwilling to return to Vermont with Mr. Whelply, who was obliged to have recourse to stratagem. A young woman of Colvin's acquaintance agreed to accompany him, pretending that she only designed a visit to New York. While there she was missing, which excited some uneasiness in the mind of the exile.

While staying a few days at New York, to prevent his returning, Mr. Whelply told him there were British men-of-war lying in the harbor, and unless he kept within doors he would be kidnapped. This had the desired effect. Colvin, when he set out for Manchester, concluded that he was on his way home to New Jersey, and never perceived the deception until he came to Bennington, where he arrived on the 22d of December, and saw many people with whom he had formerly been acquainted, which filled him with surprise.

The county court being then in session, all were filled with astonishment and surprise. The court suspended business for some hours, to gaze upon one who, in a sense, had been dead and was alive again.

Stephen related the facts amid great excitement and rejoicing, and Jesse was soon at liberty. See this case referred to vol. i. § 793.

and throw him into the sea, after which he was never seen or heard of; but near the place on the deck where the captain was seen, was found a billet of wood, and the deck and part of the prisoner's dress were stained with blood. On this, it was objected to by the prisoner's counsel that the *corpus delicti* was not proved, as the captain might have been taken up by some of the neighboring vessels; but the court, although they admitted the general rule of law, left it to the jury to say, upon the evidence, whether the deceased was not killed before the body was cast into the sea, and, the jury being of that opinion, the prisoner was convicted and executed.

§ 1118. So also when it is shown that the body was destroyed by any chemical or mechanical agents, it is, of course, unnecessary that the existence of the remains should be proved.^(u) Mr. Bentham very naturally asked whether Lord Hale's rule would not have necessarily to be relaxed whenever a part of the guilty plot was the decomposition of the body in lime, or in any of the other known chemical menstrua, or of its being submerged in an unfathomable part of the sea. And the trial of Dr. Webster furnishes an apposite answer to this inquiry. Some portions of the deceased's body, it is true, were in this case recovered, and these enough to secure its identification, but had this not been the case, and had there been adequate positive evidence of the fact of guilt *elsewhere*, it is not likely that the result would have been different. That an entire destruction of the body is practicable was lately illustrated by a case but too familiar to the professional mind in this country. A gentleman of much respectability was accidentally caught under the rafters of a burning building, and when, a few hours after, his remains were sought for, nothing could be found that afforded the slightest index of identity. And still more complete would be the obliteration of this species of evidence by the method suggested by Mr. Bentham, of submerging in an unfathomable part of the sea. Murders on shipboard must generally be of this class, and yet the books abound with cases where this species of homicide has been punished. And the testimony taken in the Webster case, which is elsewhere

(u) See fully Wh. Cr. L. § 754.

reported in full, shows that by means of chemical *menstrua* there could be an entire immunity secured to guilt if the production of the remains be insisted on. Thus Dr. Jackson said "that the flesh of a human body, if cut up into small pieces and boiled in potash, might be dissolved in two or three hours. Next to this the best substance to use in dissolving or disposing of a human body would, I think, be nitric acid, and the difficulty or danger attendant upon its use, so far as the evolution of noxious vapor is concerned, would depend upon the degree of heat applied." Since, therefore, the destruction of the body is practicable, and since, if the production of the body be necessary to conviction, the worst species of homicide would go unpunished, it is obvious that the continued existence of the body cannot be considered, as is popularly supposed, essential to the judicial establishment of guilt. And, in fact, an examination even of Lord Hale's dictum, which is most relied on for the contrary opinion, shows that the "finding of the body dead" is only given as an alternative to "proving" that the fact was done. But when the *fact of death* is not positively and indisputably shown, there should be the severest scrutiny applied and the most conclusive evidence afforded, in order to make a conviction justifiable.(v)

In a case in North Carolina, in 1861, the defendant was indicted for the murder of one Peggy Hilton. There was evidence tending to show that the defendant had criminal intercourse with Peggy for a year or two. The deceased left her home on the night of the 1st of December, 1859, about ten o'clock, and took with her one calico frock, two petticoats, and a piece of cloth, all of which were wrapped in her apron. She had not since been seen. Several days after her disappearance, the neighbors commenced to search for her. On the 11th of the same month they examined about a creek which flowed through the prisoner's land. About six hundred yards from defendant's house, on a private place near the creek, they discovered where a "log heap" had been burned. The fire was not out, but a few of the logs, or parts of the logs, were still

(v) For a full report of the Webster case in this relation, see the forthcoming (1874) edition of Wharton on Homicide.

burning. A search^{*} was made among the ashes, and a good many fragments of bones were found. Some of these were shown to the prisoner, but he denied knowing anything about them. Most of these bones were found in the centre of the log heap. They also found a substance in the ashes that was like tallow. On the 23d of January, 1860, the coroner of the county, with many persons, went to the creek, with the purpose of making a further search and holding an inquest. The creek was dragged and they found *bones*, three hair pins, three common pins, one button, one eye of a hook-and-eye, and a grain of wheat, also a black substance and fire coals, similar to those found in the place of the burnt log pile. Four physicians and one dentist were examined, who stated that among the bones they recognized part of a human skull and part of the cheek bone of a human being. The dentist deposed to the identity of human teeth among the bones exhibited in court. It was in evidence that Peggy Hilton was in the habit of wearing hair pins; also, that the Monday before she was missing (which was on Thursday) she got from the witness fourteen common pins, seven of which were large, and the others small ones. The court was requested to instruct the jury that there was no evidence in the case identifying the bones and pins found, as being part of the bones and apparel of the deceased. The court refused, but told the jury that there was evidence that the bones and pins found were a part of the body and dress of the deceased. Defendant's counsel excepted. On this and other exceptions the case came up to the Supreme Court. On this point of proof of the *corpus delicti*, Judge Battle considers the authorities at some length, and concludes that there was no error in this part nor in any part of the charge.^(w)

II. THAT THE DEATH WAS FROM VIOLENCE.

1st. POISONING.

§ 1119. (a) *Measures to be taken by the prosecution when poisoning is suspected.*—There should be a careful observation of the condition of the corpse, and of the peculiar indications upon

(w) State v. Williams, 7 Jones, N. Carolina 446.

it. Here it is that the services of an experienced and capable physician are needed.^(x)

Everything in which the poison could have been brought to the deceased, or in which it could have been retained, must be examined. All parts of the dwelling should be searched, in reference to glasses, boxes, or papers, in which poison, or the refuse of poison, may have been placed. This search should include utensils in which medicines taken by the deceased were placed.

No examination should be attempted except after notice to the opposing interest, and opportunity given to such interest to be present. Examinations held without such notice are *ex parte*, and, except in strong and peculiar cases, their results should be excluded by the courts.^(y)

The evacuations of the deceased, whether through vomiting or the stool, and particularly his urine, should be carefully preserved and tested. Arsenic, as has already been shown, frequently passes into the urine, and its presence there is a proof that the poison has entered into the system. So, also, towels or linen on which these evacuations may have dried, should be examined.

Those parts of the body through which the poison may have passed, *e. g.*, the mouth or sexual organs, and those on which it may have acted directly or by resorption, *e. g.*, the stomach or liver, should be the object of examination. Particular poisons should be looked for in the organs which they may peculiarly touch, *e. g.*, the bones, into which quicksilver and arsenic pass.

§ 1120. In view of the expected medical and chemical examination, it is necessary to carefully separate and preserve all parts of the body in which poison may be traced, so that, when the chemical analysis takes place, the parts may be kept free from foreign admixtures. The stomach, liver, and spleen should be separated and kept in distinct vessels. Should this

(x) See ante, §§ 326, 327, 337-40, 682-3; and for a case of alleged poisoning by arsenical injection, *People v. McCraney*, 6 Parker, C. R. 49.

(y) See vol. i. § 296, and notes thereto; and also *Wh. Cr. Law*, §§ 45, 865, 1462.

precaution not be observed, poison, which may have merely touched the mouth, may be imbibed after death by other members, *e. g.*, the liver or spleen, so as to produce the belief that the whole system was pervaded by the poison, and from this, that a very large quantity had been administered.

The vessels in which these parts of the body are placed, preparatory to examination, should be carefully cleansed, and should be closed and sealed, so as to prevent the interference of third parties. The orifices should be carefully closed so as to prevent evaporation, or the disturbance consequent on the intrusion of air.

It is important that the parts retained for examination should be as large as practicable. If only small fragments are kept, the materials for a broad analysis are narrowed, and the opportunity for a second or third examination prevented.^(z)

§ 1121. In respect to the examination several cautions should be kept in mind.

It is desirable, in the choice of experts, by whom the examination is to be made, to avoid mere neophytes, and to confine the selection to those who have kept up with the advance of science, who have the proper instruments and materials at their command (*e. g.*, utensils and pure tests which can act as reagents), and who possess competent experience and skill. It is peculiarly important that the chemical examination should be committed to one who has made that department a specialty.

Much embarrassment has arisen from confusing the provinces of the physician and the chemist. According to Barse,^(a) the cases have been frequent where there is an apparent conflict of testimony produced by the fact that the chemist, when examined on the trial, speaks from one stand-point, and the physician from another. The first is to be asked—

- (1) Whether the substance given to him to analyze contains an agent which belongs to the class of poisons:
- (2) What kind of poison is it:

(z) See *ante*, § 682.

(a) Manuel de la Cour d'Assises, p. 224, as quoted by Mittermaier in his *das Verbrechen der Vergiftung*, etc.

- (3) In what quantity it exists; though it is difficult and dangerous to decide in what quantity it was originally administered:
- (4) How it may have been administered, which chemical analysis may sometimes determine, as in the prosecution against the priest Maineri, where the question was whether the crime could be effected through poisoned cigars:
- (5) Whether the poison was administered purely, or in common with other agents:
- (6) Whether the substance analyzed could have come into the body through natural causes (*e. g.*, as phosphorus through food).

§ 1122. The physician's province includes more particularly the question, whether the poison in the particular case could have produced death. With this are connected the presumptions to be drawn from the discovery of substances in the body which are used sometimes for medical purposes, sometimes for poisoning.(b)

(b) Each new examination bears out the important conclusion, *that a substance whose poisonous properties are in themselves active, may, through contact with other substances, either entirely, or in great part, lose its peculiar properties.* This may happen in various ways: (1) When, in the case of certain sorts of poison, the poisonous substance becomes inactive by uniting with substances which either neutralize its strength or form with it insoluble compounds; though it is to be observed that some poisons become more intense upon uniting with other substances, those, for example, which, by being externally applied, facilitate the entrance of the poison into the body, or which increase the excitement of the tissues by which it is diffused through the system. (2) When the poison, after being administered, meets with antidotal substances. This may happen when the poisoned person, either a short time before or immediately after the administration of the poison, has taken, as is often the case in food, substances which may act upon the poison so as to render it inactive. All these principles are important, not only in the investigation of the fact of poisoning, as whether the poison was the cause of death, if it appears that the union of the poison with other substances must have rendered it inactive; but also in the settlement of the question how far criminal attempt is supposable in the case.

We subjoin a marked case which illustrates this point:—

A girl of fifteen years of age was tried before the Criminal Court of Verona, for a malicious attempt to poison her servant-woman with sulphuric acid. She mixed the poison in a glass in which some brandy was standing, which

§ 1123. The chemical examination, to be satisfactory, must go to show that the reagents employed in the detection of the

the woman was in the habit of taking before going to bed. Although the altered color of the liquid in the glass arrested the woman's attention, she nevertheless took a swallow of it, but immediately spit it out when she perceived its burning taste, as did also another woman who tried the mixture. The girl confessed her crime, at first with the declaration that she had intended to kill her servant, but afterwards that she had only wished to give her a pain in the stomach. It appeared that eighty-three grains of sulphuric acid and two hundred and forty-one grains of brandy were in the glass. According to the opinion of the experts (two chemists and two physicians), the concentrated sulphuric acid, by being mixed with the brandy, had considerably lost its strength, being in great measure converted into *acidum Halleri*, which is used as a medicine. The investigation in relation to the matter of fact hinged principally upon the inquiry how far, in the mixture of sulphuric acid with a much greater proportion of liquor, the poisonous properties of the former would be destroyed or weakened through the influence of the essential oil of the brandy. On this point there is great difference of opinion, but it is to be remarked that never before, perhaps, in the annals of medical jurisprudence, have these points been so thoroughly discussed. The effect of the time during which the poison was subjected to the action of the diluting mixture was also a point of dispute, as also the determination of the condition under which the health of the poisoned person might be injured notwithstanding that the detection of the poison was so easy, and that she must have been warned against the mixture by its offensive taste. We may notice here the importance of the *individuality* of the servant-woman, and especially whether her sense of smell was delicate; whether she was in the habit of swallowing the liquor at a draught or of drinking it with pauses; also whether she took the liquor oftener in the dark, or near a light where its changed appearance would put her on her guard. The theory was advanced that the attempt was made with absolutely unfit, not to say inadequate means, and hence should be classed under the head of criminal attempt in the second degree. The Criminal Court, however, laying aside this theory, took the matter-of-fact view of the case, and sentenced the accused to five years' severe imprisonment for attempt at murder by poison. The Court of Appeals of Venice, on the contrary, held that from the circumstances, the possibility of death should not be assumed, since, according to the testimony of the experts, it could not have followed unless the poisonous drink had been taken in greater quantity. In this view the court acquitted the accused of attempt at murder, but condemned her to two years' imprisonment, for an attempt to inflict severe bodily harm. It is to be remarked in connection with this case, how important it is in a trial for poisoning to attend to the circumstance that the original nature of the poison may become changed by the medium in which it is administered, and especially that the *time* during which it is subjected to the action of the substance used for the mixture and of the atmospheric air, may materially alter its poisonous properties.

poison were pure, and contained no elements likely to deposit the poison they were employed to discover. Sometimes the presence of the poison is produced by the reagent. It is important, also, to show that the examination was adapted to the particular kind of poison which was sought. Poisons are very various in their action, some working the most energetically when they come to the stomach, some when they touch a place where the skin is removed, some at the spot they first reach, others only upon the system generally. The local effect also greatly varies. Mineral acids so disorganize the part that its whole structure is destroyed. Metallic poisons inflame and irritate, without immediately destroying the texture. Others—*e. g.*, nicotine—without perceptible changes of structure, merely operate upon the sensitive parts of the organs with which they come in contact. These points should be kept in mind in directing the examination of a chemical witness.(c)

§ 1124. In the examination of medical witnesses, the points are more numerous. The main question is of course whether the derangement under consideration was caused by poison. This involves the consideration, (1) of the chemical examinations, (2) of the symptoms of the malady, and (3) the appearances on the corpse.

The symptoms of the malady fall within the physician's peculiar province, and have been already discussed.(d) On the second of these points, the journal or note-book of the physician may be appealed to by him to refresh his memory, though it should be remembered that a physician in large business, when he makes his notes at the close of a day in which he has made many visits, is very apt to fail in a delicate discrimination of symptoms, and is at all events, where he suspects no imposition, likely to be influenced by the talk of those surrounding the patient.

The testimony of persons attending the patient, though not in themselves experts, may be introduced as supplementary to that of the physician. It should be observed, however, that such witnesses are very easily deceived, and are apt to take strong prejudices, sometimes against the hypothesis of poison-

(c) See *ante*, § 682.

(d) See *ante*, §§ 324-7.

ing, either to avoid the disgrace falling on the family, or from false sympathy with the accused; sometimes, from passion or excitement, or the desire to shift the blame, in favor of that hypothesis.

§ 1125. Other facts should be noticed in this connection, such as complaints of the patient as to burning in the intestines, redness of the face, sweating, which symptoms should be always noticed.

According to Mittermaier, from whose essay on the Crime of Poisoning (*das Nerbrechen der Vergiftung*) we have reduced some of the above points, inquiries on the following topics should be permitted to the medical witnesses:—

(1) The condition of health of the deceased at the time when the poison was administered, involving the absence of sickness or of constitutional disease capable of producing death, down to this period.

(2) The conditions preceding the alleged poisoning, as whether the patient was in the habit of taking strong drinks, whether this occurred on the day when the disease broke out, what food he had been taking, and how far the same indications would have been produced if he had been overheated or caught cold, or had fallen into a violent passion.

(3) Those peculiar circumstances which from their rarity and general association with poisoning are supposed to have produced the latter, *e. g.*, the sudden illness after eating or drinking of a person previously in good health. It should be observed, however, that such attacks often follow meals when the food was perfectly healthy, and that on the other hand poison in many cases does not work until some time after it has been received into the frame.

(4) The medicines which the patient had taken, and particularly the antidotes, must be inquired into, since poisonous substances are often introduced through the antidotes themselves.

(5) Such circumstances as tend to show the possible agency of a natural disease, *e. g.*, cholera.

(6) There should be a jealous scrutiny of any facts tending to show that poison may have been induced by means of prior external and innocent applications. Madame Lacoste's case is

cited by Mittermaier as an illustration of the importance of this caution. In that case the appearance of arsenic was explained by the fact that the deceased had been for some time in the habit of using externally a salve, through which it is possible the poison may have been worked in.

§ 1126. (7) Appearances at the time of death, and changes in the corpse. Those who lay out the dead are often more observant and accurate, so far as extraordinary appearances are concerned, than casual observers. But it is not enough, to raise a rational presumption of poisoning, that the signs heretofore mentioned, *e. g.*, blotches, perforations, etc., should be noticed. These are the accompaniments of several natural diseases. On the other hand, these features should not be neglected, since there are many of them which tend to individuate the poison, as in the case of strychnine, where there is an extraordinary rigidity and long-continued contraction of the muscles. The absence of these signs argues the non-administration of the particular poison.(e)

The microscopic methods of discovering poison have been already discussed. It is not necessary to do more now than to call the practitioner's attention to them, as an important test.

§ 1127. (b) *Chemical proof of the existence of poison in the stomach in sufficient quantities to have caused death, though important, is not essential to conviction.* If the indictment charges poisoning, the administering of poison must be shown, either directly or inferentially. It is true that proof of the existence of poison in the body is an important item in such proof, but independently of the fact that such existence can be proved in other ways than by the absolute detection of the ingredient itself (*e. g.* by moribund appearances and peculiar pathological symptoms), the *fact* that poison was administered can be satisfactorily shown by proof of the potion being given, though there be no *post-mortem* examination at all. The case may be likened to that of a gunshot wound, received by a party on board ship, who is knocked overboard by the shock and whose body is lost. If the gun is found to have been levelled—if it is shown to have been loaded—if upon the discharge the party

(e) See *ante*, § 324.

falls—it is not necessary to show the ball in his body, or even to prove the wound. It is true that the non-production of this species of proof can only be excused by necessity: but such necessity occasionally exists in death by poisoning, as well as death from gunshot wounds. When, therefore, a chemical analysis is unattainable, the rule is, that it is not indispensable to a conviction when there is satisfactory evidence of guilt *aliunde*.(f) And this rule peculiarly applies where those charged with guilt are the agents by whom the prevention of a post-mortem was effected. Hitzig gives us a pregnant illustration of this in the case of a woman in Brussels, who, in order to cause the symptoms of the projected poison to create as little surprise as possible, gave out from time to time, beforehand, that her imbecile husband, who was the intended victim, was subject to “fits,” of very much the same nature as those which she expected the poison to produce. Her object, as it afterwards appeared, was to produce in his family, who saw him but rarely, the impression that this case, when it occurred, was merely a repetition of former attacks: and she followed this up by the attempt to prevent a *post-mortem*. Of course, such efforts as these, instead of *protecting* the criminal, expose him to a new and more formidable class of suspicions; for there is no *item* in indicatory evidence in cases of poisoning so strong as that which arises from an attempt to obliterate the indicia of guilt.

§ 1128. On the other hand, if it is in the power of the prosecution to produce before the court the opinion of experts as to the contents of the deceased’s stomach, an omission to do this is a culpable neglect, which becomes the more mischievous from the fact that it is a general rule of law, that secondary evidence is inadmissible when primary can be obtained. And even if this strict rule does not apply to cases where, instead of an examination of the stomach, which could have been had, less positive tests are offered—and the tendency of authority is, that as a technical bar it does not—yet the defendant, who has been excluded from this opportunity by the exclusive con-

(f) See as to nature and character of post-mortem, *ante*, §§ 369, 449, 479, 482, 526, 530, 548, 564, 590, 682.

trol of the law, can with great force ask the jury to infer that had this final test been referred to, it would have demonstrated his innocence.

§ 1129. "The moral evidence from the conduct of the accused," says Mr. Wills,^(g) "his antipathies and other motives—his possession of the means of death, especially if unexplained by any circumstance to account for it upon an innocent hypothesis—his declarations—his falsehoods, subterfuges, and evasions to prevent examination of the body, or to induce premature interment, and many other suspicious circumstances, constitute very material parts of the *res gestæ*, and furnish a clue to the explanation of facts which would otherwise be inexplicable. It is perfectly clear that by the law of England all such facts afford a competent and relevant evidence, from which can be inferred the criminal administration of poison."

§ 1130. (c) *Facts on which a verdict of guilty can be supported.*—Under this head we propose to touch merely the technical relations of this topic. Those bearing on medicine and surgery have been already fully discussed.

According to Mittermaier, in his monograph on the legal bearings of poisoning, two points must be established to sustain a conviction:—

*a*¹. That poison was administered to the person whose homicide is the subject of inquiry.

*b*¹. That death was the consequence of the poisoning.

Under the first of these heads it may be observed:—

*a*². The drug administered must be legally considered a poison.

*b*². It must be of such a character that after being taken it acts on the system as a poison. It should be observed that the term poison is relative, and that it is qualified by the means which the defendant used to administer it; by the part of the body within which it is introduced; by the method of administration; by the quantity administered; by the circumstances of the administration in reference to the time in which it is brought into the system; and by the mixture of the poison with other drugs.

(g) Circumstantial Evidence, 187.

§ 1131. The proof of the administration of the poison falls under the following heads:—

- a*¹. Report of the chemical examination.
- b*¹. Symptoms of the sickness.
- c*¹. Appearances at death and on the corpse.
- d*¹. Physical observations.
- e*¹. Presumptions of the particular case.

*a*¹. *Report of the chemical examination.*—Formerly, chemical proof of the existence of poison was considered essential to conviction. But this, as has just been seen, (*h*) is based on two erroneous suppositions: 1st. That in all cases of poisoning, the poison may be discovered within the deceased, or in his evacuations; and, 2d. That the results of chemical analysis exclude all doubt. It is true that, when mineral poisons, *e. g.* arsenic, are administered, they could be detected chemically. But the inadequacy of the presumption drawn from the non-discovery of poison is shown from the following points:—

*a*². Many poisons, particularly alkaloids, can only with great difficulty, and under the most favorable circumstances, be chemically detected when internally applied.

*b*². In other cases, where the poison is capable of chemical detection, the veracity of the rendering is destroyed by the rapid evacuations, *e. g.*, vomitings, that the poison induces; by the evaporation of the poison from the body after death in the shape of gas; by a protracted sickness after administering it, which produces absorption of the poison; by long delay after death, which destroys its traces; and by the eradication of counter agents.

§ 1132. *b*¹. *The symptoms of sickness.*—The disturbing influence of poison on the human frame produces certain signs, which are the peculiar accompaniments of this action. Great prudence, however, is requisite in the use of this kind of evidence, on account of the difficulty in securing certainty in the witnesses; of the fact that other sicknesses may have produced these symptoms; of the difficulty in getting at the prior health of the patient; and of the inability of the physician to form

(*h*) See *ante*, § 1127. See particularly the notes on this point in the preceding discussion of Poisons.

an opinion without a survey of *all* the facts, which in many cases is impossible.(i)

§ 1133. *c*¹. *The appearances at death and on the corpse.*—In the great majority of poisons there is a danger of deception arising from the fact that many changes in the corpse are misunderstood, while other signs, such as inflammation in the stomach, are the consequences of other diseases. The difficulty in such cases is aggravated by delay in dissection, by which the organs become putrid.

*d*¹. Among *physical* peculiarities may be mentioned a particular color of the affected parts; or a specific odor or taste; the finding in the stomach seeds of berries, which were taken as poison; the illumination of poisoned food, as in the case of phosphorus, or the smell of bitter almonds, as in the case of prussic acid.

*e*¹. The combination of facts showing *preparation* or *motive*. Thus in a preliminary inquiry we may look for the offender among those who obtained the materials appropriate for the commission of the offence, or who would be benefited by the death of the deceased.

§ 1134. The guilt of the defendant may be considered established notwithstanding—

1. That if proper means had been used death might have been averted.(j)

2. That a peculiar constitutional susceptibility increased the liability to death.(k)

3. Mismanagement on the part of medical attendants, by which the symptoms were aggravated, if, in point of fact, the poison was lethal.

On the other hand, as is correctly stated by Mittermaier, the offence will not be complete when the poison is administered in such a small quantity, or in such admixtures, as to destroy its deadly qualities, or when the death is to be traced to an entirely independent cause. In the latter case, however, the crime is consummated if it appear that the death was accelerated by the poison.(l)

(i) See *ante*, §§ 326-42.

(k) *Ibid.*

(j) Whart. C. L. § 941

(l) *Ibid.*

§ 1135. (*d*) *Duties of counsel for prosecution and defence.*—In America and England, the counsel for the prosecution is limited, in his opening, to a statement (1) of the facts showing the *corpus delicti*, and the defendants connection with it; and (2) of the law of the land bearing on the particular issue. It is not only illegal, but highly unbecoming, to refer to the defendant's character and antecedents as acting on the issue in any other way than as affording a presumption of innocence.^(m) At the same time, if the defendant sets up accident and ignorance in the use of poison as a defence, the prosecution may rebut this by showing prior attempts at poisoning by the same methods.⁽ⁿ⁾

In collecting and developing the evidence of the medical and scientific witnesses, however, the prosecuting officer's task is far more difficult. He must first take care that the witnesses so called by him should be of unquestioned skill and standing in their respective branches of study. In the preliminary hearings it is best for him to give full scope to the investigation, calling even such experts as may be suggested by the defence, so as to produce greater fairness, to form a wider base for induction, and to avoid surprise on trial. It is peculiarly important for him to familiarize himself not merely with the law in reference to the crime, but with that portion of the science of medicine with which the particular case comes in contact. Not merely does he have to address the jury on these topics, but he must so master them as to be able to direct his own witnesses, and sift those called on the opposite side.

§ 1136. The counsel for the defence, in preparing his case, will first turn his attention to collecting information as to the prior state of the deceased's health, so as to explain on natural grounds, if possible, the symptoms of the alleged poisoning. He will particularly examine the medical testimony at the preliminary hearing, seeking to contradict it when in error, and at all events, by bringing out all legitimate conflicting opinions, enable the question to be thoroughly canvassed.

On the trial, in addition to those duties in the examination and cross-examination of witnesses, which he shares with the

(*m*) Wh. C. L. § 3001-3.

(*n*) Wh. C. L. § 631-9.

prosecuting officer, it lies upon him to require that public justice, as well as justice to his client, should be furthered by satisfactory proof on the following points:—

The integrity, impartiality, experience, and skill of the experts, on whose testimony the case of the prosecution hangs.

The careful preservation of the parts or substances which were the subject of chemical or other analysis, and the adoption of due precautions to prevent an erroneous result.

The connection of the fatal disease with the poisoning.

The practicability of the method of poisoning alleged.

The connection of the defendant with the administration of the poison.

2d. WOUNDS AND BLOWS.

§ 1137. *a. Legal definition of wounds.*—The medical definition has been already given. Under the English statutes making “wounding” indictable, a breaking of the continuity of the skin is essential to the legal offence. Thus it has been decided that it is not enough “to show a separation of the cuticle only,” and hence, where a medical man said that there was a slight abrasion of the skin, from which blood would issue, but in a different manner if the whole skin were cut, the King’s Bench held that there was no wound.*(o)* So a scratch, even though death ensue through inflammation, is no wound.*(p)* Where, however, there is an internal breaking of the skin, as where the lower jaw was broken in two places, and there was an internal bleeding, this was held a wound.*(q)*

§ 1138. The mere breaking of bones, however,*(r)*, or their dislocation,*(s)* is not wounding under the statutes assigning specific penalties to “woundings.”

The wound must be effected by an instrument, and hence, biting a nose or a finger is not wounding;*(t)* and it is clear

(o) R. v. McLaughlin, 8 C. & P. 635.

(p) R. v. Beckett, 1 M. & Rob. 526; Moriarty v. Brooks, 6 C. & P. 684.

(q) R. v. Smith, 8 C. & P. 173.

(r) R. v. Wood, 1 R. & M., C. C. R. 381.

(s) Anonymous, cited Elwell on Malpractice, 316.

(t) R. v. Stevens, R. & M., C. C. R. 409; R. v. Harris, 7 C. & P. 456.

that throwing sulphuric acid on the face is not.(u) It is otherwise, however, with a blow from, or kick with, a shoe.(v)

§ 1139. It should be observed that questions of this kind cannot arise in indictments for homicide, unless it be in cases where the indictment is so inartificially drawn as to present but the single alternative of "wound." And even then it is not clear but that the term would be sufficiently comprehensive, in the way that it is ordinarily used ("giving unto the deceased one mortal wound," etc.), to cover cases of biting.(w) In other cases, where there is no breaking of the skin, the word "bruise" should be used. But even this would seem not to be now necessary. In an English case tried before Mr. Baron Alderson in 1846, the indictment charged that the defendant "with a certain instrument called a swingle, made of wood, iron, and leather, * * * did then and there give unto her the said E. W. one mortal wound of the length of one inch, and the depth of half an inch, of which said mortal wound the said E. W. then and there instantly died." The surgeon who took the post-mortem stated on his examination as follows: "I found, on examining the head, no external breach of the skin. I found a collection of blood on the back part of the head. The deceased died from extravasation of blood, which pressed on the brain. On examining and cutting the scalp, I found a collection of blood between the scalp and the cranium, just above the spot where, within the cranium, I found the pressure on the brain. I called that a contused wound, with effusion of blood; that is the same thing as a bruise. The internal part of the skin was broken. Medically we call the breaking of the skin, whether externally or internally, a wound." The defendant was convicted; the learned baron holding it was unimportant whether the injuries were external or internal, and the conviction was sustained by the fifteen judges.(x)

b. Under what circumstances wounds imply criminal agency.

§ 1140. *a*¹. *Character of the wounds themselves.*—*a*². *Adaptation to a particular instrument.*—In Cunningham's case, the effort

(u) *R. v. Murrow*, R. & M., C. R. 456; *Henshell's case*, 2 Lewin C. C. 135.

(v) *R. v. Briggs*, M. C. C. 318.

(w) See Wh. Prec. 114.

(x) *R. v. Warman*, 2 C. & R. 195; see Wh. Cr. L. § 1869.

was to show the similarity of a bruise on the deceased's person with a blunt instrument in the defendant's possession; in Webster's (though erroneously, as it turned out), to connect the mortal blow with a sledge-hammer; in Boynton's, to establish a connection between the orifice of the wound and the bore of the defendant's pistol. So convictions have been had from the peculiar jagged character of the wound indicating a saw, from the delicacy of a puncture indicating a needle, from the heaviness and breadth of a bruise, the flat side of a spade. When the weapon is found bloody or covered with hair, this strengthens the chain.

The character of the wound may indicate that the charge was by gunpowder alone, fired at a very short distance,^(y) or by very small shot,^(z) or by rifle shot.^(a) So also the *distance* of the murderer may be thus inferred.^(b)

(y) See *ante*, § 714. (z) See *ante*, § 707-10. (a) See *ante*, § 709-10-13.

(b) *Ibid.* Among the many questions which arise under this head are:—

1. Could the injury have been really produced by the weapon which is supposed to have been used?

The following facts will be of service in answering this question:—

a. Blunt instruments produce their effect partly by pressure, and occasion crushing, tearing, and breaking of the parts struck, according to the greater or less force of the blow and of the resistance offered. A smooth and blunt instrument may be recognized by the sugillation and swelling which will follow upon the blow. Cornered, rough, blunt instruments produce, besides the crushing, holes, and often torn and cracked places. Blunt instruments with smooth broad sides often produce deep-seated internal injuries of which no trace is seen upon the surface of the body.

Wounds caused by these instruments have, generally, broken, irregular edges, bleed comparatively little, and fester in healing.

b. Sharp instruments. Where the wound was produced by stabbing, its size and depth must be compared with that of the instrument. Where the wound is by a blow or cut, its edges will often show mutilations answering to gaps or defects in the instrument. A round and conical instrument produces wounds similar to those which a table-knife would occasion. The form of the instrument may often be recognized from the shape of the wound.

c. Shooting instruments. If the weapon be heavily loaded with powder, which is confined with a paper-wad, and be fired at the distance of one or two inches from the body, it will bore a hole similar to that produced by a ball, and leave no traces of paper in the opening. If the weapon be heavily loaded with small shot and fired at a distance of from one to twelve inches, it will produce one single wound at the surface, while the shot will afterwards separate and take different directions within the body. At a distance of one

The general presumptions to be drawn from the instrument of death will be hereafter noticed.(c)

and a half foot there will be separate wounds on the surface. At a distance of three feet the shot will all enter separately, but may be included within a diameter of three or four inches. This diameter increases in proportion to the distance, so that at fifteen steps the load will scatter over the whole back. If a weapon loaded merely with powder be fired at a distance of five or six inches from the body, the paper-wad, together with grains of powder, may form a wound very similar to that produced by small shot when fired in close contact with the body. If the weapon is fired at a less distance, but owing to the small charge the contents do not penetrate the skin, the surface from one and a half to two inches in circumference will be uniformly burned, while small black specks, produced by single grains of powder, will be found at further intervals. Where the weapon is fired at a distance of four feet, this burned place will not be seen, and the grains of powder will scatter over a surface of six inches in diameter. Balls often pursue a very inexplicable course in the body. When the ball is found and its shape has not been injured, it should be compared with the weapon used ; if the shape has been destroyed, its weight may be compared with that of a similar ball which has not been injured.

The wound made by the egress of a ball from the body is either similar to that made at the entrance, or smaller. In the majority of cases no contents of the body will be forced out at this opening, but the skin will be torn and exhibit a wound of different shapes, sometimes like a split, sometimes three cornered, etc.

Pure shot-wounds.—These resemble a wound made by a round cutting instrument, and are alike at the ingress and egress of the ball. Such wounds will only be found where the weapon has been fired at a distance of from ten to sixty or eighty steps from the body. Nearer than this shreds of paper and grains of powder will accompany the shot. But not all shots made within this distance produce such wounds ; there may be some defect in the weapon, or some peculiar condition of the tissues through which the ball must penetrate, or its force may be diminished by striking against a bone, and so the wound resemble ordinary shot-wounds.

If the ball splinters a bone and carries pieces out with it, or if it enters the body obliquely, the wound made by its egress may, in such cases, be absolutely larger than that made by its entrance into the body.

For how long a time are the marks given above for distinguishing between the wound made by the entrance and that made by the egress of the ball visible ? The edges of the skin, standing out in the one case, and pressing in in the other, lose this peculiarity after a few hours. In other respects the condition of the wound remains unchanged until festering begins to take place.

The scar left in healing often indicates the direction of the ball as surely as the fresh wound. The scar formed at the place where the ball entered is

(c) *Post*, § 1169.

§ 1141. The physician, as Dr. Casper reminds us,^(d) is often called to answer the question whether the injuries found upon the body could have been inflicted with some specified instrument. This is generally easy to answer, as, for instance, where

circular and concave; the skin is drawn in creases from the circumference to the centre; and the scar is white and hard. The scar which forms over the wound made by the egress of the body is, generally, smaller, and of irregular shapes, and often scarcely visible, while the other scar remains distinctly marked.

Contusion, with ecchymosis and extravasation about the wound, are indications of a nearly spent ball. The less the force of the ball the greater injuries of this sort will it produce. The following is an average of the distances within which the several varieties of shot-wounds may be found:—

- (1) Pure shot-wounds at a distance of from ten to eighty steps.
- (2) Ordinary shot-wounds at a distance of from fifty to five hundred steps.
- (3) Contusion and extravasation at a distance of from fifty to five hundred steps and more.

The hole made by the ball answers to its circumference.

In pure shot-wounds this hole is just the size of the ball.

In ordinary shot-wounds the diameter of the hole is never greater, and seldom any less than the circumference of the projectile. In case the outer skin is torn away, the wound at the entrance and egress of the ball may be somewhat larger than the ball would seem to require.

Where the ball strikes obliquely, the opening made is not round, but oval, and gives no data for determining the size of the ball.

2. Can any conclusion be drawn from the extent and position of the wound as to the bodily strength of the person who inflicted it?

The instrument used as well as the injury must be looked to in answering this question. It requires, generally, only sufficient strength to wield a heavy blunt instrument in order to produce with it serious injuries, while greater strength is necessary to effect the same with lighter instruments. Sharp instruments require less strength in proportion to the keenness of their edge.

3. The question whether any conclusion can be drawn from the position and extent of the wound as to the manner in which it was inflicted, can only be answered in special cases.

The easiest way of testing whether a given instrument produced the injury is to place it in the wound, but this is commonly to be avoided as apt to change the original appearance and size of the wound.

The question whether a given instrument is a dangerous one or not belongs not to the province of the physician, and depends altogether upon circumstances.

See Böcker's *Med. Jur.*, 1857, from which the above is translated and reduced, and see fully *ante*, § 707 *et seq.*

(d) *Gericht. Med.*, ed. 1857, § 40 *et seq.*

the skull is broken, it might have been done with almost any heavy weapon. The further question, whether the injury was probably inflicted with the specific instrument, cannot, commonly, be so positively answered. The most that can be said ordinarily is, that the wound might have been inflicted with the instrument in question, and that either it or some similar one was probably employed. A more positive answer in the negative can generally be given, as the cases where the wound could not have been caused by the specified instrument admit of little doubt. Much often depends upon this answer in questions of guilt and innocence.

A more difficult question is, whether any conclusion can be drawn from the position and extent of the injury as to the manner in which it was inflicted—whether the victim was lying, standing, etc., and as to the bodily strength employed in producing it. A close inspection of the position of the wounds, their depth, breadth, number, and correspondence with the specified instrument, will often furnish strong evidence against the evasive statements of the accused.

§ 1142. *b*². *Shape and direction*.—Whether the wound was skilfully inflicted, or done roughly and brutally, may indicate, (1) the skill, and (2) the temper of the supposed assassin. A rough and ignorant assassin will multiply wounds, so as to make sure of his victim; a man acquainted with surgery will economize them, and direct them to the most fatal part. Whether the defendant acted coolly, from the mere determination to take life, or passionately, from the purpose to inflict injury, and to satisfy revenge and hatred, may be thus gathered. In this way premeditation, and a specific intent to take life, may be inferred, and a test given by which the juries may distinguish between the several degrees of murder.*(d*¹*)*

So, too, by the shape and direction of wounds, the presumption of suicidé may be made or refuted.*(d*²*)* The direction of the wound may show, (1) whether a shot was fired from within or without a house; (2) what was the position and distance of the assailant; and (3) sometimes, what was the force used.*(e)*

*(d*¹*)* See *ante*, §§ 703–4, *post*, § 1178.

*(d*²*)* See *ante*, § 717.

(e) See *ante*, §§ 717–32.

Thus, where a farmer was found dead on the high-road, with his throat cut, "the wound was found to have been made, not, as is usual in suicides, by carrying the cutting instrument from before backwards, but as the throats of sheep are cut when slaughtered by a butcher. The knife had been passed in deeply under and behind the ear, and had been brought out by a semicircular sweep in front; all the great vessels of the neck, with the œsophagus and trachea, having been divided *from behind forwards*." The prisoner, who was proved to have been a butcher, was subsequently tried and executed for the crime.(f) Similar questions, arising from a hemorrhage from the pudenda, have been already noticed.(g)

§ 1143. *Was the injury found upon a dead body the real cause of death, or of the changes which the body had undergone?*—In answering these questions we must look to the reactions which have taken place.(h) Where the following evidences of reaction are manifest, it may be concluded with great probability that the injury was inflicted during life:—

a. Inflammation and its attendants, festering, traces of healing, recent granulation and scars.

b. A filling of the small bloodvessels around the wound with blood, so as to produce red stripes about the edges of the wound. This appearance, however, may also be observed in cases where the injury was produced after death.

c. Changes of color, red, brown, blue, greenish, yellow, produced by extravasation. These will not be observed until some time after the injury has been inflicted.

d. Exudation of curdled blood from broken bloodvessels. That the blood is curdled is no evidence that it must have exuded after death.

e. Vesications from burning, the appearance of a red inflamed ring around the burnt place. Blisters, although they may expose, when laid open, a red skin, yet indicate nothing as to whether the burning occurred before or after death, since the same appearances may be produced by intense heat in this case as are observed upon a living body. Scalding never pro-

(f) Taylor's Med. Jur. 191.

(h) See *ante*, § 691.

(g) See *ante*, § 705.

duces vesication upon a dead body, but causes the epidermis to fall off in shreds. Flame applied to the skull-bone of a dead body will causé it to crack open, and the lamellæ to fall off in layers.

f. A cracking open of the edges of the swollen wound. The wound made by a shot when it enters a living body is at the surface swollen, blackened, and cracked open around the edges; the passage made by the ball is narrow, and filled with clotted blood, while infiltration of blood will be observed in the surrounding parts. In the case of dead bodies the ball draws the skin into a funnel shape.

It is possible that all the above marks may be wanting, and yet the injury have been inflicted during life, especially in cases where death follows immediately upon the injury; but such cases are only exceptional.

Whether the changes which the body has undergone are to be ascribed to the injuries inflicted upon it, or to some previous cause, as disease, can only be decided by a careful examination of all the circumstances bearing on the case in hand. The constitution of the person, his predisposition to disease, the locality in which he found his death, the species of injury and its extent, together with other circumstances, must be considered in weighing the probabilities of the case.

§ 1144. *c*². *Particular class of weapon.*—*a*³. *Gunshot.*—As has been shown, “near” wounds are shown from the blackening and burning of the skin, and the width and laceration of the wound. From this the presumption of self-infliction may be drawn, though homicidal wounds, in a close conflict, may have the same characteristics. (*h*¹)

In wounds produced by a shot, it is sometimes the case, as is stated by Dr. Casper, (*i*) that different organs are bored through, and death caused by bleeding; while in others the organ is utterly torn to pieces, and death produced in this way. The instrument used in any given case is rarely a subject of examination on the part of the physician. When this is the case, the question occurs, whether the instrument has been discharged; and if so, when. Boutigny has answered this

(*h*¹) See *ante*, § 707 *et seq.*

(*i*) *Gericht. Med.*, ed. 1859, p. 146.

question by describing minutely the changes which take place, within given periods, upon the powder which remains in the piece after it is discharged. Much weight, however, should not be allowed to these results, given by a man unknown to science, especially in cases where the life of an accused person may be depending. Besides the correctness of the results deserves to be questioned, from the fact that no allowance is made for different qualities of powder, different states of the atmosphere, etc. In questions of this kind, gunsmiths, huntsmen, etc., are generally much better qualified to answer than the physician, and their testimony should be preferred.

In reference to the effect produced by the shot upon the body, the condition of the parts where the ball entered and where it emerged, the course which it followed, the resistances with which it met, etc., must be noted.

§ 1145. *b*³. *Punctured wounds*.—The inferences to be drawn from this species of wound have been already noticed. (*j*)

§ 1146. *c*³. *Incised wounds*.—Here the question may arise between accidental injuries, through the falling upon or striking against glass or crockery, and voluntary, when the wound is intentionally inflicted. It is also to be observed that in suicide an incised wound on the throat is often preferred, though it is sometimes inflicted by an assassin, in which case it may have been inflicted in order the better to conceal the crime. (*k*) These points have been considered under prior heads. (*l*)

Wounds inflicted by a blow with sharp instruments, such as a razor, knife, dagger, sword, bayonet, scythe, etc.—we here translate from Dr. Casper (*m*)—may be either shallow or deep. Where the instrument used was sharp, the outer edge of the wound will, of course, be smooth, but the surface somewhat flattened. The appearances resulting from reaction differ according to the portion of the body on which the injury is made, and the length of time intervening between the infliction of the wound and the examination of the same. If the instrument presses to the bone, it will either break this into pieces or else divide it; this latter is more apt to occur with the

(*j*) See *ante*, § 703.

(*k*) Taylor's Med. Jur. 192.

(*l*) See *ante*, §§ 703-707, 717.

(*m*) Gericht. Med. 1857, p. 139.

bones of the fingers or arm. Both effects are often seen where the blow falls upon the skull. The size of the instrument by which such a wound was inflicted cannot be determined from the appearance of the wound. Where the muscles are cut crosswise, they contract and leave a gaping wound, which by no means answers to the instrument with which it was inflicted.

(a) Where the wound is produced by a cut with a sharp instrument, the sides are smooth and not flattened, and converge to a sharp angle at either end. The same appearances from reaction will be seen as in the case of wounds produced by a blow. Cuts which do not penetrate much beneath the skin may yet open large bloodvessels, and cause the person to bleed to death. In such cases it will often be impossible to determine which is the beginning and which the end of the wound. Surrounding circumstances, such as blood upon one hand and not upon the other, the rent made in the clothing, etc., will sometimes throw light upon this point. When the wound is made upon a neck where the skin is very much wrinkled, the appearance will be that of several separate cuts.

Wounds made by a thrust with a sharp instrument produce little bleeding externally, except where they pierce some large bloodvessel lying near the surface of the skin; and, where the instrument is small, they exhibit scarcely any appearances of reaction. If, however, the instrument penetrates to the internal organs, gushes of blood, or urine, or food in process of digestion, will follow. It deserves to be mentioned in this connection that it is often very unjust to blame the examining physician for not tracing out the original source of the bleeding, or the very bloodvessel penetrated by the instrument. Such an examination would in many cases prove very tedious and laborious, and throw no additional light upon the cause of death.(n)

Wounds produced by cutting afford no means of determining the size of the instrument.

(n) See *ante*, § 703.

(b) Dull instruments, as is noticed by Dr. Casper,^(o) produce very different results, according to the strength with which the blow is given, and the part of the body struck. Sometimes instant death is produced by the crushing of some organ; or death, more or less speedy, may result from rupture of a bloodvessel, owing to concussion. Bones may be injured in various degrees, from a slight fracture to entire crushing. Organs may be torn apart in such a way that the wound will not at all correspond with the instrument by which it was made. The appearance of the person may be entirely changed by the breaking of certain bones in the face, by the swelling of the lips and eyelids, etc. Several of these effects may be combined, either by the use of several different instruments, or by the use of one which has several different sides, adapted to different purposes.

Rupture of the internal organs frequently results from the use of such instruments. Spontaneous rupture never occurs with sound organs; and whenever the *basis cranii*, the liver, the lungs, etc., are ruptured, it may safely be supposed the effect of considerable violence.

§ 1147. *d*³. *Contused wounds*.—This involves the inquiry whether the wound came from a fall from a height, or against a hard surface, or from a blow from a heavy body falling upon the deceased, or by voluntary or involuntary shocks against a hard substance when in rapid motion, or by a blunt weapon in the hand of an assailant, or, in rare cases, of the deceased himself.^(p) These points have already been noticed.^(q) In Stirling's case (Cleveland, Ohio, 1860), where the deceased was found at the bottom of a flight of stairs, with a contused wound on his head, which shortly caused his death, the verdict of the jury followed the weight of medical evidence, that the death was from a fall.

§ 1148. *d*². *Number of wounds*.—In *suicides* a legal presumption of self-agency has been strengthened from the wound being single,^(r) though such presumption can be but weak, since an assassin may often dispatch his victim with a single

(o) Gericht. Med. p. 143.

(p) *Ante*, § 717.

(q) *Ante*, § 704 *et seq.*

(r) Burrill, Circum. Ev. 695.

blow, and, on the other hand, suicides have struck themselves repeatedly before the blow took effect.^(s) Recent wounds on the back of the hands, and wounds the result of a struggle, give a strong homicidal presumption.^(t)

§ 1149. (a) *Injuries by violence.*—In cases where there are no external marks of violence whatever upon the body, it is by no means to be concluded simply from that reason that death was not produced by violent means. So far is this from being the case, no external traces of violence, as we are reminded by Dr. Casper,^(u) are to be expected in such injuries as are followed by immediate or very speedy death; as, for instance, in ruptures of the organs, etc. The following remarkable case is cited by him in this connection:—

A driver who, upon a cold winter night, was descending the hill from Spandau with a heavily-loaded wagon, and had dismounted in order to relieve his horses, was overtaken by the wagon and thrown with violence against a tree by the roadside, where he was found next morning lying dead. The only external marks of violence were a slight abrasure of the skin upon the left shoulder and on the right jaw. There was nothing remarkable about the appearance of the head except that the *sinus transversus* seemed more full of blood than usual. On opening the spine at the neck about a quart of dark blood ran out. The muscles of the back were suggillated through the whole length of the spine, but the marrow was uninjured. Thirty ounces of dark blood were found in the left breast. The heart had been torn from its proper position, was entirely separated from the large bloodvessels, and was lying almost loose in the cavity of the breast. The pericardium had been torn throughout its entire diameter. The ends of large bloodvessels, as of the pulmonary artery and of the *aorta*, were distinctly traceable in the cavity of the breast. The skin of the heart was sound and firm, and the heart still contained much dark, clotted blood. The left lung also was torn throughout its middle segment, and a wound two inches long and a half

(s) See *ante*, §§ 703, 717–22, etc.

(t) *Ante*, §§ 717–22; Taylor's Med. Jur. 201.

(u) Handb. Gericht. Med. 1857, p. 122.

inch deep was found on the liver. Yet there was nothing remarkable in the external appearance of the body!

§ 1150. *e*². *Situation of wounds*.—The presumptions falling under this head have been already noticed.(*v*)

§ 1151. *b*¹. *Expression of countenance*.—"In cases of suicide," says M. Burrill,(*w*) "death being desired and determined on, there is no expression of fear on the countenance, though it may be haggard from the influence of other passions; the eyes being usually closed and sunken. In cases of assassination, on the contrary, where death is struggled against and shrunk from, there is always a degree of fear, amounting sometimes to the extremity of terror, imprinted on the visage, the eyes open or staring. The countenance in these cases is also usually pale, although sometimes there may be the opposite appearance of redness or suffusion. The latter circumstance is considered important, as it may indicate the use of violence in order to stop the cries of the subject of the crime."

In suicides produced by despair, however, it has been observed that the expression of the countenance is often more agonizing than that produced in any other kind of death.(*x*)

§ 1152. *c*¹. *Inferences from surrounding objects*.—*a*². *Clothing*.—This, in reference to the kindred presumption of premeditation, will be considered under a subsequent head. In Courvoisier's case, it was held that a cutting through a cravat or portion of a dress was indicative of homicide, since it was not likely that a suicide would strike the blow without first removing such obstacles.

The effect of blood on clothing has been already examined.(*y*)

(*v*) *Ante*, § 717 *et seq.*

(*w*) *Circumstantial Evidence* 686.

(*x*) *Post*, § 1155.

(*y*) *Ante*, §§ 724-753. The following is from the *N. Y. Observer*, of Aug. 8, 1860: "In 1825, a youth resided in a small town in Loudon Co., Va., who was a barkeeper of a tavern; he became a confirmed gambler. He set off one day on horseback on a travelling tour, with a person whom he knew to have in his possession a large sum of money, and before he started armed himself secretly with a pistol, at the muzzle of which was a small dagger attached. On Saturday night they arrived at Centreville, in Fairfax County. After supper they left the house, and in a short time the young man returned without his companion. When the landlord asked for him, the answer was, 'Am I his keeper?'—the ominous reply of the first murderer! About day-

Rifling of the pockets, tearing of the dress, or marks of its having been put on in a manner unusual for the deceased, incisions or perforations, dirt clinging to the texture, all afford grounds for a presumption of homicide.(z)

In rape, the condition of the clothing forms one of the main points from which a presumption of violence may be drawn.

§ 1153. *b*. *Agent commensurate to the effect*.—If no weapon be found by which the offence could have been committed, the presumption of homicide, as distinguished from suicide, is very strong.(a) “If a weapon be found near the body,” says Mr. Burrill,(b) “or within a short distance from it, its nature and the degree of its sharpness, as corresponding with the appearance of the wound, are important considerations. Its appearance, also, and relative position of the body (that is, as

light next morning he was seen crossing a field where the corpse was found perhaps a day or two afterwards. He returned to his residence on Sunday, and I conversed with him within thirty hours after his hands were reeking with blood; he seemed gay and cheerful as ever. He was arrested on suspicion, and in his trunk was found the pistol, which, to the naked eye, displayed no marks of blood. When, however, the microscope was applied, it was clearly discoverable, and also a very small portion of one of the hairs of the dead man’s whisker, which was of red color. He was taken off, accompanied by a lawyer, who was unsurpassed in physical and moral courage by any other man I ever knew. When they arrived at Centreville the excitement was tremendous. All were clear that he was guilty; some said that if the accused would touch the corpse it would bleed. On hearing this prognostication his counsel compelled him to come up stairs and touch the cold body, in order to do away the suspicion. He now appealed to the crowd in eloquent terms that his client was innocent, because no blood issued from either of eighteen wounds. Long after this his trial came on at the county town of Fairfax, before Judge Dade and an impartial jury of his own selection. The testimony was entirely circumstantial and indirect. But, when the different links of the chain were put together, it pointed with fatal certainty to the prisoner. The microscope helped greatly in tightening the rope around his neck. That little fraction of a hair, mixed with blood, connected with some of the identified money of the deceased, and other circumstances not now recollected, brought the guilty youth to the gallows. Afterwards it appeared that the murdered man lay on the ground through the whole night mortally wounded, but was able to implore and beg his pursuer on Sunday morning to spare his life; but, acting on the principle ‘that the dead tell no tales,’ he stabbed him seventeen times, until death closed the scene.”

(z) See 1 Taylor’s Med. Jur. 188.

(a) See *ante*, § 717 *et seq.*

(b) Circumstantial Evidence 690.

lying on the right or left side of it), require it to be most accurately examined and considered, as the appearances of suicide are sometimes attempted to be given to murder, by the perpetrator, in order to escape suspicion and discovery. The instrument with which a suicidal wound of the throat is most commonly made is a razor, and it is frequently found either grasped in the hand or lying by the side of the deceased. Where the wound must have produced almost instant death, if the razor is found closed, there is fair ground to suspect the interference of another person; although the circumstance also has happened in cases of suicide. If the instrument be found still firmly grasped in the hand of the deceased, no better circumstantial evidence of suicide can perhaps be offered, it being impossible that any murderer could imitate such a state and position. But where the razor is held loosely in the hand, or with no compression of the fingers upon it, there is room for the supposition of homicide, which may become strongly presumptive, especially if no blood appear upon the hand."

§ 1154. *c*². *Place where found*.—Was the ground marked by struggling, and does it show that a body was dragged over it? These indications, particularly the latter, are much relied on by the courts as showing violence.^(c) So of the prints of feet, though here there is great danger that, by a change of shoes, a crafty assassin may throw a false suspicion on an innocent person. So as to blood; but here, also, there is great danger of fraud. The cases have not been unfrequent, where adroit assassins, by smearing blood on weapons belonging to others, or by making false tracks, have baffled inquiry.

§ 1155. *d*¹. *Position and appearance of the body*.—*a*². *Attitude*.—Where the body stiffens in an attitude of resistance or imprecation—where, as in Cunningham's case, it is mutilated—where, as in Webster's case, it is cut to pieces in order to be burned or otherwise disposed of—where it is crumpled or doubled up so as to be packed away in a box—where it is sunk in a pond loaded with stones—where an attempt has been made to disguise the features—here homicide will be

(c) *State v. McCann*, 13 Smedes & Marshall 478.

presumed.(d) So, as has already been noticed,(e) a presumption of violence is lent by the fact that a weapon is found in a stiffened hand, lying on it in such a way as to be supported by the hand as it was stretched after death, and not grasped by it as it would be in case of suicide. So, on the other hand, the firm grasping of a pistol or weapon indicates suicide. Where the weapon lies close to the body on the ground, no inference either way can be drawn.

In a New York case a medical expert had testified as to the form, nature, extent, depth, length, width, and direction of the wound, and its precise location on the head. The question was then put, "In what position do you judge the body to have been when it received the blow on the side of the head?" also questions as to the position of the body when other wounds were received. The court admitted them; but the Court of Appeals, Woodruff, J., giving the opinion of the court, decided that the questions were incompetent; that medical men are not presumed to be experts in the matter of giving and receiving such blows, and that the jury are equally capable of drawing the proper inferences from the facts proved if material.(f)

The *posture*, in case of a sudden and surprised death, is lying on the back, and in such case, unless natural causes of sudden death be found, the presumption is homicide.(g) Then, again, the disposition of the limbs is significant. Sentimental suicides compose themselves gracefully for the spectacle. But, when despair is the controlling cause, the countenance at least may display misery even more intense than that of a death struggle with an assassin.(h)

§ 1156. *b². Marks of blood.*—This topic has been already discussed.(i)

In a case before the New York Court of Appeals, in 1868, it appeared, that, when the prisoner was on trial for murder, the State's attorney introduced as a witness the officer who made the arrest, and who testified, under objections, that

(d) See Burrill's Circumst. Ev., p. 684.

(e) *Ante*, § 717 *et seq.*

(f) *Kennedy v. People*, 39 New York 245.

(g) See *ante*, § 717 *et seq.*

(h) See *ante*, § 1151.

(i) *Ante*, § 724 *et seq.*

he found *blood* on the prisoner's clothes found in his room. The judge allowed the clothes and stains (of blood) to be shown to the jury. On exceptions to this decision the case finally came up before the Court of Appeals. That court said: "Stains of blood found upon the person or clothing of the party accused have always been recognized among the ordinary *indicia* of homicide. The practice of identifying them by circumstantial evidence, and by the inspection of witnesses and jurors, has the sanction of immemorial usage in all criminal tribunals. The testimony of a chemist who has analyzed blood, and that of the observer who has merely recognized it, belong to the same legal grade of evidence." (z)

§ 1157. *c*². *Bruises*.—Here, in connection with the points already mentioned,(a) we may call attention to the legal presumptions to be drawn from the appearances called *ecchymosis* and *suggillation*. These appearances, in proportion as they increase in number and extent, evolvè the presumption of homicide.

Where death has been produced by violence, certain suspicious spots are often found upon the body. These are commonly roundish in shape, from one-quarter to three-fourths of an inch in diameter, of a red, or reddish-brown, or a dirty yellowish-brown color, rather hard and tough, and when cut into exhibit no real *suggillation*. These spots may puzzle the examining physician, and, where the manner of death is unknown and is attended with suspicious circumstances, they require the most minute attention, as they may possibly indicate a struggle in which the person was engaged at the time that death occurred. In the majority of cases, however, these spots are produced by the person's striking against some hard substance at the moment of death, and have nothing to do with the manner of death. The same appearances may also be produced after death by rough handling of the body, etc. Even some days after death pseudo-*suggillations* may be produced, by excoriating some part of the body with a stiff brush,

(z) *People v. Gonzalez*, 35 N. Y. 49.

(a) *Ante*, §§ 691, 701.

etc., which might easily be mistaken for reactions that occurred during life.^(a¹)

§ 1158. *Have the injuries which appear upon a dead body been inflicted before or after death?*—Generally, as is stated by Dr. Casper,^(a²) injuries inflicted during life may be easily distinguished from those inflicted upon the dead body by the fact that in the latter case there will be no appearance of reaction, such as inflammation, bleeding, festering, swelling, granulation, or drying up of the edges of the wound. But it is important to observe that in the case of fat bodies, injuries inflicted after death—as, for instance, a cut with a knife—often assume an appearance, when the body begins to swell, which it is very difficult to distinguish from reactions that have taken place during life. This may occur where bodies have lain undiscovered in water until the process of decomposition has begun. It will also be difficult, often impossible, to distinguish the two cases in question where the injured parts have been singed or charred by fire. But, while it is true that injuries inflicted upon a dead body never show any appearance of reaction, it is by no means true that reactions always appear where the injury has been inflicted during life. Many cases occur, some of which have been already noticed, where no trace of suggillation, no inflamed places, no festering, etc., can be seen upon the body, even though the injury was inflicted during life. This is especially the case where death is very suddenly produced by the opening of some large bloodvessel, as of the *carotis*, *jugularis*, etc. In such case there is not the slightest trace of reaction, no suggillation, festering or swelling; and, if a wound is made upon the dead body near that which caused death, and similar to it, it will be impossible to distinguish the two.

Very frequently the injuries found upon the body are such as have been produced *lege artis*, as by cupping or bleeding, amputation, etc.^(b) These require nothing more than a gene-

(a¹) *Ante*, §§ 691, 700.

(a²) *Gericht. Med.*, p. 128, and see fully *ante*, §§ 691-700.

(b) Casper, *Gericht. Med.*, ed. 1857, p. 135.

ral notice at the hands of the examiner, except in cases where the practice of the operating physician is called in question.

To this head belong also injuries produced upon the body where it has served as food for wild animals.

Where the injuries found upon the body are such as have been the immediate cause of death. In this case, of course, the examination of the injuries should be very careful and thorough. The saggillated places, where they are prominent, should be accurately described, the size, diameter, etc.(c)

§ 1159. *e*¹. *Probability of the infliction of the injury before death.*—This topic has already been discussed.(d)

§ 1160. *f*¹. *Connection of the wound with the death.*(e)—It is necessary that the death should be shown to have been produced by the particular blow described and charged. Technically, as was shown in Peterson's case, if the wound is charged to have come from a knife, when in fact it is from a pistol, the variance is fatal. This difficulty, however, has in many cases been remedied by statutes.(f) The practical result of the common law is well stated in Bird's case, where all the judges concurred in saying that where certain assaults were put in evidence, and relied on by the prosecution, as being the cause of death, but where the clear surgical testimony was that the death was caused by a blow on the head, of which there was no evidence whatsoever, the defendants were entitled to an acquittal.(g)

But, while it is necessary to show that the wound caused the death, positive proof that life continued to the moment of the blow is not required.(h)

If it appear that the death was accelerated by the prisoner's violence, it is no defence that the deceased was laboring under a disease otherwise fatal.(i) Nor is it a defence that the death was the immediate result of a surgical operation, which operation, in the opinion of competent surgeons, was rendered

(c) Casper, *Gericht. Med.*, ed. 1857, p. 136. See these points considered fully, *ante*, §§ 691, 700.

(d) See *ante*, §§ 691, 700.

(e) See *ante*, §§ 769 *et seq.*, as to the medical question.

(f) See also *Wh. Cr. Law*, § 594.

(g) *R. v. Bird*, 2 *Eng. R.* 448.

(h) *Wh. Cr. Law*, § 941.

(i) *Ibid.*

necessary to avoid the effects of a wound otherwise mortal.(j) Nor is it a defence, that, had the deceased consented to an amputation, or been more skilfully treated, he might have recovered.(k)

C. INTENT AND DESIGN, FROM WHAT TO BE INFERRED.

I. PRIOR ATTEMPTS, PREPARATIONS, THREATS.(a)

§ 1161. Prior attempts of the defendant to assassinate the deceased can always be received to prove intent, and so of former menaces or expressions of vindictive feeling.(b) And on the trial of a husband for his wife's murder, the prosecution may put in evidence a long course of ill treatment by the husband of the wife.(c) And on a trial for the same crime it has even been held that adultery with another woman could be shown for the purpose of explaining the motive.(d) It has been held admissible, also, to show that on the same day the deceased was killed, and shortly before the killing, the defendant shot a third person, the transactions appearing to be one.(e) But it is inadmissible to prove that the defendant had been guilty of murder or of attempts to murder third parties,(f) or that he had a tendency to commit the particular offence.(g) It is here, indeed, that is to be perceived the line of demarcation between the civil and the common law. By the former it is considered competent to show that the defendant was likely, from the peculiarities of his moral structure, to have committed the particular crime. In the latter, while the physical capacity and mechanical concomitants suitable for the commission of the offence may, as will be hereafter shown, be proved, it is otherwise with regard to the moral or physical constitution.(h)

(j) *Ibid.*

(k) *Ibid.*

(a) *Post*, § 1178.

(b) See *Wh. Cr. L.*, § 648 *et seq.*; *State v. Rash*, 12 *Iredell* 382; *State v. Watkins*, 12 *Conn.* 47; *Johnson v. State*, 17 *Ala.* 618; *R. v. Voke*, *R. & R.* 531.

(c) *State v. Rash*, 12 *Iredell* 382.

(d) *State v. Watkins*, 12 *Conn.* 47; *Johnson v. State*, 17 *Ala.* 618.

(e) *Heath v. Com.*, 1 *Robinson* 735.

(f) *Wharton's Cr. Law*, § 631 *et seq.*

(g) *Ibid.*

(h) *Wh. Cr. Law*, §§ 631, 648.

§ 1162. Purchasing, collecting, and fashioning instruments of mischief; repairing to the spot destined to be the scene of it; acts done with the view of giving birth to productive or facilitating causes for removing obstructions in the execution of the design, or for obviating suspicion, etc., may also be put in evidence for the same purpose.

§ 1163. A remarkable instance is presented in the case of Richard Patch, who was convicted and executed in 1806, for the murder of his friend and patron, Isaac Blight. The prisoner and the deceased lived in the same house, and the latter was one evening shot, while sitting in his parlor, by a pistol from an unseen hand. A strong and well connected chain of circumstantial evidence fixed Patch as the murderer, in the course of which it appeared that a few evenings before that on which the murder was committed, and while the deceased was away from home, a loaded gun or pistol had been discharged in the same room. This shot the prisoner represented at the time as fired at him; but there were strong grounds, especially from the course of the ball through the shutter, for believing that it must have been done by himself, in order to avert suspicion, and induce the deceased and his servants to suppose that assassins were prowling about the building. Of the same character is the case related by Dr. Hitzig, of a woman who, in order to prepare her friends for an intended crime, sent once a week for arsenic to the apothecaries, for the alleged purpose of killing rats. Possession of the instruments or means of offence, under circumstances of suspicion, are important facts in the judicial investigation of imputed crime. Where a man had in his possession a large quantity of counterfeit coin unaccounted for, and there was no evidence that he was the maker, the presumption is, that he had procured it with an intent to utter it. Facts of this kind become more indicative of guilty purpose, if false reasons are assigned to account for them; as, for instance, in the case of procuring poison, that it was procured to destroy vermin, which is the excuse commonly resorted to in such cases. A female convicted at the Warwick Summer Assizes, August, 1831, of the murder of her uncle by poison, alleged that she had bought arsenic to poison mice, and pointed to a mouse which she said

had been killed by it, whereas it was proved that the mouse had not died from poison.⁽ⁱ⁾ To this class of facts may be referred the case of false representations as to the state of another person's health, with the intention of preparing the connections for the event of a sudden death, and to diminish the surprise and alarm which attended its occurrence,^(j) as was done by Captain Donnellan respecting Sir Theodosius Boughton.^(k)

§ 1164. It has been remarked that murderers, especially in the lower walks of life, are frequently found busy for some time previous to the act in throwing out dark hints, spreading rumors, or uttering prophecies relative to the impending fate of their intended victims.^(l) In the case of Susannah Holroyd, who was convicted, at the Lancaster Assizes of 1816, for the murder of her husband, her son, and the child of another person, it appeared that, about a month before committing the crime, the prisoner told the mother of the child that she had her fortune read, and that within six weeks, three funerals would go from her door, namely, that of her husband, her son, and the child of the person whom she was then addressing. And so, on the trial of Zephon, in Philadelphia, in 1845, it was shown that the prisoner, who was a negro, had got an old fortune-teller in the neighborhood, of great authority among the blacks, to prophesy the death of the deceased. Great caution, however, should be used in sifting this kind of proof, particularly when the persons against whom the presumption is pointed are ignorant and superstitious, since, among such, the habit of loose talk of this nature is too prevalent to make an instance of it, when standing alone, any just ground for suspicion.

§ 1165. Threats may also be put in evidence for the same purpose, when they go to show ill will from the defendant to the deceased. Thus, where the prisoner, a negro, said he intended "to lay for the deceased if he froze the next Saturday

(i) *R. v. Mary Ann Higgins*. Lond. Med. Gazette, vol. ix. p. 896, and Annual Register for 1831.

(j) Wells on Circum. Evi., p. 212.

(k) See Gourney's Report of the Trial.

(l) 1 Stark. on Evi. 465-66 (3d ed.).

night," and where the homicide took place that night; where it was said, "I am determined to kill the man who injured me;" where the prisoner had declared, the day before the murder, that he would certainly shoot the deceased; and where the language of the defendant was, "I will split down any fellow that is saucy." Several considerations, however, have already been adverted to, which divert the applications of evidence of antecedent preparations, and which apply with equal force to this head. In addition to these, it is important to observe: 1st. The words supposed to be declaratory of criminal intention may have been misunderstood or misremembered. 2d. It does not necessarily follow, because a man avows an intention, or threatens to commit a crime, that such intention really existed in his mind. The words may have been uttered through bravado, or with a view of intimidating, annoying, extorting money, or other collateral objects. Thus, a man, such as Dr. Parkman, may have frequently been the object of threats or curses of this kind from irritated tenants, and yet it was from a man who used neither that his death proceeded. 3d. Another person, really desirous of committing the offence, may have profited by the occasion of the threat to avert suspicion from himself. A curious instance of this is given in the *Causes Célèbres*. A woman of extremely bad character and violent temper, one day, in the open street, threatened a man who had done something to displease her, that she would "get his hams cut across for him." He was found dead a short time afterwards with his hams cut across. This was, of course, sufficient to excite suspicion against the female, who, according to the practice of continental tribunals at that time, was put to the torture, confessed the crime, and was executed. A person was, however, soon after taken into custody for some other offence, who confessed that he was the murderer; that, happening to be passing when the threat was uttered, he conceived the idea of committing the crime, as he knew the woman's bad character would be sure to tell against her. 4th. It must be recollected that the tendency of a threat or declaration of this nature is to frustrate its own accomplishment. By threatening a man you put him on his guard, and force him to have recourse to such means of protection as the force of

the law, or any extra-judicial powers which he may have at command, may be capable of affording to him. Still, however, such threats, as observed by Mr. Bentham, "by the testimony of experience, are but too often sooner or later realized. So to the intention of producing the terror and nothing but the terror, succeed, under favor of some special opportunity, or under the spur of some fresh provocation, the intention of producing the mischief, and (in pursuance of that intention) the mischievous act."

II. MARKS OF VIOLENCE.

§ 1166. Marks of violence, in connection with the cause of death, have already been considered. At present they are only to be noticed in connection with the question of intent. It cannot be doubted that when a wound is found to have been inflicted in a secret or concealed part, which is inaccessible in sudden and passionate conflict, it bears a violent presumption of having been the result of design. Thus, the wounds, of which the Scotch historian tells as having been inflicted by forcing a heated iron into the fundament, could have been explained in no other way than on the hypothesis that to death was intended to be added concealment. In the same class may be enumerated the thrusting of a needle in the navel of an infant, running a sharp but slight instrument in the cavity behind the ear, dropping corrosive acids into the ear itself, and forcing molten lead down the throat through a tube; of each of which resorts the books give instances.⁽ⁿ⁾ The principle on which the presumption of intent can be drawn from such cases is, that a person acting under the impulse of passion is much less likely to inflict a skilful wound, than one whose act is the result of premeditation.^(o)

§ 1167. Whether the wound was inflicted in self-defence or otherwise; whether it was self-inflicted, or inflicted by a

⁽ⁿ⁾ Mittermaier von Beweise, 402; Demme's Annalen des Criminalrechts, vol. iii. p. 215; Bauer, Theorie des Anzeigenbeweises; Henke, Darstellung, sec. 99; Blanci de Indiciis, Venet, 1545; Reinhardt de eo quod circa reum ex Præsumpt. Convinc. et Cond. Just., etc. Erford, 1732; Heinroth in Hitzig's Zeitschrift, n. 42, p. 257.

^(o) Presumption from gunshot wound, see *ante*, §§ 707-717.

stranger; whether the perpetrator of the crime was an expert or otherwise—may also be deduced from the wound. And the direction of the wound may often be shown for the purpose of testing the validity of a defence. Thus, where the defence was, that, the ground being rough and slippery, the prisoner stumbled, and both barrels of the gun had gone off by accident, the defence was confirmed by tracing the direction of the shot, which was found to be pointed upwards.(p) The difference in appearance between wounds inflicted before and after death has been already considered.(q)

§ 1168. If, as has been said, the death was not accelerated by violence, the defendant must be acquitted. Thus, in 1847, on a trial for manslaughter, the surgeon who had attended the deceased stated, that on examining her body he had found the mark of an old wound on her head, and a slight bruise on one of her thighs; but he further stated, that he made a *post-mortem* examination of the body, and that his opinion was, that the cause of the deceased's death was confirmed consumption, her lungs being tuberculous, and that it had not been accelerated by violence, but was wholly attributable to natural causes. The defendant, under the direction of MURPHY, Sergeant, who consulted with Lord Chief Baron POLLOCK, was acquitted.(r) But it is no defence that the deceased was laboring under a mortal disease, if death was accelerated by the defendant's violence;(s) and this, no matter how remote the cause, if the intention was to commit an assault, and death resulted.(t)

III. INSTRUMENT OF DEATH.

§ 1169. The use of a lethal instrument, knowing it to be such, gives the strongest presumption of design, if the weapon appears to have been used contrary to the defendant's usual custom.(u) Whether it was the defendant's custom to carry the particular weapon, becomes, in such case, a material ques-

(p) Wh. on Homicide, § 240.

(q) *Ante*, §§ 691-701.

(r) *R. v. Conner*, 2 C. & K. 518; see also *R. v. Crompton, C. and Mars.* 597.

(s) *State v. Morea*, 2 Ala. 275.

(t) Wh. C. L., § 941.

(u) See Wh. on Hom. 41, 385.

tion. Thus, in Selfridge's case,^(v) where the fatal weapon was a pistol, the defendant was permitted to prove that he had found it necessary to carry such a weapon, in consequence of the danger of being waylaid in his passage between his place of business and his residence in the country. And in the old cases, such as those of Major Oneby and of Mr. Lutterel, it having been the uniform custom of those times for gentlemen to carry swords, no presumption was drawn from the fact that in these instances swords were the instruments of death. But when the weapon by which the homicide was committed was one not usually carried, the presumption is, that it was assumed for the special purpose.

§ 1170. Other inferences are to be adduced from the instrument of death which it may not be out of place here to notice. Suicide may be inferred from the discovery of the weapon near the body.^(w) This, however, is by no means a certain test. Thus, in July, 1683, the Earl of Essex was found dead in the Tower, with his throat cut, and a razor lying near him. His throat was smoothly and evenly cut from one side to the other, and entirely down to the vertebral column. Notwithstanding this, the razor was found to be much notched on the edge. This fact those who favored the view of suicide were asked to explain. They could do so by no other way than by supposing that the deceased had notched the razor by drawing it backwards and forwards on the neck bone. This he could hardly be deemed competent to do after all the great vessels of the neck had been divided. If the weapon be found in the vicinity of the corpse, the question arises whether it could have been placed in its position by the act of the deceased. In the case of Courvoisier, who was tried for the murder of Lord William Russell, there were two facts relied upon to show that this was not a case of suicide. One was, that a napkin was placed over the face of the deceased, and the other that the instrument of death did not lie near the body. To the same point is the case of Jane Norkott, who was found dead in her bed with her throat cut, while a bloody knife was found sticking in the floor a good distance from the bed,

(v) Wh. on Hom. 417.

(w) See *ante*, §§ 722, 1140.

but as it stuck the point was turned towards the bed, and the haft from it. This last fact told strongly against the hypothesis of suicide.

§ 1171. On the trial of How, for the murder of Church, in Alleghany County, N. Y., in 1824, it was a material fact that a patch of square home-made linen, which was found near the deceased, being apparently a part of the wadding which was discharged, together with the ball which was the cause of death, was of the make and quality with other patches found almost simultaneously in the box of a rifle in the defendant's possession.

§ 1172. William Richardson was tried at Dumfries, in 1787, for the murder of a young female in the Stewarty of Kircudbright, in the autumn of 1786.(x) It appeared from the evidence that the deceased, who lived with her parents in rather a remote part of the district, was, the day in question, left alone in the cottage, her parents having gone out to their harvest-field. On their return home, a little after mid-day, they found their daughter murdered, with her throat cut in the most shocking manner. The circumstances in which she was found, the character of the deceased, and the appearance of the wound, all concurred in excluding any presumption of suicide; while the surgeons who examined the wound were satisfied that it had been inflicted by a sharp instrument, and by a person who must have *held the instrument in his left hand*. On opening the body, the deceased appeared to have been some months gone with child; and on examining the ground about the cottage, there were discovered the footsteps, seemingly, of a person who had been running hastily from the cottage, and by an indirect road through a quagmire or bog, in which there were stepping-stones. It appeared, however, that the person had, in his haste and confusion, slipped his foot and stepped into the mire, by which he must have been wet nearly to the middle of the leg. The prints of the footsteps were accurately measured, and an exact impression taken of them; and it appeared that they were those of a person who must have worn shoes, the soles of which had been newly mended, and

(x) Burnett's Criminal Law of Scotland, p. 524 *et seq.*

which, as is usual in that part of the country, had iron knobs or nails in them. There were discovered also, along the track of the footsteps, and at certain intervals, drops of blood; and on a stile or small gateway near the cottage, and in the line of the footsteps, some marks resembling those of a hand which had been bloody.(y) A number of persons being present at the funeral, the steward depute, with a view of obtaining some clue to the murderer, called all the men together, to the number of sixty. He then caused the shoes of each of them to be taken off and measured; and, after going nearly through the whole number, they came to the shoes of the prisoner, which corresponded exactly to the impressions, in dimensions, shape of the foot, form of the sole, apparently mended, and the number and position of the knobs. (Up to this moment no suspicion had fallen on any one in particular.) The prisoner, on being questioned where he was on the day the deceased was murdered, answered, seemingly without embarrassment, that he had been all that day employed at his master's work. Some other circumstances of suspicion, however, having transpired, he was, in a few days after, taken into custody. On his examination he acknowledged that he was *left*-handed; and, some scratches being observed on his cheek, he said he had gotten them when pulling nuts in a wood a few days before. He still adhered to what he had said of his having been, on the day of the murder, constantly at his master's work, at some distance from the place where the deceased resided; but it appeared that he had been absent from his work about half an hour (the time being distinctly ascertained) in the course of the forenoon of that day; that he had called at a smith's shop, under pretext of wanting something, which it did not appear that he had any occasion for, and that this shop was in his way to the cottage of the deceased. A young girl, who was some one hundred yards from the cottage, said, about the time the murder was committed (and which corresponded to the time that the prisoner was absent from his fellow-servants) she saw a person, exactly with his dress and appearance, running hastily towards the cottage, but did not

(y) As to foot-prints, see *post*, § 1182.

see him return, though he might have gone round by a small eminence which would intercept him from her view, and which was the very track where the footsteps had been traced. His fellow-servants now recollected that on the forenoon of that day they were employed with the prisoner in driving their master's carts, and, when passing by a wood, which they named, the prisoner said he must run to the smith's shop, and would be back in a short time. He then left his cart under their charge, and, they having waited for him about half an hour, which one of the servants ascertained by having at the time looked at his watch, they remarked on his return that he had been longer absent than he said he would, to which he replied that he stopped in the woods to gather some nuts. They observed at this time one of his stockings wet and soiled, as if he had stepped into a puddle, on which they asked him where he had been. He said he had stepped into a marsh, the name of which he mentioned; on which one of his fellow-servants remarked that he must have been either drunk or mad if he stepped into that marsh, as there was a footpath which went along the side of it. It then appeared, by comparing the time he was absent with the distance of the cottage from the place where he had left his fellow-servants, that he might have gone there, committed the murder, and returned to them. A search was then made for the stockings he had worn that day, and a pair were found concealed in the thatch of the apartment where he slept, and which appeared to be much soiled, and to have some drops of blood on them. The last he accounted for, at first, by saying that his nose had been bleeding some days before; but it being observed that he had worn other stockings on that day, he next said that he had assisted in bleeding a horse when he wore those stockings; but it was proved that he had not assisted, but had stood on that occasion at such a distance that no blood could have reached him.

§ 1173. On examining the mud or sand upon the stockings, it appeared to correspond precisely with that of the mire or puddle adjoining to the cottage, and which was of a peculiar kind, none other like it being found in the neighborhood. The shoemaker was then discovered who had mended his shoes a short time before, and he spoke distinctly to the shoes

of the prisoner, which were exhibited to him, as having been those he had mended. It then came out that the prisoner had been acquainted with the deceased, who was considered in the country as of weak intellect, and had on one occasion been seen with her in a wood under circumstances that led to a suspicion that he had criminal connection with her; and, on being gibed with having such connection with one in her situation, he seemed much ashamed and greatly hurt. It was proven further, by the person who sat next to him while the shoes were being measured, that he trembled very much, and seemed a good deal agitated; and, in the interval between that time and his being apprehended, he had been advised to fly, but his answer was, "Where can I fly to?" In the prisoner's defence, evidence was brought to show that, about the time of the murder, a boat's crew from Ireland had landed on that part of the coast, near to the dwelling of the deceased; and it was said that some of the crew might have committed the murder, though their motives for doing so it was difficult to explain, it not being alleged that robbery was their purpose, or that anything was missed from the cottages in the neighborhood. On this evidence the prisoner was convicted and executed. Before his death, he confessed that he was the murderer, and said that it was to hide his shame that he committed the deed, knowing that the girl was with child by him. He mentioned also to the clergyman who attended him where the knife would be found with which he had perpetrated the murder. It was found accordingly in the place he described (under a stone in the wall), with marks of blood upon it.^(z)

IV. LIABILITY OF DECEASED TO ATTACK.

1st. *Possession of Money.*

§ 1174. This opens a wide range of testimony. It is admissible to prove that the deceased had received a considerable sum of ready money just before the fatal moment, and that he might be supposed to have the whole or a part of it on his person. When the defence is passion or self-defence, evidence

(z) Best on Presumptions, § 262.

of this kind is always proper to prove premeditation, though it should have no effect on the jury, unless it be connected by presumption or otherwise with the defendant. If he was not likely from the circumstances to have any suspicion of the fact—if the opportunity of robbing the deceased was not used—if the defendant's means were such as to make the acquisition of money in such sums and at such risks out of the range of possible temptation—the fact should not be allowed to weigh. It will be seen at once that not only the deceased's condition and habits—*e. g.*, those which would show the likelihood of his having money on his person at this particular time—but those of the defendant, become thus the legitimate subjects of inquiry. So far as the *deceased* is concerned, a very strong tone is lent to this species of presumption by the fact of his being a peddler or itinerant vender of jewelry. The easy exportation of the goods of this class of persons, their usual isolation, and the readiness with which they can be enticed under business pretenses into places where they can be secretly dispatched, contribute to sharpen very much the probability that a violent homicide, of which a person of their calling was the subject, was committed for the sake of gain. On the other hand, the situation of the defendant after the guilty act is to be closely scrutinized. Was there any change in his circumstances exhibiting greater means of expenditure than before? For this purpose evidence is always admissible, showing the unexpected extinguishment of pressing debts, or increase of a bank-balance, or investments or outlay of any kind whatever.

§ 1175. History rather than the record of criminal courts affords examples of cases where homicide has been committed to remove from the assailant's path a party who stood between him and the consummation of his avarice or his ambition. In England, however, the poisoning of Sir Theodore Broughton, in Paris that of the family of the Marchioness Brinvilliers, and in Belgium that of Gustavus Fougnyes, are conspicuous examples of the judicial punishment of homicide committed for the purpose of removing an obstacle in the way of a decent. And so frequently in that corrupt state of society which preceded the French Revolution was this method of diverting the

channel of inheritance resorted to, that a specific under the name of the "Succession Powder" disputed with the "Aqua Tophana" the credit of being the most effectual remedy for this purpose. The inventress of the last-named agent was said to have poisoned six hundred persons, and in Paris at the close of the seventeenth century the practice increased to so alarming an extent that it was necessary to establish an inquisitorial court, called the "Chambre Ardente," for the purpose of watching and acting upon the use of poisons as a social element. By this court two women, named La Vagren and La Voison, were sentenced to be burned alive in 1780; and the sentence was executed. The perfumer of Catharine de Medicis had the reputation of being able to convey poisons through a variety of vehicles, as a jelly or the smell of a rose. Ancient testimony to this effect was very emphatic, Plutarch, Theophrastus, Livy, Tacitus, and Aulus Gellius uniting in verifying it. That the modern belief was not peculiar to France, nor consequent upon the revelations of the Chambre Ardente, is proved by the fact that it was received in England at the time of Somerset's trial by both sides of that great politico-judicial struggle. Shakspeare thus recognizes the general currency which the opinion had obtained:—

" Their great guilt,
Like poisons given to work a great time after,
Now 'gins to bite the spirits."—*Tempest*, Act III. s. 3.

§ 1176. But, however well-founded may have been the then popular belief, it is clear that if the art ever existed it is now lost. Dr. Amos, whose authority in this branch of medical jurisprudence rests on the most elaborate research, tells us that "it may now be doubted if a medical man could indicate with certainty any poisonous preparation of which the effect should be fatal, but should nevertheless be suspended for two months or even a week. And perhaps good scientific testimony could be produced, negating the quality of being a slow poison to any of Franklin's drugs, unless, indeed, they be repeated in slow doses for a considerable period."^(a)

§ 1177. Neither in England, nor in this country, has there

(a) Great Oyer, 347.

been any recent instance of a trial for homicide in which the motive of succession was supposed to be involved. And indeed it is not likely that in the present popular temper of either country such a species of crime could find place. The abolition of hereditary office takes *patronage* out of the line of descent; and there is therefore no *cortège* ready to surround an heir-expectant and to dignify with the title of party spirit what with us would be at once denounced as an example of unnatural crime which is not to be permitted to exhibit itself in the sight of man. The system, also, that obtains among us, of launching young men at an early age into the world on an independent basis of support, relieves them from those positions of luxurious and yet impotent dependency in which the cadets of noble continental families were formerly nurtured. And, independently of this, which subtracts in the great mass of cases the motive for this species of homicide, it may not be unsuitable for us to notice a still more fundamental reason in the essential distinction between the Saxon and the Italian or the Italic-Gallican characters. That subtle and tortuous ambition which seeks to reach its object by secret approaches, conducted under the cover of patient and polite servility, is as much an exception with us, as is the more sudden and public manifestation of passion with them.

2d. *Old Grudge.*

§ 1178. In point of law the proof of an old grudge supplies a violent presumption of deliberation. No matter what may be the intermediate provocations, if a *prior* intent to kill exist, that intent will be presumed to continue down to the fatal blow.^(b) If there has been time for cooling, the prior provocation only goes to prove an old grudge, and to make the offence murder. Thus in Major Oneby's case—which is the leading one under this head, and has been already cited—the evidence was that the prisoner being in company with the deceased and three other persons at a tavern, in a friendly manner, after some time, began playing at hazard; when Rich, one of the company, asked if any one would set him three

(b) Wh. on Hom. 198, *ante*, §§ 703, 1142.

half crowns; whereupon the deceased, in a jocular manner, laid down three halfpence, telling Rich he had set him three pieces; and the prisoner at the same time set Rich three half crowns, and lost them to him. Immediately after which, in an angry manner, he turned about to the deceased, and said, it was an impertinent thing to set halfpence, and that he was an impertinent puppy for so doing, to which the deceased answered, whoever called him so was a rascal. Thereupon the prisoner took up a bottle, and with great force threw it at the deceased's head; but did not hit him, the bottle only brushing some of the powder out of his hair. The deceased in return immediately tossed a candlestick or bottle at the prisoner, which missed him; upon which they both rose up to fetch their swords, which then hung up in the room, and the deceased drew his sword; but the prisoner was prevented from drawing his by the company. The deceased thereupon threw away his sword; and the company interposing, they sat down again for the space of an hour. At the expiration of that time the deceased said to the prisoner, "We have had hot words, but you were the aggressor; but I think we may pass it over;" and at the same time offered his hand to the prisoner, who made answer, "No, damn you, I will have your blood." After which, the reckoning being paid, all the company, except the prisoner, went out of the room to go home; and he called to the deceased, saying, "Young man! come back; I have something to say to you;" whereupon the deceased returned into the room, and the door was closed, and the rest of the company excluded; but they heard a clashing of swords, and the prisoner gave the deceased the mortal wound. It was also found, that at the breaking up of the company the prisoner had his great coat thrown over his shoulders, and that he received three slight wounds in the fight; and that the deceased, being asked upon his death-bed, whether he received his wound in a manner among swordsmen called fair, answered, "I think I did." It was further found that, from the throwing of the bottle, there was no reconciliation between the prisoner and the deceased. Upon these facts all the judges were of opinion that the prisoner was guilty of murder; he having acted upon malice and deliberation, and not from sudden passion. It

should probably be taken, upon the facts found in the verdict and the argument of the Chief Justice, that, after the door had been shut, the parties were upon an equal footing in point of preparation before the fight began in which the mortal wound was given. The main point then on which the judgment turned, and so declared to be, was the evidence of *express malice*, after the interposition of the company, and the parties had all sat down again for an hour. Under these circumstances the court were of opinion that the prisoner had had reasonable time for cooling; after which, upon an offer of reconciliation from the deceased, he had made use of that bitter and deliberate expression, that he would have his blood. And again, the prisoner remaining in the room after the rest of the company retired, and calling back the deceased by the contemptuous appellation of young man, on pretence of having something to say to him, altogether showed such strong proof of deliberation and coolness as precluded the presumption of passion having continued down to the time of the mortal stroke. Though even that would not have availed the prisoner under the circumstances; for it must have been implied, according to *Mawgridge's* case, that he acted upon malice; having, in the first instance, before any provocation received, and without warning or giving time for preparation on the part of Mr. Gower, made a deadly assault upon him.

When there is difficulty in ascertaining the probable perpetrator of a homicide, it is desirable, therefore, to consider who there is who had an old grief or cause of provocation against the deceased. For this purpose evidence of threats and hostile declarations is always admissible on trial.

3d. *Jealousy.*

§ 1179. Upon this head, as well as the last, it is not within the province of this work to enter. It is sufficient here to remark, that in inquiring for the supposed agent in a homicide, motives of this class are always a proper topic of investigation.

V. POSITION OF DECEASED.

§ 1180. That the deceased was found tied is not always a certain ground for assuming that he was the victim of a violent homicide, for cases exist where a party intending suicide has attempted in this way to relieve his memory from the disgrace of self-murder. This, however, is very difficult to effect, and the disguise is readily penetrated. It is far different, however, with the converse, where the perpetrator of a violent homicide endeavors to so arrange the position of the deceased, as to give it the appearance of a *felo de se*. Cases of this kind are numerous, and sometimes the artifice has been so skilfully contrived as for a while to avert the current of suspicion. Thus, in a case in Mississippi, the deceased was found lying dead with his own pistol in his hand, with which the fatal shot had undoubtedly been fired, and with his body arranged in such a way as to be entirely consistent with the hypothesis of deliberate self-destruction. No question, indeed, as to this being the fact existed, until it was subsequently accidentally discovered that the pistol had been wadded with a piece of paper which was a fragment of a sheet in the defendant's pocket. So, also, on the trial of a German named Papenberg, in Philadelphia, in 1844, it appeared that the deceased was found with a hatchet lying by his side, with the sharp edge of which his throat had been cut, in a manner which made the hypothesis of suicide not improbable. One of the most powerful circumstances in dispelling this hypothesis, and in pointing to the real offender, was the discovery in the pocket of the latter of a handkerchief, in which was marked in blood the profile of the precise weapon with which the wound was effected. In the case of Courvoisier, who was tried for the murder of Sir Wm. Russell, suicide, as has already been mentioned, was set up as a defence, with much show of evidence; but two facts were successfully relied on by the prosecution to rebut it, viz., that a napkin was placed over the deceased's face, and that the instrument of death did not lie near the body. And so Mr. Amos tells us of a trial where the defence of suicide was defeated by the fact, that, while medical observation shows that prussic acid produces *instantaneous* death,

the deceased was found with a *corked* bottle in her hand, from which five *drachms* of that particular poison had been taken, and with the bedclothes composed about her person with elaborate precision.(c)

§ 1181. Other points are to be noticed in the same connection. Thus, it is important to examine whether there are marks of a scuffle about the deceased, and what footsteps are noticed leading to or from the *locus in quo*, together with their dimensions and other peculiarities.(d)

VI. MATERIALS APPROPRIATE TO BE CONVERTED INTO INSTRUMENTS OF CRIME.

§ 1182. It is here that what the civilians call *indicatory* evidence comes into great play. No *deliberate* homicide is committed without preparation, and the more malignantly contrived is the act, the more—such are the sanctions of society—it exposes itself to detection, by the discovery of the trains laid by it for the purpose of effecting the guilty purpose. Thus, in *poisoning*, it is necessary that the poison should have been pre-procured, either in its rudimental or its complete shape. For this purpose it is admissible to show not only, as in Sir Theodore Broughton's case, the possession of the fatal drug, but its purchase, or the purchase of its component elements. Inquiries, also, as to the effect of that particular drug—possession of books in which the nature of poison is described—become pertinent, for, unless the defendant is a scientific man, he must necessarily fortify himself with information before he attempts anything so hazardous as placing in the die both the life of another and of himself. When a gunshot wound is the cause of death, premeditation as well as identity may be determined in the same way. Of course, when fire-arms are habitually used, the possession of powder is of no moment in this respect. But the use of a particular fragment of wadding has often been the means of insuring conviction; and when a party is not in the habit of carrying

(c) See *ante*, §§ 717-722, 1151, for discussion of suicidal or homicidal presumptions.

(d) See *post*, §§ 1186-7.

fire-arms, but assumes them for a particular occasion, this, as has already been noticed, lends a strong presumption of design, if it does not form part of a chain of circumstances indicating the guilty party. The species of preparation which most often leads to the discovery of the offender, in this class of homicide—particularly among those with whom the carrying of fire-arms is habitual—is the selection or arrangement of a lair or shooting stand, from which the victim can be shot down without arresting the suspicion of himself or the observation of others. In a late case in South Carolina, the only trace by which identity could be pursued was that arising from the construction, by the assassin, of a shed or cover made of boughs of trees, from which the deceased was shot at. Similar to this, was the discovery of a level in a darkened room in a private house, upon which an air-gun had been poised for the purpose of taking a more secure aim. The more artful and skilful is the method of death chosen, the more conclusive is the presumption it affords when discovered. Thus, in the traditional homicide of Amy Robsart, the fact which defeated the hypothesis of suicide was, that the planks which had been taken up from the floor for the purpose of opening a pit-fall, were so artfully cut out as to enable them afterwards, had it been necessary, to be returned to their former places without the appearance of having been disturbed. Hitzig, also, mentions a case where suspicion of a projected homicide, by poisoning, was attempted to be warded off by the prior announcement of a tendency to symptoms, on the part of the intended patient, of the same general character as those which the poison was likely to produce. And nothing added such point and emphasis to the evidence of design in the Webster case, as the presumption existing, that the defendant had prepared beforehand the means of disposing of the deceased's body.

Great care, however, should be exercised in conducting examinations for the purpose of testing how under given circumstances the particular result could have been produced. When the examinations are carelessly and inartificially carried on, their results should be rejected by the court. A strict rein, also, should be placed on experiments carried on during

the trial for the purpose of testing the adequacy of supposed agencies. Unless thus guarded, such experiments are apt both to cumber the issue and to mislead the jurors. Take, as illustrating this, the following statement of certain "experiments" made before the jury in a homicide case in Illinois:—

"The door was placed against the shutters in the rear of the judge's bench, and the experiment commenced.

"1. A hole was bored in the head and tyle of the door, and a two-inch screw screwed in. A. Wheaton, a jurymen, hung to it, and held.

"2. An inch and a half screw was then used with the same effect.

"3. The jurymen stepped off the chair, and the screw gave.

"4. The jurymen stepped off the chair, the rope slipped, and the screw was pulled nearly out.

"5. A hook, size of smaller one found in the room, used, and did not give.

"6. Another screw, of same size, used with same effect.

"7. Experiment on last hook; did not give.

"8. Experiment on plain one and a half inch screw; did not give.

"9. Same experiment with same effect.

"10. Tried by prosecution, on a hook similar to the one used in No. 5 hook; the whole broke.

"11. By defence, one of the hooks found in Jumpertz's room; did not give.

"12. By prosecution, on same hook in a different place; hook was bent down.

"13. With the same hook; juror stepped from the chair, and hook pulled out.

"14. A two-inch screw used and when juror stepped from the chair, it was nearly pulled out.

"15. A screw found in the room was then used, and when the juror stepped off from the chair, it remained firm."^(d)

The Supreme Court very properly said they did not "approve" of this "exhibition" and "experiments," but at the

(d) *Jumpertz v. People*, 21 Illinois 375.

same time intimated that in themselves they were not ground for a new trial.

VII. DETACHED CIRCUMJACENT BODIES.

§ 1183. Was the deceased's dress torn, his pockets rifled, or were there any traces left by the supposed murderer on the spot? The more artful the design, the more emphatic, as has already been noticed, is the presumption to be drawn from it. Thus, in a case in New Jersey, suspicion was for some time averted by the fact that all the horse-tracks led to the spot, and *none* from it. This, however, tended only to clinch the fact of the defendant's guilt, when it was discovered that the horse which he had ridden that night bore on its hoofs the marks of the shoes having been nailed on *backwards*. So, also, where leaves were used for the purpose of concealing foot-tracks to and from the spot, the presumption against the accused party was certainly not *weakened* by the discovery that the leaves were none of them taken from a level above that which he could conveniently reach, he being, in fact, much below the average height.

§ 1184. A woman was tried in England, in 1818, before Mr. Baron Garrow, for arson. She had been met near the ricks, which were the subject of her incendiary attempt, about two hours before midnight. On one of the ricks was found a piece of woman's handkerchief, and in a tinder-box near the spot were some unburnt cotton rags. On examining the cotton taken from the latter with a lens, it was proved to be of the same fabric and pattern as a gown and some pieces of cotton-print taken from the prisoner's box at her lodgings. A still more conclusive presumption was drawn from the comparison of a half-handkerchief taken from a bundle belonging to the prisoner with the piece found in the rick. A critical examination by experts of the two, showed that they belonged to the same square. It appeared, also, that the hemming in each was of the same breadth—the stitching in each was of the same degree of evenness—and that each was sewed with black sewing-silk, which was the more remarkable from the fact that articles of that character were usually sewed in cotton. Now, although these circumstances would have been entirely insuffi-

cient to warrant a conviction without proof of guilt *aliunde*, it cannot be denied that they are of much value in relieving the court and jury from that anxiety which must always arise when there is a doubt whether, if the circumstances in question had been explored, they would not have tended to negative the defendant's guilt. And as the burden of proof is on the prosecution, if it neglects to examine facts like these, the presumption is, that, if they had been examined, they would have told against it. In this view, as well as to promote public justice generally, their investigation is a matter of duty.

§ 1185. In a trial in Philadelphia, in 1844—already mentioned under another head—a handkerchief found on the defendant's person was discovered to be marked with a profile of a hatchet with which the fatal wound had been inflicted. The hatchet itself was peculiarly notched, and a critical analysis showed the marks on the handkerchief to be blood. Other circumstances conspired with this to make the presumption irresistible that the defendant was the guilty agent.

§ 1186. The piecing together of the wadding of a pistol with papers or other material found in a suspected party's possession, is a well-known method of identification.^(e) It should be observed, however, that this is a species of identification very easily fabricated, as is illustrated by the case of Boynton, in Mississippi, where a scrap of paper from which the wadding was cut, was purposely put in the defendant's pocket in order to inculpate him.

§ 1187. In 1836, a Spaniard, named Palayo, was charged with attempting the life of an officer in the post-office, by depositing in it packets filled with fulminating powder, one of which exploded while in the act of being stamped, causing thereby serious personal injury. The letters, which were in Spanish, and one of them subscribed with the prisoner's name, were addressed to persons in Havana and Matanzas, who appeared to have been the object of the writer's especial malig-

(e) 1 Starkie's Law of Ev. 490; Bentham's Jud. Ev., Book v. ch. xv. 256; Wills' Circum. Ev. 97.

nity. Evidence that the defendant was on the spot, mailing letters, at the particular time, was held to be materially corroborated by proof that the impression on the wax with which the letters were sealed corresponded with that of a seal worn about the defendant's person.(f)

Footprints, whether of man or beast, lead often in like manner to discovery of the guilty agent. In a case already referred to, which occurred in New Jersey, in 1820, it appeared that the defendant, who was charged with arson, had turned his horse's shoes round, after arriving at the house to be fired, so that there should appear to be *two* persons proceeding *to* and none *from* it. This very artifice, however, was the means of his detection, since the reversal of the shoes, as indicated by the recent marks of the nails on the horse's feet, afforded one of the most emphatic of the indications by which the defendant's guilt was determined.(g) But proof of similarity of footprints alone does not fix identity.(h)

§ 1188. "It is of the utmost importance," says Mr. Best, "to examine minutely for the traces of another person at the scene of death, for it is by no means an uncommon practice with murderers to dispose of the bodies of their victims in such a manner as to lead to a supposition of suicide or death from natural causes;(i) while, on the other hand, persons about to commit suicide, but solicitous to preserve their reputation after death, or their property from forfeiture, sometimes make away with themselves in such a manner as to avert suspicion of the mode by which they came to their end.(j) In one case, where a female was found dead in a room, with her throat cut and a large quantity of blood on her person and on the floor, the presence of another person in that room was demonstrated by the print of a bloody *left* hand on the *left* arm of the deceased.(k) Where a man was found dead, with a discharged pistol lying beside him, the hypothesis of suicide from that pistol was rebutted by showing that the fatal bullet was too

(f) Wills' Circum. Ev. 99.

(g) See *ante*, § 1172.(h) *R. v. Britton*, 1 F. & F. 354.

(i) 1 Stark. Ev. 572.

(j) *Ibid.* 577.

(k) Case of Mary Norket and others, 14 Ho. St. Tr. 1324.

large to fit it.^(l) The following case strongly illustrates the difficulties which sometimes attend investigations of this nature. A man, on detecting his wife in the act of adultery, fell into a state of distraction, and having at first dashed his head several times against the wall, then struck himself violently and repeatedly on the forehead with a cleaver, until he fell dead from a great number of wounds. All this was done in the presence of several witnesses. But suppose it had been otherwise, and that the dead body had been found with these marks of violence upon it, murder would have at least been suspected.^(m) And even where there is the clearest proof of the infliction of wounds, still death may have been the result of previous disease, or violence from some other source. Cases illustrative of the former of these are numerous,⁽ⁿ⁾ and the two following show the necessity of not overlooking the latter hypothesis.

§ 1189. "At an inn in France, in the year 1808, a quarrel arose among some drovers, during which one of them was wounded with a knife, on the upper part of the *chest*, as also on the face and hand. The wounds were dressed and he left to return home, but the next morning he was found dead, bathed in blood, with the left lung and pulmonary artery cut. His death was at first attributed to the wounds received at the inn, but on a more minute examination this appeared unlikely, and it ultimately turned out that he had been robbed and murdered on his road home.^(o) In another case, a girl expired in convulsions while her father was in the act of chastising her for a theft, and who was believed both by himself and the bystanders to have died of the beating. Although there were marks of a large number of pretty severe stripes on the body, they did not seem to the medical man who saw it to be quite sufficient to cause death, who therefore made a *post-mortem* examination, from which, and other circumstances,

(l) Theory of Presumptive Proof, App. Case, 2d sec. Also, Beck's Med. Juris. 591-2.

(m) Beck's Med. Jur. 502.

(n) Several instances of this will be found in Beck's Med. Juris., chap. xv. (7th edit.) entitled "Wounds on the Living Body."

(o) Beck's Med. Juris. 558.

it appeared that the girl had taken poison on finding her crime detected.”(p)

§ 1190. One of the most remarkable cases of conviction on this species of evidence, is that of George W. Carawan, a deposed Baptist preacher, who was tried and convicted in Beaufort County, North Carolina, in the fall of 1853, for the murder of Clement H. Lassiter. Carawan was a man of great natural force of character, as well as of ingenuity and courage, but was destitute of any further education than he had picked up in mature years; and was sensual, passionate, and unscrupulous. He lived in a section of the country which is peculiarly destitute of the means of instruction, either moral or intellectual. In one district where he had property, and which he occasionally made his residence—an island in Beaufort County—he acquired such a control over his neighbors as to enable him for some time to defy the attempts of the law to secure his arrest. He was over fifty years of age when the murder for which he was tried took place, and had recently married a second wife, almost immediately upon the death of the first, whose end the subsequent developments showed he had at least hastened. Lassiter, the deceased, was a young man of mild disposition, who had been for some time engaged in the neighborhood as a schoolteacher, and who had been employed in the defendant's house in that capacity. When he was residing there the defendant threw out intimations of jealousy as to an intimacy between his wife and Lassiter, though, as the evidence subsequently showed, without any real ground. It appeared that previous to the death of Lassiter the prisoner had made threats as to him, and that the deceased entertained fears that he would fall a victim to these threats. On Sunday, the 14th of November, the deceased stayed all night at the house of a man named Dorset Mason, with whom he had been boarding, and spoke of his intention to go on the next day out on the turnpike road to Mattamuskeet Lake to get a school, expressing his fears of the prisoner, and speaking of getting some one to go with him. He left Mason's the next morning, with his carpet-bag, and went to the house of Thomas

Bridgman, a neighbor of Carawan, where he dined. After dinner he took his carpet-bag and started on up the road, passing Carawan's house about two o'clock. Carawan was then in the yard, and just before Lassiter appeared went into the house, which was a short distance only from the road, and from which he had an unobstructed view of any and all who might be passing. Lassiter stopped at one or two neighbors, and then passed on along the road towards the lake, and was seen no more alive. Carawan was in his house a short time only after the deceased passed; he then left and went direct across his field and pasture to the woods on the back of his farm, and was soon followed by his wife to the same point, with a double-barrelled gun concealed under her apron. The wife returned shortly to the house without the gun. Carawan disappeared in the woods, and is supposed to have hastened through the woods to a place beside the road, where the murder was committed. Not a great while after Lassiter had gone upon the road a gun was fired in that direction, at quite a distance. Carawan returned to his house at sundown, without his gun. The place was an appropriate one for the perpetration of such a crime, and one likely to be selected. In a few days the non-arrival of Lassiter at his appointment on the lake began to awaken attention. It was ascertained that he had gone that way on Monday. Suspicion began to be excited. His friends became alarmed. It was noised about that he had been murdered. Inquiries were set on foot in all directions, and on Friday a general search was commenced on both sides of the turnpike-road. While the inquiries were going on, the prisoner manifested great interest in the result of them, and made efforts to divert these inquiries into a different channel, suggesting to one of his friends the probability that Lassiter had run away, before this friend had heard that the deceased was missing. The remarkable fact then was developed that Lassiter's dead body had been carried off a long distance from the road, into a dense and almost impenetrable thicket, and there, beneath the mossy turf of a low bottom, so carefully and adroitly concealed that it seemed impossible that any human search could ever discover its hiding-place.

§ 1191. Two men, on Saturday afternoon, after a long and tedious search, which they were about to abandon as hopeless, were led to this place; but how, they could not tell. No mound was there, or footprints, and the moss was smooth and level all alike. A few lumps of dirt, less than a handful in all, and a decaying limb of laurel that had been overturned, were the sole circumjacent indications. There these men found the body, riddled with shot and bullets, crammed into a hole upon its face, the elbows sticking up, and trampled on, and covered with turf. Though Carawan took no part in the search, yet he betrayed his interest during its progress, inquiring where and how far it had been made, and where next they proposed to look. And as soon as the result was announced to him, he prepared a budget of clothes and escaped; declaring, as he went, to his nephew and his servant, "Boys, I must go away, or I shall be hung." He told his nephew, that, if he would tell the people that he was home all day Monday, he would give him the best negro that he had. Some time afterwards he returned to his home by stealth, at night, and surrendered himself to the officers of the law only when he discovered that it was useless longer to hold out. After his arrest, and during his imprisonment, the evidence showed that he was uneasy about the witness whom he had tried to purchase with a bribe, and making further efforts to hire him to leave; in default of this, to get others to get rid of him, "by hook or by crook."

§ 1192. The defendant was convicted; but scarcely had the jury returned their verdict, when he drew from his breast a single-barrelled pistol, rose from his seat in a half sitting posture, leaned forward, and, thrusting his arm between two attendants, took deliberate aim at Mr. Warren, one of the counsel engaged in prosecuting for the State, and fired. The ball struck just above the heart, and, passing through the lapel of his coat, and cutting the cloth on the breast, struck the padding, and fell to the floor. He then dropped this pistol, and, instantly taking another, applied it to his own forehead. One of the officers, observing the movement, seized his arm and pulled it down to the railing of the box, but could get it no further. During this struggle, the prisoner, with great

coolness, leaned his head against the muzzle of the pistol and fired, the ball entering the right side of the skull, considerably behind and somewhat above the ear, and traversing the brain until it lodged just over the right eye. He then dropped on his seat senseless, and died shortly afterwards.

§ 1193. One other remarkable incident accompanied this case. There followed the circumstantial evidence, a supplement of direct testimony, which, though for judicial purposes without value, became interesting for the purpose of showing how completely, in this case, presumption was verified by fact. A negro slave, by the laws of North Carolina, was an incompetent witness; and it so happened that there stood behind the trial in this case a negro man named Seth, in whom Carawan placed great confidence, and who was privy to the whole transaction. His statement, as given after conviction, was as follows: "On Monday night, just before dark (the day on which Lassiter was murdered), whilst Seth was feeding the horses in the stable, his master came to him and told him he wanted him to take an oath to keep secret what he was going to tell him, and made him take the oath. He then told him he had killed Lassiter, and that he must go and help him to bury the body; and to get a pair of leading lines (such as he used to guide the horses in ploughing), and go with him down on the turnpike. The boy got the lines; but asked, as he was about to start, if he was going to leave Carawan Sawyer, and a free negro boy who was then living with Carawan, at home whilst they were gone. Carawan answered that he was not, and then went to the house and sent Sawyer and the free boy to Bell's, as stated in the trial. They then started, and when they got to Yankee field Carawan took a strong rail from a fence which inclosed a small garden. When they got to the two pines, Carawan led the way a few yards to the bushes, and there lay the body of Lassiter. The negro was terribly frightened, and thought he heard somebody coming on the road, but it was only his heart beating. The coat had been taken from the body, and doubled under it. Carawan said he had done this to keep the blood from running on the ground. He told the negro that he had concealed himself close to the two pines, and just as Lassiter had passed he rose up to shoot him.

In taking aim he stepped on a dead bush, which broke under his foot. The noise attracted Lassiter's attention; he turned partly around, and saw him. He cried out, 'O God!' and fell. He rose up straight again, but fell instantly. Carawan sprang into the road, seized the body, and threw it into the bushes, and then with his hands scraped up the blood in the road, and casting it into the ditch, threw some juniper-wood upon it. He then went to the body, and dragged it further off from the road, took off the coat, doubled it up, and laid the body upon it, so that the coat was directly under the wounds. The first thing Carawan and the negro did was to put the coat upon the body. This was done hurriedly, and then they tied him 'hog-fashion,' Carawan pulling the body about, and jerking the line very roughly to tie it; and then they fastened him to the rail. They first attempted to take him through the woods and bushes, direct from the pines to the spot back of the Yankee field, selected by Carawan for the burying place. The negro being much shorter than Carawan, and the ground uneven, they stumbled and fell, and in the darkness found it impracticable to go through that way.

§ 1194. "Carawan then told the negro they must take the road—that if any one should be coming behind or before they would hear in time to step aside in the bushes; but that in fact no one would be travelling at that time of night, especially as it was very cold. They accordingly took the body up the turnpike to the east end of the Yankee field, and then carried it into the woods. They had much difficulty, and fell with the body several times. On such occasions Carawan would fly into a passion and kick both the negro and the body, sometimes stamping the latter. When they reached the spot which Carawan had previously fixed upon, they laid the body down, untied it, and prepared to bury it. Carawan first cut the turf with a knife, took it off and laid it aside, the negro helping as he was wanted.

§ 1195. "They then commenced digging the grave with sticks, taking the dirt out with their hands and putting it into their hats, and then throwing it into the woods. They did this in order not to leave any dirt about the grave. Finding this process difficult and tedious, Carawan ordered the

negro to go to the house and get a hoe. He said he was afraid to go. Carawan insisted, and the negro started, concluding in his own mind to go to the neighbors and betray him. But before he had gone fifty yards, Carawan called him back. They put the body as well as they could into the hole they had partially dug, and covering it over temporarily with the turf, left it and went home, taking the rail and line with them. On Wednesday, which was a rainy day, Carawan went out alone with a hoe and completed the work of burial."

§ 1196. The negro further stated, "that, as soon as the body of Lassiter was found, Carawan came into the woods where he and Sawyer were cutting wood, and told them that Lassiter was found, and he was going away, as he would be hung if he staid there—that he should send for his family, and wanted Sawyer to come with them. He then took the negro with him to the turnpike and told him to go up on the road and see if anybody was in sight either way. On his reporting there was none, Carawan crossed the canal, and the negro saw no more of him till he came back from Tennessee. He was constantly on the look-out for his return. He was afraid if Carawan came back and caught him he would kill him. He saw some one cross the yard and go into the house, and as soon as he became satisfied it was Carawan, he ran with all his might to one of the neighbors and told that his master had come back."

§ 1197. Akin to this are the results of recent extraordinary exertion on horses used by defendants, a point which is worthy of consideration, when it was necessary that some distance should have been rapidly travelled in order to enable the suspected party to pass from the spot where the crime was committed to his place of retirement. This is illustrated in the trial of Ilow, who was convicted in Alleghany County, N. Y., in 1824, for the murder of Othello Church.^(g) The prisoner's house here was some distance from the deceased's, and there were several circumstances (*e. g.* old grudge, etc.) which indicated the defendant as a likely party to have committed the murder. Immediately upon the alarm being given,

(g) 2 Wheel. C. C. 412.

two of the neighbors took sleighs, the snow being on the ground, and proceeded at once to the defendant's house. The defendant was at home, and nothing particular about his appearance or dress was discoverable. On proceeding to the stable, three horses were found, one dry and blanketed, the next very wet, having the appearance of natural sweat, and was smoking greatly. On this point considerable evidence was taken as to the tendency of horses, when subject to particular diseases, to sweat in the night season in the manner described. There was other evidence with regard to the instrument of death, which left little doubt, and the result was a conviction and a subsequent full confession.

VIII. POSSESSION OF FRUITS OF OFFENCE.

§ 1198. When property has been taken from the deceased, the possession of it in a third party opens, of course, an important avenue of inquiry. It should not be forgotten, however, that *light* articles, such as form suitable earmarks, would be much more likely to be secreted by an assassin on the person or on the property of another.^(r) A distinction here exists between articles of great value and trifles, such as may have been collateral to the homicidal intent. The possession of the *first* gives an overweening presumption of complicity; that of the *second*, if there has been time for the purpose, is equally likely to have been the result of the artifice of another.

§ 1199. With regard to the general properties of indicatory testimony, it is important to keep in mind, that, whatever may be the differences as to its value in other respects, it has some very decided advantages over the direct testimony of a limited number of witnesses, and which are thus clearly stated by Mr. Bentham, "First, by including in its composition a portion of circumstantial evidence, the aggregate mass on either side is, if mendacious, the more exposed to be disproved. Every false allegation being liable to be disproved by any such notoriously true fact as it is incompatible with, the greater the number of such distinct false facts, the more the aggregate mass of them is exposed to be disproved; *for it is the property of the*

(r) See *ante*, § 1174.

mass of circumstantial evidence, in proportion to the extent of it, to bring a more and more extensive assemblage of facts under the cognizance of the judge. Secondly, of that additional mass of facts, thus apt to be brought upon the carpet by circumstantial evidence, parts more or less considerable in number will have been brought forward by so many different deposing witnesses. But, the greater the number of deposing witnesses, the more seldom will it happen that any such concert, and that a successful one, has been produced, as is necessary to give effect to a plan of mendacious testimony, in the execution of which, in the character of deposing witnesses, divers individuals are concerned.”(s) In short, a conclusion of guilt, deduced from a process of well-collected reasoning, upon evidence purely presumptive, may be quite as convincing, and in some cases infinitely more so, than one arising from direct testimony.(t)

D. INFANTICIDE AND FŒTICIDE.(#)

I. HOW FAR FŒTICIDE IS AFFECTED BY THE DEGREE TO WHICH GESTATION HAS PROCEEDED.

§ 1200. By the common law, as expounded by the earlier text writers, the destruction of an infant *en ventre sa mere* was a high misdemeanor, no matter what was the stage of gestation;(u) and, if the death occurred at any time subsequent to birth, the offence was murder.(v) The law in respect to fœticide, in England and in most of the United States, it is true, has been settled by statutes which will presently be noticed; but, before proceeding to their consideration, it is important to observe that on the general question of the amenability to indictment of the offender in all cases where the life of the fœtus has been destroyed, there has been a concurrence of judicial sentiment wherever the point has arisen. Where such injury has been attempted by violence to the mother, there can be, of course, no doubt. All assaults are indictable, and the guilty

(s) 3 Benth. Jud. Ev. 251.

(t) Best on Presumption, § 194.

(#) See this subject medically examined, *ante*, §§ 84–107, 108–178.

(u) 3 Coke's Inst. 50; Bract. I. c. c. 31; 1 Hawk. c. 13, s. 16; 1 Rus. on Cr. 671; Wh. C. L. § 942.

(v) R. v. Senior, 1 Mood. C. C. 346; Wh. C. L. § 942.

party, upon conviction, is punishable with fine and imprisonment; nor, when the offence takes this shape, is it necessary that the aggrieved party should have been even touched. Thus, it has been held that throwing a squib,^(w) shaking a whip, and presenting a gun,^(x) form an assault; and so far has this doctrine been pushed, that it has been ruled that a party, who enticed a young girl into a private place, and there exposed his person to her, might be convicted of an assault with an intent to commit a rape, though there was no evidence that he actually touched her.^(y) Nor is it necessary that there should be resistance, if there be not complicity. Thus, where a medical practitioner had sexual connection with a female patient of the age of fourteen years, who had for some time been receiving medical treatment from him, upon the jury finding that the injured party was ignorant of the nature of the defendant's act, and made no resistance, solely from a *bonâ fide* belief that the defendant was (as he represented) treating her medically with a view to her cure, the fifteen judges of England held that the defendant was guilty of an assault.^(z) Had he intended to consummate the offence by force, it would have been rape.^(a)

§ 1201. Where, therefore, there is no statute defining the offence and prescribing a special penalty, there is no doubt that the attempt to commit fœticide by a third party is unpunishable by an assault, provided the mother be not an accomplice. Where, however, she consents, this form of prescribing must be abandoned, and the term "assault," if inserted in the indictment, discharged as surplusage. In such a state of facts, an interesting question arises, which was anticipated in England by the early enactment of a statute providing for the whole subject matter, but which, in the United States, has been the subject of much conflicting adjudication. It being everywhere conceded, that producing the abortion of a *quick* infant is indictable at common law, the courts of Massachu-

(w) 2 W. Bl. 892.

(y) *Hays v. People*, 3 Hill 351.

(a) *Ante*, § 273.

(x) 1 Hawk. c. 62, s. 1.

(z) *R. v. Case*, 1 Eng. R. 544.

setts,(b) of New Jersey,(c) and of Iowa(d) have held, that, unless the infant is quick, the offence is not indictable unless made so by statute. The contrary opinion has been advanced and carried into effect with equal resoluteness by the Supreme Court of Pennsylvania.(e) This conflict of authority has been fully considered elsewhere, and it was there maintained, after a full examination of authorities, which it is not necessary now to review, that the protection of the law was cast round an unborn child from its first stage of ascertainable existence, no matter whether "quickening" had taken place or not. Except, however, in those States in which no legislation on this branch of criminal law has been had (and they are but few), the point has ceased to be of practical importance; but in those jurisdictions where the common law still exists untouched, and where there has been as yet no judicial settlement of the immediate question, it may still be contended with far the greater show of reason, if not of authority, that to make the criminality of the offence depend upon the fact of quickening is as repugnant to sound morals as it has already been shown to be to just medical judgment. That it is inconsistent with the analogies of the law is shown by the fact, that an infant, born even at the extreme limit of gestation after its father's death, is capable of taking by descent, and being appointed executor.

In most of the States, however, statutory provisions now exist by which feticide is made the subject of specific penalties.(f)

§ 1202. Mittermaier proposes the following points of inquiry:—

1. Whether the pregnant female was aware that the means employed were such as, *under the circumstances*, would be likely

(b) *Com. v. Parker*, 7 Met. 263; *Com. v. Bangs*, 9 Mass. 387. See as to present law, *Com. v. Wood*, 11 Gray 95.

(c) *State v. Cooper*, 2 Zabriskie 57.

(d) *Hatfield v. Gano*, 15 Iowa 177; *Abrams v. Foster*, 3 Clarke 274.

(e) *Com. v. Demain*, 6 P. L. J. 29; *Mills v. Com.*, 1 Harris 631; see *State v. Howard*, 32 Vt. 380.

(f) *Wh. Cr. Law*, § 1214, etc.

to produce abortion, or to effect the death of the child in the womb.

The same author remarks that the question whether the means used were means for producing abortion is not pertinent, since all such means may also serve other purposes. Everything depends upon the circumstances under which the means were used. As, for instance, grains of ergot, savin, and all such so-called means of abortion, if taken in small doses and continued only for a short time, will have no such effect. The same is also true of the mechanical means employed.

Where an abortion had been effected by the use of instruments and the administering of ergot, and the patient had died from the effects, the parts of the person upon whom the instruments were used for the purpose of procuring an abortion, which had been preserved, were properly allowed to be submitted to the inspection of the jury in connection with the testimony of the physician who made the *post-mortem* examination.(g)

§ 1203. 2. *Has the accused employed certain supposed means?*—The physician will seldom be able to answer this question positively. There are no means which are attended with such peculiar symptoms as to leave no doubt that they were employed. The appearances resulting from the use of mechanical means may also be produced in many other ways. Hence, in such cases, other evidence must be sought in addition to that offered by the physician.

§ 1204. 3. When the result proper to the employment of certain means is observed, and when it is established that the accused actually employed such means, may the result be attributed to the use of the means?

§ 1205. Upon this point Mittermaier very properly remarks that it cannot be concluded simply because abortion has followed the use of certain means of abortion, that it actually resulted from the use of such means. In some such cases it may be shown that the abortion did not result from the means employed, but was produced by some other circumstances. In

(g) Com. v. Brown, 14 Gray 419.

each case the physician should be very careful to examine whether any such circumstances exist.

To these questions proposed by Mittermaier, Dr. Böcker(*h*) adds the following:—

§ 1206. 4. Whether means have been employed which could produce abortion.

Everything here depends upon the manner in which such means were used. A pregnant woman may eat, for instance, once or twice a day a grain of ergot without detriment, while twenty grains taken daily for a week together would certainly cause abortion.

5. Has there been a miscarriage?

6. Did the fœtus in question come from the accused?

7. What facts are there which lead to the conclusion that the abortion was produced intentionally on the part of the mother, or of some other person, or that it occurred through carelessness or from accident?

8. To these may be added the question whether the fœtus was alive at the time of the operation. If dead, and known by the operator to be so, the statutory offence is not made out.(*i*)

While it is possible to produce abortion by the use of certain remedies, and also by mechanical means, yet it will be very difficult to prove in any given case that the abortion resulted from the use of such means, or that the use of such means caused the child to be born dead.

II. HOW FAR THE OFFENCE IS AFFECTED BY THE FACT OF BIRTH.

§ 1207. While, as has been seen, it is a misdemeanor at common law to kill a child in its mother's womb, the offence becomes murder if the child dies after birth in consequence of violence inflicted before delivery. It was decided, in fact, at a very early period, that if a child die *after* birth in consequence of a potion or bruises administered *before*, the offence is murder.(*j*) And *a fortiori*, when a blow is inflicted on a child's head *during* birth, and it is afterwards born alive, and then

(*h*) Gericht. Med., § 115; and see fully *ante*, §§ 1-22, 84-107.

(*i*) Com. v. Wood, 11 Gray, Mass. 85.

(*j*) Wharton on Hom. 93-3; Wharton's Crim. Law, §§ 942, 1220.

dies, the same result obtains.(*k*) But the fact of actual birth must be shown, and mere breathing is not enough for the purpose.(*l*) It is no defence that the child died in consequence of want of viability, resulting from premature delivery, if this delivery was caused by the defendant's misconduct in bringing about a miscarriage for the purpose of destroying the child.(*m*)

§ 1208. The confidence reposed by courts in former days on the hydrostatic test was entire; and several executions took place on testimony of viability of this character alone. Such, however, is no longer the case. On the trial of a woman in 1835, at Winchester Spring Assizes, in England, it was proved that the lungs were inflated; but on cross-examination the medical witness said that if the child died *during* birth the lungs might have been inflated. As the question of guilt depended upon the child having been *born* alive, and as the fact of the inflation of the lungs was the only evidence of life that was produced, Mr. Baron Gurney stopped the case.(*n*) A single sob during birth is enough to produce inflation.(*o*) And where on an indictment for infanticide it appeared in evidence that the child's throat was cut, the wound dividing the right jugular vein, and that the lungs floated in water, and proved to have been inflated; but the medical evidence showed that this test only proved that the child must have breathed, and not that it had been born alive, and that there were instances of children being lacerated in the throat in the act of delivery—Mr. Baron Park told the jury, that, if they entertained doubts as to whether the child was born alive, it was hardly necessary to go into evidence on behalf of the prisoner. The jury, without going further, returned a verdict of acquittal.(*p*)

(*k*) R. v. Senior, 1 Mood. C. C. 346.

(*l*) Wharton's Crim. Law, §§ 942, 1220.

(*m*) R. v. West, 2 Car. & Kir. 783; Wharton on Hom. 192-94.

(*n*) R. v. Simpson, Cummin on the Proof of Infanticide, p. 40.

(*o*) R. v. Davidson, 1 Hume's Com. 486.

(*p*) R. v. Grounell, Wills on Circum. Ev. 205.

III. TESTS OF VIABILITY RECOGNIZED BY THE COURTS.

§ 1209. Some fluctuation of sentiment has existed as to how far it is necessary for the child to be actually produced.^(g) While on the one hand, it is not enough for the child to have breathed, unless the whole body was brought into the world,^(r) and while more than one learned judge has expressly ruled that there must be an entirely independent circulation,^(s) on the other hand, the fifteen judges have united in holding, that to constitute such an independent existence, so as to constitute murder, it is not necessary that the child should have breathed,^(t) nor that the umbilical cord should be severed.^(u) For this conclusion two reasons are given; one rested on legal, the other on medical foundation. "If that" (the reverse) "were the law," said Vaughan, J., "the child and the after-birth might be completely delivered, and yet, because the umbilical cord was not separated, the child might be knocked on the head and killed, without the party who did it being guilty of murder."^(v) In another case, on the part of the prosecution, there was strong evidence to prove that the child had been wholly produced alive from the prisoner's body, and that she had strangled it by fastening a handkerchief, or some such thing, around its throat; but it was clearly proved by Mr. Wood, the surgeon who examined the body of the child, that it must have been strangled before it had been separated from the mother by the severance of the umbilical cord; and it was further stated by Mr. Wood that a child has, after breathing fully, an independent circulation of its own, even while still attached to the mother by the umbilical cord; and that, in his judgment, the child in question had breathed fully after it had been wholly produced, and had, therefore, an independent cir-

(g) As to viability, see *ante*, §§ 41, 66-7, 128.

(r) *R. v. Poulton*, 5 C. & P. 229; *R. v. Enoch*, 5 C. & P. 539; *R. v. Wright*, 9 C. & P. 754.

(s) Parke, J., *R. v. Enoch*, 5 C. & P. 539; Gurney, B., *R. v. Wright*, 9 C. & P. 754.

(t) *R. v. Brain*, 6 C. & P. 349.

(u) *R. v. Trilloe*, 1 Car. & Mars. 650; S. C., 2 Mood. C. C. 413.

(v) *R. v. Reeves*, 9 C. & P. 25.

ulation of its own before and at the time it was strangled, and was then in a state to carry on a separate existence. "If you are satisfied," said Erskine, J., to the jury, "that this child had been wholly produced from the body of the prisoner alive, and that the prisoner wilfully, and of her malice aforethought, strangled the child after it had been so produced and while it was alive, and while it had, according to the evidence of the surgeon, an independent circulation of its own, I am of opinion that the charge is made out, although the child, after it was so strangled, still remained attached to the mother by the navel string." The prisoner was convicted, and, upon a case reserved, the judge held the conviction right.(w)

(w) *R. v. Trillor*, 1 Car. & Mars. 650; S. C., 2 Mood. C. C. 413.

The reader is referred on this point to the following able opinion delivered in 1865, in the Probate Court of the City and County of San Francisco. In the matter of the Petition of Henrietta M. Garwood for Letters of Administration of the estate of Joseph M. Garwood, deceased.

The petition is in the usual form, and, if its allegations have been sustained by the testimony, its prayer should be granted. The application for letters is contested upon the alleged ground that the child, named Joseph M. Garwood, was not born alive.

Joseph S. Garwood was a resident of this country, the husband of the petitioner, and the son of Joseph Garwood, who is the contestant. Joseph S. Garwood died on the 22d day of February last, and administration of his estate was granted by this court to his widow, the petitioner. On the 18th day of May, A.D. 1863, the petitioner gave birth to a child, the offspring of her marriage with Joseph S. Garwood. If this child was born alive, it had an interest in the estate of its father.

From the testimony on the hearing, the following facts appear: Mrs. Garwood was confined on the 18th day of May last. Her labor was long and severe. The physician found her, at 1 o'clock in the morning, "with strong labor-pains upon her," and she was delivered between 3 and 4 o'clock in the afternoon of the same day. Within an hour after the arrival of the physician, the head of the child rested at a point from which it was not dislodged by the natural process. Medicine was administered, but failed of the purpose intended, and the head was delivered about 3 o'clock P.M., by means of forceps. The delivery of the head was half an hour in advance of the delivery of the body. About fifteen minutes after the delivery of its head, the child breathed, "drew four or five breaths," and struggled violently, which, in the opinion of the physician, increased the pains, which subsequently expelled it from the body, "in probably not less than ten minutes." During this period the shoulders and chest were so compressed that breathing was impossible. After the delivery of the body, the child did not breathe, but there was circulation between the child and mother through the umbilical cord, the

§ 1210. The following legal propositions may be considered as now undisputed:—

beating of the child's heart, and muscular movement of the extremities, the hands and feet. The muscular movements continued a very short time, immediately after the delivery of the body. The umbilical cord was severed about fifteen minutes after the delivery of the body, and the heart beat after the severance two or three minutes, ceasing gradually, which was the last action or movement of any part of the child's system.

Efforts were made to resuscitate the child, such as sprinkling it with cold water, slapping it with the hand, rolling it, artificial breathing, and all the usual methods. This was before the severance of the cord. After the severance, little was done, except putting it into warm water, supplying heat, and inflating the lungs. "There was no response to the inflation of the lungs." The child never cried. It should be added, that it appeared from the testimony of the petitioner that her general health and that of her husband was good; that she first discovered indications of fœtal life in December, 1862, namely, motions, slight at first, but which continued at intervals with increased power, to the time of delivery. Her own testimony and that of the physician showed that the period of gestation was the full term.

Was this child born alive?

* * * * *

Considering it, then, as settled, that, to acquire the right to inherit and transmit property, the child must be born alive—that is, must be alive after a complete delivery—we might next attempt a definition of life. But is any definition necessary? Is it within the capacity of any man to give us a definition which could aid us in our inquiries? We know life by its manifestations, and not otherwise. If a child has just come into the world, and has not breathed, cried, or moved, there is naturally an anxious inquiry on the part of all present as to its possessing life. No one, whether ignorant or learned, stops to inquire what life is, and doubtless the most ignorant and the most learned are equally intelligent in regard to it. But the child cries, and all know there is life. They do not see life, they do not hear it—the sound is not life—but all recognize the crying as a sure sign of life. It is not in every instance so easy to determine what are signs of life, but we always judge of the fact of life from acts or circumstances which seem to us to be indications of it.

We are then to look at the acts or manifestations of life in the case of the child, named Joseph M. Garwood, after its delivery, and determine from them, as well as we can, whether it was born alive.

In cases analogous to this, crying has always been considered the best or most satisfactory evidence of live birth, and at an early day in the history of our law was deemed an indispensable test. This was the doctrine of Glanvil and Bracton. (1 Greenleaf's Cruise, p. 157, § 16.) Littleton, however, seems to have doubted whether it was necessary to prove that the child cried. The rule, as laid down in *Dyer's Reports* (Dyer 25), is that it is sufficient, "although the issue be not heard to cry, so it can be known that it hath life, for it may be that the issue is dumb." In Paine's case (Paine's Case, 8 Coke's

(1) Where there is a malicious wound inflicted on an infant, with intent to produce death, and death ensues *after birth*, the offence is murder.

R. 34), reported by Lord Coke, the rule is stated in nearly the same words as in Dyer.

Blackstone says (2 Black. Com., p 127): "The issue must be born alive. Some have had a notion that it must be heard to cry; but this is a mistake. Crying, indeed, is the *strongest* evidence of its being born alive; but it is not the only evidence." Taylor says, "The visible respiration of a child after its birth, or as it may be manifested by its *crying*, is an undoubted sign of its having been born alive."

That crying or breathing is sufficient evidence of live birth is unquestionable. But this child never cried, nor, so far as could be discovered, did it breathe after its birth.

According to Coke (1 Institutes, cap. 4, sect. 35), "motion, stirring, and the like" are proof that the child was born alive. Taylor says: "The pulsation of a child's heart, or even the spasmodic twitching of any of the muscles of the body, is regarded as a satisfactory proof of live birth." Wharton and Stillé say ([30 a] their Med. Jur., ed. 1860, § 327): "Every spontaneous movement is an evidence of life." The last-named writers do not probably mean that every such movement is a sufficient evidence of life, for they add: "To what degree these must be carried to constitute evidence of life before a court of law, it is not for us to determine."

That motion of any part of a human body ordinarily indicates life will not be questioned. That every kind of motion does so seems to be questioned by good authority. In *Fish v. Palmer*, decided in the Court of Exchequer at Westminster Hall, in 1806, the question was whether a certain child was born alive. It appeared from the testimony that the attending physician (deceased at the time of the trial) had declared an hour before the birth that the child was alive; that it did not cry, nor move, nor show any symptoms of life, except that upon being put into warm water; there twice appeared a twitching and tremulous motion of the lips. Of the physicians examined as witnesses, two agreed that this child was alive after its birth, while one gave it as his opinion that it was not alive. Upon this testimony the jury found that the child was born alive. This case can be entitled to but little authority as a precedent. So far as we can learn, it has no place in any volume of reported cases. We do not know what instruction was given the jury by the court. All we can infer is that the court considered the testimony competent, and that the jury considered it sufficient. The case would seem to be entitled to no more consideration than was given it by the character of the witnesses. If the two physicians were correct in their opinions, the verdict was right; if the other was correct, the verdict was wrong.

Of the recent writers on medical jurisprudence, Dr. Taylor approves the case of *Fish v. Palmer*. (Taylor, Med Jur., p. 429.) Referring to it, he says: "It cannot be admitted physiologically that any tremulous motion in the muscles could ever take place spontaneously in a dead body; and the

(2) Where there is a malicious exposure of an infant, with intent to produce death, and death ensues *after birth*, it is murder.

spasmodic motion of the lips differs only in degree from the active motion of a leg or an arm." Again: "It has been objected to this view of the case, that the motion described may have been the mere remains of muscular irritability, and not a sign of actual life. I am unable to perceive the force of this objection. Irritability, as manifested by spontaneous motion, is not a property of dead matter, and the remains of irritability must, physiologically speaking, be regarded as the remains of life or of a vital power in the muscles." Dr. Taylor, however, refers to a case stated by M. Mare, "somewhat similar, but in which the medical opinions were opposed to his views." I find the names of some other writers whose views coincide with those of Dr. Taylor, but how far their opinions are entitled to respect, I cannot learn.

On the contrary, it is said of that case in *Beck's Medical Jurisprudence* (12th edition, vol. i. p. 415): "The proofs of life relied on are equivocal. It has been suggested, and I think with truth, that the convulsive motions merely show that the muscular fibre has not yet lost its contractility. Still-born infants, or those who die instantly on being delivered, are not unfrequently observed to open their mouth, and extend their arms or legs. May not these be merely the relaxation of a contracted muscle, or the stimulus of the atmospheric air on a body unaccustomed to it?" And in support of this dissenting opinion, the author quotes or refers to the statements of other medical writers of the highest authority.

* * * * *

It seems to me that the weight of authority is adverse to the decision in the case of *Fish v. Palmer*. Indeed, it seems to me that the most common observation of the bodies of animals recently killed, must be sufficient to show that there is a "twiteling and tremulous motion," which is not an indication of present, though it doubtless is of recent life.

I think the rule laid down by Wharton and Stillé, that "every spontaneous movement is an evidence of life," is best sustained by such English and American authority as we are favored with. I suppose this includes every voluntary movement and every natural action of any part of that internal organism, self-acting so far as relates to ourselves, by which "we live, and move, and have our being," every action of any part of the human system which is the result of "its own impulse, energy, or natural law, without external force." It excludes every muscular movement which comes not through the will, or which is not the result of its own impulse or natural law, but is caused by some extraneous force, acting directly and ultimately upon the muscular system, whether that force be electricity, or cold, or the atmosphere, or any other external agency by which the muscles of the human body may be affected. It excludes every movement or action which, from any cause, may be manifested in a body from which life has ever so recently, and from whatever cause, departed.

Before testing, by this rule, the facts which appear in this case, it may be

(3) Where there is a wanton exposure of an infant, without the intent to produce death, but with the expectation of shift-

well to look for a moment at the testimony of the physicians who were examined on the hearing. There were two—Dr. Whitney, who attended Mrs. Garwood during her confinement, and Dr. Gibbons. Both were of the opinion that the child was born alive. Dr. Whitney spoke of the circulation between the child and the mother through the umbilical cord, the beating of the child's heart, and the muscular movement of the extremities, as evidences of life, but he did not testify as to the force or conclusiveness of any one of these facts, by itself considered, nor did Dr. Gibbons. I regret that the testimony is not more specific. That it is not, is not, of course, the fault of the witnesses, and I am far from saying that it is the fault of any one. I only say that, as it was intended to enlighten one almost entirely ignorant of the deductions to be drawn from the principal facts, if it had shown these with more particularity, it would be more satisfactory.

Tested by the rule before stated, I am of the opinion that the muscular movement of the extremities shown in this case does not show that the child was born alive. In the absence of any testimony upon this point, I cannot infer that this motion was spontaneous, and my opinion is that it was not.

I am not sufficiently informed to enable me to determine whether the fact of the circulation between the mother and child, can be tested by this rule. I know the attending physician considered it an evidence of life, but evidence is a very indefinite term. I am entirely without knowledge of the importance which ought to be attached to this fact.

The beating of the heart is a fact of another character. That it is ordinarily satisfactory evidence of life, we know, independent of the testimony of physicians. The fact of the beating of the heart being once established, it would seem incumbent upon those who would deny the inference which naturally follows, to show that, in the particular case, the action is not spontaneous, is not "the result of its own impulse, energy, or natural law." There was no examination for the special purpose of illustrating this point, and though a portion of the testimony of Dr. Gibbons, as it appears on my minutes, might throw some doubt upon it, I do not suppose, from the general tenor of his testimony, that he intended to say that the beating of the heart might go on in the absence of life. I am not unaware that cases have occurred in which physicians of the highest eminence have considered the beating of the heart as no proof of the presence of life, and I am not free from suspicion that in the instance in question, the real cause may be something else than cotemporaneous vitality; but a court could hardly declare this, independent of testimony.

In connection with the fact of the beating of the child's heart, and as giving character to it, I think the general testimony of the physicians as to the child's being born alive, the testimony of the petitioner as to her uniform good health, and the indications of foetal life continuing from an early period to the birth of the child after the full period of gestation, and the testimony of the attending physician as to the manifestations of life between the delivery

ing the support of the infant upon some third person, and death ensues *after birth*, it is manslaughter.

of the head and of the body, may well be considered. I do not mean that any manifestations of life before a complete delivery can establish the fact of live birth, but it would seem that such manifestations might give increased significance to any movement in the system subsequent to delivery.

All the circumstances considered, my conclusion is, that, in the case in question, it should be held that the beating of the heart was spontaneous, and that the child was born alive.

I think the conclusion I have announced is in accordance with the intimations, dicta, and decisions of the English courts, in civil cases, since the 28th year of Henry III., the date of the case before cited from Dyer, and also in accordance with the views of a majority of English and American writers on medical jurisprudence. It must, however, be confessed that there are very few cases to guide us. Indeed, it is hardly too much to say that there is not a case, English or American, in which it can with certainty be said that the questions involved in this case have been considered and determined, nor one which can very much aid us by its analogies. The case in Dyer, if case it can be called, is the mere announcement of an opinion. There are no names or facts given. Doubtless there were both persons and facts connected with the case, but we are ignorant of them. Paine's case, reported by Lord Coke, gives what would now be considered mere dicta as to any other evidence than crying being sufficient to prove live birth, for in that case, "to remove all scruples, it was found that the child was heard to cry." Of later cases, I have only found two, *Fish v. Palmer*, before referred to, and *Llewellyn v. Gardiner et al.*, decided in 1854; though, doubtless, there are others. In the last-named case, the only question was whether the child cried, and it was found that it did. As a precedent the case is unimportant. The opinions of writers on medical jurisprudence are by no means uniform, and are not always satisfactory. Cases of this character seem to have been investigated much more frequently, and with much greater research and learning, in France and Germany, than in this country or in England. I am satisfied that in a French court it would not be held that this child was born alive. I did not forget that in France, proof of respiration is required to establish live birth, but independent of this, it is believed that the French medical jurists would hold that the child in question was not born alive. They manage such matters better there than here. Questions of this character are, sometimes at least, referred by the courts to their most eminent physicians, and the result is as liberal and enlightened as it can be rendered by all the learning of modern times. I have, however, in the determination of this case, felt bound by what seemed to me the weight of English and American authority. I have not endeavored to establish any new rule—I have only desired to find the rule already established. If this case should be carried to the Supreme Court, it may be determined upon more liberal principles. That tribunal may regard it in the light of continental learning. It may re-establish the rule as laid down in Glanvil and Bracton, and as it has ever stood in the Scotch law, and

(4) Where there is an exposure resulting from necessity, ignorance, or insanity, and death ensues *after birth*, the offence

make crying the only sufficient test of live birth, a rule recommended by its simplicity and certainty, and, as it is said, by sound physiological reasons. There is, in the way of the old rule—less than might be supposed—only a few centuries, and a few decisions and opinions, all of which, the decisions and opinions, are founded on an idea, now known to be false, namely, that a child born dumb could not cry. However this may be, I am glad this case is of such a character that any error here can be effectually remedied on appeal.

Before closing, I shall briefly refer to a few cases, English and French, which seem at variance with my conclusion in this case, and which long made me doubt, and which still leave me in some doubt of its correctness.

In *Rex v. Enoch and Pulley* (5 Car. & P. 539; 9 *Ibid.* 754; 1 Car. & M. 650), in which the defendants were charged with the murder of a child, Mr. Justice Parke held that “there must have been an independent circulation in the child, or the child cannot be considered as alive for this purpose,” or, in other words, without an independent circulation it cannot be considered so far born alive that it is murder to kill it. The same rule was laid down in several subsequent cases of a similar character. Now, I do not know that anything more is required to establish live birth in cases of infanticide, than in cases of inheritance. If however, this rule should be applied in this case, I could not determine from the testimony that an independent circulation in the child had been established. It may have been established, and may be clear enough to one capable of making the proper deductions from the facts proven, but to no other person. I did not, however, allow the rule as declared in the cases referred to in this connection, to affect the determination of this, because I doubted whether it was a well-settled rule, and because I could not find that it had been anywhere recognized as applicable in civil cases.

A case is stated in Beck's *Medical Jurisprudence* (vol. i. pp. 419, 420, 421, 12th ed.), which I shall condense here: “In 1834, a female in France, supposed to be eight months advanced in pregnancy, was seized with convulsions and died. About a quarter of an hour after her death a child was extracted by Dr. Carbaret, by the Cæsarian operation. This physician swore that he saw the chest and ribs move; that there was pulsation in the umbilical cord, and also at its base, after it was cut off, and that on laying his hand on the region of the heart, he felt it beating. The body was put into a warm bath, and immediately on immersion the right hand was raised toward the head, and a slight respiration ensued. This testimony was confirmed by several female witnesses. The question was put to several physicians, whether the child had lived. Velpeau gave an affirmative answer. Orfila, Dubois, Pelletan, and others were of a contrary opinion. The same question, with another, was finally referred to Drs. Marjolin, Roux, and Marc. They were of the opinion that the motion of the arm was mechanical, owing to the stimulus of immersion acting on the remains of fetal life, and so with respect

is excusable homicide, in which, in accordance with an American practice, the defendant is entitled to an acquittal. The leading cases from which these principles are extracted are as follows:—

§ 1211. Ann Walters, the prisoner, who was an unmarried woman, had taken a place in a stage-wagon, on the 13th of April, 1841, and started in the wagon at about ten o'clock on that night, at the Wellington Inn, which is situated on the Malvern Hills. The evidence showed that she must have left the wagon after that time, as she overtook it at Ledbury. It further appeared that she was delivered of a female child at the roadside, between the Wellington Inn and Ledbury, and that, after the child was born, she had carried it a distance of about a mile to the place at which it was found dead, which was also at the roadside. It further appeared that this was a much frequented road, and that two wagon teams and several persons were on it about the time at which the child was left; and that a wagoner, named Weaver, who was passing along the road, heard the child cry, but, instead of going to tender any assistance, he went on, and told some other persons, who went to the place where the child lay, and there found it dead from cold and exhaustion. The body of the child was found quite naked. It further appeared that the prisoner had arranged with a woman named Thomas to be confined in her house. It was urged for the prisoner by Mr. Charles Phillips,

to what Dr. Carbaret considered to be respiration, and, in fine, they found that *all the indications might be referred to the remains of fetal life.*" From the similarity between the facts in this French case and the case of the child of the petitioner, the conclusion arrived at in the former, by so many physicians of the greatest learning and experience, might seem to be entitled to control our conclusion in the latter. I will not say that the same conclusion might not be proper in our courts, upon the same testimony, but I doubt if a court could properly make the same deductions from the same general facts, unaided by the testimony of experts. Besides this, the French medical jurists seem to make a distinction between uterine and extra-uterine life, which appears to have been intimately connected with the result arrived at in the case last cited, but which, I think, has never been recognized by the courts of this country or England, and not generally by our medical jurists. Whatever physiological reasons may exist for this distinction, our law seems to regard life, present in the body after birth, as sufficient in this class of cases, whether that life is uterine or extra-uterine.

the eminent criminal barrister, that it was clear that the prisoner had no original intention of destroying the child, as she had made arrangements for the taking care of it. He insisted, also, that there was equally little doubt that she had got out of the wagon when seized with the pains of labor; that she had carried the child, after its birth, as long as her strength would allow, and that she had then laid it on the roadside, hoping that some passer-by would render it assistance. Mr. Justice Coltman told the jury—and his charge has since been uniformly followed—that, if a party do any act with regard to a human being, helpless and unable to protect itself, which must necessarily lead to its death, the crime amounts to murder; but, if the circumstances are not such that the party must have been aware that the result would be death, that would reduce the offence to the crime of manslaughter—provided the death was occasioned by an unlawful act, but not such as to imply a malicious mind. There have been cases, he said, where it has been held that persons leaving a child exposed and without any assistance, and under circumstances where no assistance was likely to be rendered, and thereby causing the death of the child, were guilty of murder. “It will be for you,” he continued, addressing the jury, “in the present case, to consider whether the prisoner left the child in such a situation that, to all reasonable apprehension, she must have been aware the child must die, or whether there were circumstances that would make it likely that the child would be found by some one else, and its life preserved, because then the offence of the prisoner would be manslaughter only. It is impossible to say that the offence of the prisoner could be less than manslaughter. It is for you to consider whether, under all the circumstances, the child was left in such a situation that there was a reasonable expectation that it would be taken up by some one else and preserved. Suppose a person leaves a child at the door of a gentleman, where it is likely to be taken into the house almost immediately; it would be too much to say that, if death ensued, it would be murder; the probability there would be so great—almost amounting to a certainty—that the child would be found and taken care of. If, on the other hand, it were left on an unfrequented place, a barren

heath, for instance, what inference could be drawn, but that the party left it there in order that it might die? This is a sort of intermediate case, because the child is exposed on a public road, where persons not only might pass, but were passing at the time; and you will, therefore, consider whether the prisoner had reasonable ground for believing that the child would be found and preserved." The jury rendered a verdict of guilty of manslaughter.(x)

§ 1212. In a case tried in Pennsylvania, in 1846, before Chief Justice Gibson, Bridget Harman, a married woman, in very destitute circumstances, who had been, it was alleged, deserted some time previous by her husband, was indicted for the murder of a female infant child, at the time nine months old. The evidence showed that at 6 A. M. on the 11th of August, 1846, she had taken the child away from the house where she then lived, and at 9 A. M. she returned, saying she had given it away. She was seen shortly after she left, with a shovel, going towards a stream in which the remains of the child were subsequently found. No question existed but that, under the circumstances, if the defendant was guilty at all, she was guilty of murder in the first degree, of which crime she was convicted, though never executed.(y)

IV. CORPUS DELICTI IN INFANTICIDE.

§ 1213. Mr. Wills, in his very interesting work on Circumstantial Evidence, discusses with much ability the difficulties attending the proof of the corpus delicti in cases of infanticide. These difficulties may be enumerated as follows:—

§ 1214. (1) *The uncertainty as to the fact of pregnancy.*(z)—The history of the English queens, Mary I. and Mary II., with each of whom spurious gravidity was frequently mistaken for pregnancy, singularly illustrates this. In a case tried in Lancaster, in 1808, before Mr. Justice Chambre, the suspicion of pregnancy arose principally from the bulk of the deceased while living, coupled with circumstances of conduct which denoted the existence of an improper familiarity between the

(x) R. v. Walters, 2 Car. & Marsh 170.

(y) Com. v. Harman, 4 Barr 269.

(z) See *ante*, §§ 18, 115.

parties, and from the discovery, upon post-mortem examination, of what was supposed to be the placental mark. The medical testimony was very divided. On the one side it was proved that the deceased was subject to obstructions; that the appearance of the uterus might be accounted for by hydatids, a species of dropsy, in that part of the body; and that what was thought to be the placental mark might be the *pediculi* by which they were attached to the internal part of the surface of the womb. On the other hand, four medical witnesses expressed a decided opinion that the deceased had been recently delivered of a child nearly come to maturity. The learned judge charged the jury that it was a mere matter of conjecture, *first*, whether the deceased had been with child; and *secondly*, whether she had been the subject of the alleged abortion. The defendant was acquitted.(a)

§ 1215. (2) *The uncertainty as to the time of death.*—We have already noticed the difficulties which arise when it is necessary to determine whether the child died *before* or *after* birth. The law, as has been seen, is that if the death occurs *after* birth, it is murder; if it occurs *before* birth, it is but a misdemeanor at common law. It is not necessary at this point to do more than to refer to the views already expressed as to the physiological facts bearing on this point.(b)

§ 1216. (3) *Presumptions which bear with great force in ordinary cases of homicide apply much more weakly to cases of infanticide.*—“Concealment of pregnancy and delivery,” says Mr. Wills, “may proceed even from meritorious motives; as where a married woman resorted to such concealment in order to screen her husband, who was a deserter, from discovery.”(c)

§ 1217. (4) *Gestation and delivery, under the most favorable circumstances, are attended with casualties; and in cases of clandestine and illegitimate delivery this must be still more strongly the case.*(d)

(a) *R. v. Angus*, Burnett's C. L. of Scotland 575. In a case which has been already given, a young girl, under the delusion that she had really been confined, made confession of the birth and murder by herself of an illegitimate child, and might have been convicted, had there not been a medical examination showing that no confinement had taken place. *Ante*, § 1115; and see generally *ante*, §§ 18, 37.

(b) See *ante*, §§ 1-128.

(c) Wills on Circum. Ev. 206.

(d) See *ante*, §§ 1-37.

BOOK IX.

LEGAL RELATIONS OF IDENTITY.

A. OF PERSONS LIVING, § 1218.

1st. By direct evidence, § 1218.

a. Appearance, § 1218.

b. Voice, § 1226.

c. Marks, § 1227.

d. Daguerreotypes, photographs, and portraits, § 1231.

2d. By inferential evidence, § 1233.

a. Presence in the neighborhood, § 1233.

b. Suspicious circumstances, § 1235.

B. OF PERSONS DEAD, § 1236.

1st. Age, § 1236.

2d. Teeth, § 1236.

3d. Sex, § 1236.

4th. Skeleton, § 1237.

5th. Clothing, § 1238.

A. OF PERSONS LIVING.

§ 1218. 1st. *By direct evidence. a. Appearance.*—Identification of the person seen with the person accused is established by the testimony of witnesses who have known him long enough to have his appearance impressed firmly on their memory. Such is the evidence of neighbors, old acquaintances, and relatives. Numerous instances, however, have occurred in which such witnesses have been entirely mistaken. Such was the celebrated case of *Martin Guerre* and *Arnaud du Tilh*, which was tried before the Parliament of Toulouse, France, in 1560. Martin Guerre had been absent from home some eight years, when a person, afterwards proved to be Arnaud du Tilh, appeared and represented himself as the long absent man. So great was the resemblance, that his statement was accepted by all of Guerre's family, including his wife, four sisters, and two brothers-in-law. He lived with Guerre's

wife three years, and had two children by her. About this time some circumstances occurred to cause suspicions in regard to the true character of the supposed husband, when he was arrested and brought before the criminal judge of Rieux to answer to a charge of fraud. Upon his examination, he answered satisfactorily the most minute inquiries in relation to the former life of Martin Guerre. Some one hundred and fifty witnesses were examined during the investigation, of whom between thirty and forty testified, from a lifelong acquaintance, that the prisoner was Martin Guerre, while about the same number swore positively that he was Arnaud du Tilh, whom they well knew; and over sixty, who knew them both, declared that they were unable to say which the prisoner was. The prisoner, however, was condemned to death, when an appeal was taken to the Parliament of Toulouse. Here the difficulty continued; a large number of witnesses testifying to the identity of Guerre and the prisoner, and an equal number denying it. Among the former were *the four sisters of Martin Guerre*. Finally, however, Martin Guerre himself appeared, and then the relatives were requested to say which was the real *Martin*, when they were both together. Immediately the sisters distinguished and recognized their brother. No doubt now remaining as to the guilt of the prisoner, he was condemned, and afterwards executed.

§ 1219. Of the Tichborne case it seems premature to speak at this date (April, 1873), as the claimant is yet to be tried for perjury, and the verdict against him at *Nisi Prius* was rather in the nature of a non-suit than of a decision on the merits. But even on the case as thus imperfectly presented, a more remarkable illustration of the uncertainty of testimony as to identity cannot be found. A roving impostor—to take the adverse view—named Orton, *alias* Castro, *alias* Doolan, so arranged to personate a baronet of the United Kingdom, and the heir to a large entailed estate, that he—Orton, *alias* Castro, *alias* Doolan—was sworn to be Sir Roger Tichborne by eighty-five witnesses, comprising Sir Roger's mother, "the family solicitor, one baronet, six magistrates, one general, three colonels, one major, two captains, thirty-two non-commissioned officers and privates in the army, four clergymen, seven tenants of the Tichborne

estates, and seventeen servants of the family." The claimant's case, however, broke down on cross-examination. It was proved that he was ignorant of the mother tongue (French) of the genuine Sir Roger, and of the town in which the latter passed the first sixteen years of his life; that he was ignorant of the rudiments of the knowledge which it was shown that Sir Roger possessed; and that he exhibited in exuberance traits mental, moral, and physical, which it was impossible that Sir Roger should have acquired. It was said that it was in the power of the defence, had its case been opened, to have proved that certain tattoo marks which existed on Sir Roger were wanting on the claimant; though this proof would have been by no means conclusive, since such tattoo marks, as has been already noticed, may vanish with time. On the other hand, the claimant gave proof of a fish-hook wound on the eye; of a mark of bleeding on the ankle; and of a peculiar scar on the head, which a hairdresser swore he had seen on Sir Roger's. It is important to keep these in mind as showing how deceptive this kind of testimony may be.^(a)

(a) The following, from the Spectator of March 9, 1872, is remarkable for the ability with which it touches on the difficulties of this form of testimony:

In all this gigantic Tichborne case, with its long array of counsel on each side, its endless lists of witnesses, and its revelation of modern jurymen, who almost justify Mr. Bright's dictum that we might get a House of Commons by taking the first six hundred men who pass under Temple Bar, no single figure is so interesting as that of the claimant himself. Take what view we like of him, accept any hypothesis we may of his career, and he must be a personage nearly unique in the annals either of misfortune or of crime. On the former theory, he has lost much more than his position, or estates, or even his liberty; he has lost his own identity. There is no hypothesis on which it is possible to assume even for a minute that he is Sir Roger Tichborne except this—that a man thrown into new circumstances, oppressed by unaccustomed labor, and debauched by dissolute living, may in twelve years so deteriorate in body, mind, and habit of thought as to be virtually a new and lower man, may forget utterly three-fourths of all he has ever known, including that kind of knowledge which once acquired becomes instinctive, such as the knowledge frequently retained by fatuous persons of the moves at chess; may become utterly reckless in statement—that does happen to a large proportion of opium-eaters—may lose all those habits, ways, and instincts of caste which, if once evident in any human being, are supposed to be indelible, and which certainly often so enter into the fibre of the nature as to be transmitted like physical qualities. There must be possibilities in all

§ 1220. On a less conspicuous theatre than the Tichborne case, though not unlike it in some prominent characteristics, is the following:—

human beings of lesions of brain coexisting with great mental acuteness, of defects of memory side by side with great retentiveness, such as physiologists have never recorded among their marvellous tales, of changes, indeed, such as are hardly consistent with continuous identity. We do not even yet reject that hypothesis as a possibility, though we should have done so had we been jurymen, for we do not yet know the limits of the possible, and a speculative thinker is free where a jurymen is bound, but there is no other on which the theory of the suit can even as an intellectual argument be sustained. Sir Roger Tichborne, supposing that he appeared in that box and made those answers, must be a man as isolated in his mind as his misfortunes, the subject of some unknown mental disease, the victim of some form of aphasia which affects much more than the memory, which spreads over the whole mind, instead of its mechanical instrument the memory, and fearfully injures the entire morale. We need scarcely say this is no more our view than it was that of the jury or the judge, yet it is difficult absolutely to exclude it—impossible not to consider for a moment what the inner Sir Roger—imprisoned in that huge form, conscious of an identity he has lost the faculties to prove, conscious of unbearable injustice, yet with the untouched shrewd side of his mind aware that the injustice is not wilful, but is one of the thousand results of his misfortune—must now be feeling, or, if feeling has been dimmed by some lethargy of spirit, corresponding to the growth of fat upon his body, must be feeling as if he felt.

And if we accept the other hypothesis that the man is no member of the Tichborne family, a mere impostor who has gulled the credulous, wasted months of legal time, and sworn not to one but to a thousand perjuries, what a unique figure he remains, how widely different from the one any foreigner would previously have imagined! The strongest point in his favor is his extreme unlikeness to the sort of man a clever rogue would have picked out to be agent in such a fraud. He if decently competent would have hunted the world for a great actor, a wicked Garrick, the precise character which is certainly not that of this claimant. He has strong qualities rather than high capacity. That he is a determined man is clear from his whole bearing in the witness-box under the attorney-general's fire of denunciation and at the time of his arrest; that he is a remorseless one is sufficiently proved by the attack on Mrs. Radcliffe—an attack the wickedness of which does not depend on his identity; and that he is an able one is the first of Sir J. Coleridge's many points. But what a strange, imperfect, shot-silk kind of ability it must be! Grant for a moment Sir J. Coleridge's apparent theory of the origin of the affair, that a man named Orton or Castro, bred a butcher, had thought or had been persuaded that if accepted by Lady Tichborne as her son he would without trouble be admitted heir to the family estates, and had gradually conceived a more elaborate scheme, still the fact remains that he must be either the man he claims to be, or have got up his case slowly, piece-

“In 1821, an action was instituted by Mary McCreth against William Dickinson, administrator to the estate of Captain

meal, and amidst enormous difficulties, as acutely as Sir J. Coleridge himself, who, indeed, in the earlier part of the long trial, wanted to “change brains with him,” and hinted that he was cross-examining his questioner, extracting safe answers from the very questions themselves. This uncultivated, fat, hard-drinking butcher must have had twice the legal though latent capacity of the sharp little ferret who created such amusement in the witness-box; must have had a nearly cloudless memory; must have divined whole classes of questions to which he would be subjected; must have had a mind sensitive as that of an artist, to enable him to evade so many pitfalls without ever showing his fear. And he must have possessed that mind in spite of the temperament so rarely found associated with it, a temperament essentially lethargic, apathetic, slow of impulse, and habituated to lazy enjoyment. The claimant remained for years as cool and impassive as the Emperor Napoleon. No doubt he may have been greatly helped, but personation is the most difficult of tasks, and he must have picked up and retained many thousands of isolated facts and circumstances almost as difficult to learn as isolated words in a language you never heard. And, yet, as we said, on the theory of the defence, how incomplete his mind was, how very little it became educated in the five years for which the claim has been maintained! He could and did learn enough to convince a few men of all ranks, positions, and degrees of culture, and induce them to lend him money, to take in the majority of the populace, and to leave after his examination-in-chief an impression of doubt even on experienced counsel; but he never, supposing him not to be a deteriorated Sir Roger, caught the whole of any lesson—never, for instance, learned French—an unsolved puzzle, for he had plenty of time, and had been able during his lifetime to acquire some Spanish—never learnt how English gentlemen write letters, never realized fully to himself as a great actor might have done what Roger Tichborne must have been, never to all appearance rose to the conception that his life-work was to carry the deception through, never even got hold of a clear conception as to the kind of knowledge in which he would like to be wanting. His case was no doubt a hopeless one, for the grand obstacle to personation, the impossibility of knowing all that the double must have known, existed to a much fuller extent than the public at first suspected. Garrick playing the part would have been saved by instinctive morale from the frightful artistic blunder about Mrs. Radcliffe, but Garrick could not have provided for the tattooing evidence. We have only, however, to think of the impression Garrick, or say Mr. Alfred Wigan, would have created with his French, and his air, and his readiness in acquiring knowledge, and with the plaintiff’s materials, to see how greatly this claimant fell short in the powers necessary for his part. The result must have been the same, but if Mr. Wigan had been the pretender half England would have believed in him to his dying day. It undoubtedly wished to believe him. Whether the case enlisted the sympathies of the poor against the rich, whether this fat, impassive, bad man realized the popular ideal of a

Talbot, who, as was alleged by him, was an Englishman. Mrs. McCreth, however, averred that Talbot was her brother, and an Irishman, and that, as his only relative, she was entitled to his estate. On the part of the claimant, the evidence by writing and parol was exceedingly strong. Mrs. Lee, one of her witnesses, swore to an acquaintance with the captain for fourteen years before his death, during all which time he lived in the same house with her. He spoke only of one sister; said her name was McCreth, and she lived in London; that she was so young when he came away, that she would not now know him. He wished to name Mrs. Lee's child Mary, after his sister. He was in the Liverpool trade; had frequently been there, but said he could not leave his ship to go and see his sister. He never spoke of any other relative. He had a letter in his writing-desk, which he said was from his sister, and requested it to be read to him while on his death-bed. In addition to this, the letter from Mrs. McCreth was produced, stating where she lived, and how long she had there lived. And a Mr. Leary was produced to prove her actual residence, and identify her person. A letter in answer to this was also produced by her from Captain Talbot. In Mrs. McCreth's letter, she states her poverty; writes by way of Liverpool; requests her brother to direct his letters to No. 2 Lombard Street, London, and further states: 'You may not be acquainted with my marriage, since I was, you know, very young when

baronet—as we half fancy he did—or whether the story awoke that capacity for wonder always so great in uneducated mankind, it is an undoubted fact that, until the attorney-general rose, a majority of the lower classes were on the claimant's side, and that the speech, with its long-drawn length, and artistic repetitions, and bursts of artificial but effective indignation, did what no amount of evidence given piecemeal would have done. Indeed, not the least astonishing fact in the character of the claimant, as revealed by himself, and without reference to his identity, is the interest and, so to speak, sympathy it excited in men who, nevertheless, were perfectly aware that it was, on his own showing, radically bad. Out of his position he would not have attracted them, but in it they felt towards him as they would to a horse in a race or a dog in a fight, and pardoned the viciousness for the pluck, the cleverness, and above all, the temper he displayed. Is it because Englishmen are so bad tempered that in any conspicuous person, be it the Emperor Napoleon, or Mr. Disraeli, or the claimant in the Tichborne Case, impassiveness seems to them so marvellous a quality?

you left Newport, county Tipperary, Ireland.' This letter was found among his papers; he declared it to be from his only sister, and showed his sincerity by keeping it for ten or twelve years. In health, sickness, and insanity, he always spoke of his sister, and never of any one else. Upon these facts it appeared to be clear that he was an Irishman.

§ 1221. "On the other side, however, they attempted to show that Captain Talbot had always said 'that he was an Englishman; that he had four or five sisters; that Dickinson was the son of one of those sisters.' A petition by the captain for letters of naturalization, in which he states 'that he is a subject of the King of Great Britain,' was produced, which, however, was a little equivocal in its operation, as Ireland might be considered as embraced by the term 'Great Britain.' But to strengthen the defence, a number of sea-captains testified 'that Talbot had frequently told them he was born in England.' A portrait was also produced by Mrs. Lee, at whose house the captain died, which was said to bear a strong resemblance to the deceased; but even this did not remove the difficulty; for while one-half of the witnesses swore that it was the very counterpart of the English Captain Talbot, the plaintiff's testimony was just as strong to show that it was an admirable likeness of the plaintiff's brother, whom they professed to know, and that it even bore a strong family resemblance to the sister (the plaintiff).

"Mr. John K. Kane (the present judge of the District Court of the United States), was the counsel for the defendant. He enforced the testimony for the defence with great ingenuity and ability, and manifested no less skill and power in his assaults upon the evidence for the plaintiff. His theory was, that loose impressions, derived from thoughtless conversations of Captain Talbot, many years ago, had been misunderstood, or misrepresented by the plaintiff's witnesses; that it was exceedingly improbable that Captain Talbot should sail to Liverpool for years, and never visit his only sister, who was in London, but about two days' journey; that the letter received by him was supposed by him to be from the mother of the defendant, whose name was also Mary, a favorite sister, whose husband's name he probably supposed to be McCreth;

that he had written his letter under that impression, and that the letter intended for one of these women fell into the hands of the other, and produced all this confusion. He dwelt, also, upon the want of credibility of some of the plaintiff's witnesses, and the bias and interests of others; he adverted to the fact of many years having elapsed without the plaintiff's asserting her claim; and he planted himself firmly upon the petition for naturalization, signed by Captain Talbot, and stating himself to be a native of Great Britain. He also maintained, that the portrait itself bore strong marks of English peculiarity of feature; and, lastly, that the defendant, being in possession of the property, was not to be deprived of it, but by conclusive or, at least, most satisfactory proof on the part of the plaintiff, who could not be entitled to recover upon a doubtful title.

“The answer on the part of the plaintiff, by David Paul Brown, was, that it was not more remarkable that Talbot should not visit the plaintiff, than that he should not have visited the mother of the defendant, whose residence was proved to be nearer to London than Liverpool; that if he had not been born in Ireland, he never could have recognized the truth of the letter found in his possession, ‘referring to the time when he left his sister Mary, in Newport, Tipperary, Ireland;’ that if the witnesses were doubtful, the letter was unquestionable; that Captain Talbot could not have supposed that the letter was from the defendant's mother, consistently with the notion that he was an Englishman; and, if he was not an Englishman, there was no defence. The credit of the plaintiff's witnesses was maintained, and that of the defendant's impugned; the fact of the mother of the defendant being rich, and the plaintiff poor, was referred to as corroborative of the relationship of the latter to the deceased, who had said ‘that he had but one sister, and that she was poor, though respectable;’ this poverty was also relied upon to explain her not having earlier instituted legal proceedings. As to the petition for naturalization, its apparent inconsistency with the plaintiff's claim was accounted for by its equivocation—by its having been loosely filled up, and carelessly signed—and instances confirmatory of this notion were cited; the matter of

place of birth, as indicated by the portrait, was also minutely discussed, with very opposite deductions from those drawn by Mr. Kane; and, in conclusion, the plaintiff's counsel maintained that, although he had not established an unquestionable claim, his proofs far outweighed those of the defendant, and that the principle which obtained in criminal cases, that a reasonable doubt should discharge the defendant, did not prevail in civil suits. The case, nevertheless, resulted in a judgment for the defendant, and the poor plaintiff passed the remainder of her days in penury and misery, maintaining to her last moment her claims to the Talbot estate."(b)

§ 1222. How false evidence of diversity, as distinguished from that of identity, can honestly arise, may be illustrated by the remarkable case of Lord Aberdeen, settled finally (1872) in the English House of Lords. A young nobleman of high birth, pure morals, and excellent education, is seized with a romantic passion for a sailor's life. He comes to New England, where, under a feigned name, he throws himself into the society of sailors and laboring men; lives in their homes, adopts their pursuits, and acquires their habits and their language, so that his new companions begin to look upon him simply as a respectable though reserved young man belonging to their own social order. He makes long cruises in sloops, in which his fellow-sailors regard him as one distinguished from themselves only by perhaps a little higher line of early education; and when one day, in a storm, he is swept overboard and is drowned, they have no suspicion that the waves are swallowing the representative of one of the oldest and noblest of British peerages, the successor of an earl, who had only a few years before presided over the British ministry; or that in a few months all that wealth, that power can do, at enormous cost, to collect evidence of that fact of drowning, will be invoked. Now, the sailors and farmers, who learned to look upon the young Earl of Aberdeen simply as a sailor, naturally invested him with the incidents of a sailor's history and life. And their tenacity in this belief—a belief as natural as it was

(b) Brown's Forum, pp. 508-513.

false—serves to illustrate the vehement antagonisms of evidence in cases of disputed identity.(b')

§ 1223. The peculiarities in the appearance of a criminal, as observed about the time of the commission of a crime, corresponding to similar circumstances in the appearance of the accused, form an important means of identification. Among these the following may be mentioned:—

§ 1224. *Size.*—Any difference from the ordinary stature or size of the body, as where a person is unusually tall or short, corpulent or slim, at once strikes our attention, and is remembered, under impressive circumstances, with more distinctness than more minute points.

§ 1225. *Dress.*—This is also one of the principal points that strike the attention in observing a person under suspicious circumstances. In Barbot's case(c) the peculiar dress of the prisoner was the means of identifying him.

A woman was tried at Warwick Spring Assizes, 1818, before Mr. Baron Garrow, for the crime of arson. The prisoner had been met near the ricks which were set on fire, about two hours after midnight. A tinder-box was found near the spot, containing some unburnt cotton rags, and a piece of woman's neckerchief was found in one of the ricks where the fire had been extinguished. The piece of cotton in the tinder-box was examined with a lens, and the witness deposed that it was of the same fabric and pattern as a gown and some pieces of cotton print taken from the prisoner's box at her lodgings. A half neckerchief taken from a bundle belonging to the prisoner, and found in her lodgings, corresponded with the color, pattern, and fabric of the piece found in the rick, and it was deposed that they both belonged to the same square; and, from the breadth of the hemming, and the distance of the stitches on both pieces, which were hemmed with black sewing-silk of the same quality (whereas articles of that description are generally sewed with cotton), the witness clearly inferred that they were the work of the same person. The prisoner was capitally convicted, but, there being reason to believe that she was of un-

(b') See Burke's Rise of Great Families, etc., London, 1873.

(c) 18 State Trials 1229.

sound mind, she was relieved. Evidence of this kind must, however, be admitted with caution. On the trial of a young woman for child murder, it appeared that the body of a newly-born female child was found in a pond about a hundred yards from her master's house, dressed in a shirt and cap; and a female witness deposed that the stay or tie which was pinned to the cap, and made of spotted linen, was made of the same stuff as the cap found in the prisoner's box; but a mercer declared that the two pieces were not only unlike in pattern, but different in quality.^(d)

§ 1226. *b. Voice.*—Peculiarity of voice always makes a strong impression on the mind of the observer, and is a valuable assistance in identification. In Harrison's case,^(e) a witness testified that on the night when the deceased was found strangled in a hackney coach in the street, she saw a coach stop at a place named, and heard a person in the coach tell the coachman to go to a certain house, and when he did not go fast enough she heard him swear at him for going so slow. Afterwards she saw the coachman return with the deceased who entered the coach. The witness upon hearing the voice of the prisoner declared that it was the same she heard swear at the coachman on the night in question, and in this way led to an entire identification.

§ 1227. *c. Marks.*—Besides the general appearance, dress, manner, and voice of a person, peculiar marks upon the body are a very important, perhaps much the most reliable, means of identification. Scars, burns, cicatrices, fractures, etc., upon some portion of the body of the prisoner, distinctly remembered by those who have seen them, will generally be received as evidence of identity. Very often where the scars resemble each other they may have been caused by different agencies. In such cases the evidence of physicians can be brought to testify as to the cause of the wound. Still such evidence is not always reliable, for a mark of such a nature may exist from exactly the same cause in two different persons. It goes, however, a great way in establishing identity, and is generally conclusive, unless rebutted by stronger contradictory evidence.

(d) Wills, Circumstantial Ev. 96.

(e) 12 State Trials, 850, 860, 861.

§ 1228. According to Böcker, the gender, age, size, stature, walk, bearing, color of hair and eyes, shape of eyes and nose, appearance of teeth, the condition of the hands, feet, bones, and joints, must be observed, together with changes produced by pregnancy, birth, miscarriage, disease, etc. Moles leave important evidence, which continue throughout life, unless cut away, and then a scar remains. Marks of branding and of tattooing, if not permanent, at least last for years, though it should be observed they may¹ be fabricated. Scars from injuries or disease can often be observed for a long time. In reference to the hair, it is to be observed that there are various means of changing its color. Different employments often impart some peculiarity to the hands or other organs.

The above rules apply also to the examination of a dead body, in case the appearance has not yet been affected by decomposition.

§ 1229. That scars, however, may be deceptive, will be readily seen. On the bodies of several persons may be often seen scars so similar that at a short distance of time it is impossible to remember how they are distinguishable. Scars, also, may be simulated; and they wear out in the course of time. Of the uncertainty of such testimony the Tichborne case,^(f) and that of Heasman, to be presently given, may be taken as illustrations, to which may be added the following:—

§ 1230. In 1857 the body of a young woman, upon whom an abortion had been produced, and who had been murdered by a blow upon the head, was found in a ploughed field near Newbrug, New York. The body was supposed to have been identified as that of Miss Sarah Bloom, and a man named Jenkins, with whom Miss Bloom was last seen, was arrested, and already a strong chain of circumstantial evidence, fixing, it was thought, the murder upon him, was made out. Jenkins insisted that the corpse was not that of Miss Bloom, and, sure enough, after four days, when the mysterious corpse had been buried, Miss Bloom made her appearance alive and well. The resemblance between herself and the corpse, however, was so striking as to increase the caution with which similar cases

(f) *Ante*, § 1219.

should be regarded in future. The body had a scar on the left eyebrow precisely where Sarah has one; the body had a cut on the main finger of the left hand precisely where Sarah has one of the same character; the body had a small black mole about half-way between the ankle and the knee, on the shin bone, exactly where Sarah has one; but, strangest of all, the body had two toes of the left foot grown together, precisely like Sarah's, except that Sarah's are not grown together so far down on the joint; the toes of both feet of the body, like Sarah's, were pressed together from wearing tight shoes, and Sarah wears a coral ring on just the finger from which on the corpse a ring had been stripped. These facts, connected with Sarah's absence, the remarkable story of Jenkins as to where he had left her, the incident of her going in a direction where she did not hear of the discovery of the body, and was not herself heard from for four days, combined to make a case of indicatory evidence on which a conviction might well have rested.

§ 1231. *d. Daguerreotypes, photographs, and portraits.*—The admissibility of photographs is discussed in another work; (*g*) and it is there shown that they are now received as primary evidence of identification. (*h*)

(*g*) Wh. C. L., 7th ed. (1874). See title "Photograph."

(*h*) Another point, so writes Dr. George Burr, when discussing the Ruloff case in the Journal of Psychological Medicine for October, 1871, was somewhat novel. It was important that the bodies of the two drowned men should be identified. No one who saw them recognized either one. They had lain in the water two days; were now exposed to a warm atmosphere, and decomposition was rapidly progressing; and, unless their present appearance could be preserved, in a few hours all hopes of recognition would be gone. A photograph picture was therefore taken of the bodies, which, by means of a stereoscopic instrument, enabled acquaintances subsequently to recognize in them the persons of Jarvis and Dexter, both ascertained to be comrades and associates of Ruloff.

Counsel for the prisoner objected on the trial to any evidence of identification being received, founded upon an examination of the pictures. The objection was overruled, and exception taken. In this case there were other circumstances which corroborated the testimony of the witnesses who identified the bodies from viewing the pictures, and which established their identity beyond all doubt; but, as this kind of evidence is quite likely hereafter to be employed in various ways upon the trial of cases, the remarks of Judge Potter, one of the judges in the Supreme Court holding the general term, in

§ 1232. Pictures have not been without their use for detective purposes.⁽ⁱ⁾ A capital conviction is reported by Mr.

discussing the point, may very properly be quoted. He says: "It is the every-day practice to use the discoveries in science to aid in the investigation of truth. As well might we deny the use of the compass to the surveyor or mariner; the mirror to the truthful reflection of images; or spectacles to aid the failing sight, as to deny in this day of advanced science the correctness, in greater or less degree depending upon the perfection of the machine, and the skilful admission of light to the photographic instrument, its power to produce likenesses; and upon the principle, also, that a sworn copy can be proved when the original is lost or cannot be produced, this evidence was admissible."

As germane to this point, I add the following, taken from the *New York Evening Post*, which, although a newspaper paragraph, is somewhat significant of the future employment of photographs upon the witness-stand.

"An Australian gentleman, examining a mining claim, was seized, stripped, and covered with tar and wool. He went and got himself photographed in this guise, and sued his assailants for two thousand dollars damages, putting in his picture as evidence."

(i) For the following note I am indebted to the officers having charge of this special department (1860) in the Mayor's office in Philadelphia.

"During the mayoralty of the Hon. John M. Scott, in 1842-43, rough pen and pencil sketches were made of the countenances of the prisoners the remembrance of whom it was thought desirable to perpetuate. Of these there now remain on file, etc., sketches of twelve individuals; this may be considered as the first approach towards the formation of a Rogue's Gallery; these have been found useful in a number of instances. During the administration of Mayor Gilpin from 75 to 80 daguerreotypes and ambrotypes of noted men in police annals were made the nucleus of a gallery, though kept in a trunk under lock and key most of the time. They were seldom exhibited to others than officers of the detective department of police. With the present administration the gallery of photographs commenced, and has been carried forward to its present condition, numbering now (April 24, 1860) 266 portraits. It has been thought desirable, in furtherance of police ends, to add, as far as possible, the portraits of men, notorious in other cities, but who occasionally visited us professionally. Exchanges have been made to some little extent with New York, Albany, Pittsburg, etc., and pictures received have been hung up in our gallery. As it regards the pictures of men known to the police as rogues of a high grade, very few of these, as yet, are known to exist, in any portion of the land. Generally, these men will *not*, under any consideration, sit for their portraits. When in custody, and are therefore secure, the question is often asked, How do you get the consent of these men and women to sit and have their likenesses taken to be hung up for general exhibition? The answer is, Sometimes by threats of thirty days' imprisonment, as the alternative of refusal; at others, and in most cases, the parties have been arrested for the commission of some crime,

Wills to have been secured by the prisoner having given his portrait to a youth, which enabled the police, after watching a month in London, to recognize the culprit.(j)

§ 1233. 2d. *By inferential evidence.* a. *Presence in the neighborhood.*—When a person very strongly resembling the accused was seen in the neighborhood of the alleged crime, it is very strong evidence of identity. Evidence of proximity, and that of presence as inferred from it, may sometimes be made out by physical facts, such as the impression of boots of a peculiar kind, afterwards discovered to be the same as those of the prisoner. This latter evidence is very common, and the one most naturally sought for directly after the commission of the crime. Footsteps, as evidence of the number as well as the particular kind of persons engaged, are important indications. In the case of Mrs. Arden, who, with a number of others, was accused of murdering her husband, at Feversham, in England, in 1551, the crime was committed in the house of the deceased, and the dead body carried out and laid on the ground. From the impressions made upon the recently fallen snow, the prisoners were tracked through all their progress back to the house, where, by means of yet stronger evidences of guilt, conviction was brought about.

Impressions from other parts of the body answer likewise a useful purpose in detecting and identifying an offender. In the case of *Rex v. Brindley*,(k) impressions were found on the soil, near the scene of crime, of the knee of a man who had worn breeches made of striped corduroy, with a patch of

and, having years of imprisonment before them, are reckless and regardless of consequences so far as their pictures are concerned, and yield readily to the demand therefor. The greater portion of the pictures in our gallery are the pictures taken under these circumstances; and, therefore, for any practical purposes, are by the writer deemed almost useless—especially so with regard to the younger portion of them. They alter so materially in person, etc., as often to be hardly recognized after years of imprisonment.

“The one great idea in the establishment of a Rogues’ Gallery should be to enlarge the acquaintance of detective officers with individuals with whom they have to do, and thus to give the officers greater facilities in the performance of official duty.”

(j) Wills, Circum. Ev. 95.

(k) Wills, Circum. Ev. 100.

peculiar shape; which was found to correspond exactly with the dress of the prisoner.^(l)

§ 1234. In a case that came before the New York Court of Appeals in 1865, it appeared that the plaintiff in error had been indicted for the murder of Owen Thompson, and tried and convicted in the lower court; after which the case came before the Court of Appeals on exceptions to the judge's charge. The evidence against the prisoner, which was purely circumstantial, seemed to prove that the deceased was killed opposite a cattle yard, leased by the prisoner only the day previous, and the abstraction from his person of his pocketbook and a large sum of money; that the last time Thompson was seen alive was in company with the prisoner, that the day following the murder the prisoner disappeared from the place where the murder was committed, that he was poor and destitute for a long time previous and up to the time of the murder, and that he was possessed of a large sum of money the night after the murder. Other circumstances appeared in evidence against the prisoner, such as having made false representations, etc. The prisoner introduced no evidence to prove his whereabouts on the day of the murder, or how he came into possession of the money. The judge charged the jury, "That when it is in the power of a party, if he is not the man, to show where he was on that day, at some time of the whole day, and he living in a place where he is well known, that which before may have been regarded as highly probable ripens into certainty;" also, "He has had abundant opportunity, also, of showing where he got that money; but he has not done it. Circumstantial evidence of this sort, when left unexplained, if in the power of the prisoner to explain if not true, becomes of a *conclusive* character."

The Court of Appeals held this charge to be erroneous; "that it was unnatural and illogical, and fatal alike to innocence and guilt." The true rule of law in such cases is, that an absence of an attempt to account for the person's whereabouts, when it appears to be in his power to do so, is not, in

(l) See Wh. Cr. Law, § 862.

law, conclusive of the facts in dispute, but is strong presumptive evidence against him.^(m)

§ 1235. *b. Suspicious circumstances.*—Under this head we may mention anything remarkable in the appearance of the prisoner, either before or after the crime, which may lead an observer to suspect something wrong. Singularities of conduct of a criminal, from the inability to conceal the secret which is weighing on his mind, have been already mentioned. Whenever any physical connection exists between something belonging to the prisoner and traces of the criminal at the scene of crime, identification may be established by actual comparison. In the case of footprints, this is done by fitting the feet or shoes of the party to the impress which they left. Footprints, or impressions made by instruments used by the person committing a crime, may aid in identification in two ways: *first*, by showing the quarter from which the criminal came immediately before the crime, or to which he went directly after it; *second*, as specially pointing out the guilty person. Marks of violence, such as impressions of instruments used in forcing the way into a house, show that the perpetrator came from without. The absence of any such traces may lead also to the inference that the criminal was an inmate of the house. Evidence of the peculiar manner in which an instrument of crime was used, may contribute material aid in fixing guilt upon a particular person. Where the evidence shows that a fatal wound has been inflicted by the left hand, for example, and the accused is found to be left-handed, this circumstance, although, of course, not conclusive, lends great force to other indications. Objects left at the scene of crime, which are found to belong to the prisoner, are evident means of identification. A connection, also, between something found at the place of the crime, and something in the prisoner's possession, may here be mentioned. Where the bullet, for instance, with which a murdered man was killed, fits exactly a fire-arm in the prisoner's possession, or where the wadding of a gun corresponds to wadding found with the prisoner, strong evidence

(m) *Gordon v. People*, 33 N. Y. 501.

is afforded of identification.(n) Chief Justice Shaw, in his charge in the *Webster* case,(o) mentions the case where a portion of a broken knife blade was found in the murdered man's body, and afterwards the handle, with a small portion of the blade remaining, was discovered, and the two parts were found to fit so exactly that no doubt could exist of their having once been joined together in the same blade. Positive evidence was adduced to show that a knife with exactly the identical handle had been in the prisoner's possession but a day or two before the crime.(p)

B. OF PERSONS DEAD.

§ 1236. 1st. *Age*.(q)

2d. *Teeth*.(r)

3d. *Sex*.(s)

§ 1237. 4th. *Skeleton*.—This subject, in its general relations, has been already noticed.(t) Where nothing but the skeleton has been found, it may be identified by peculiar marks or objects found near it. In the case of *Rex v. Clewes*,(u) twenty-one years after the death of a certain person his body was identified by his widow from some peculiarity about the mouth, and by a carpenter's rule and a pair of shoes found near the remains, and identified as having belonged to the deceased.(v)

§ 1238. 5th. *Clothing*.—In *Peterson's* case, which has been already given, the difficulties attending this kind of evidence are illustrated. There the clothes were so much decayed as to make their recognition almost impossible. The wife of the deceased, however, was able to identify a small fragment of his vest, and a little package of needles she placed in his pocket before he left her.

§ 1239. The legal weight of photographs as identifying dead bodies has been already noticed. Undoubtedly such testimony should be received, but it should be examined with

(n) See *ante*, §§ 1220, 1223.

(p) See *Bemis' Report*.

(r) See *ante*, § 292.

(t) See *ante*, § 289.

(v) *Burrill on Circ. Ev.* 681.

(o) *Bemis' Report*, 465, 466.

(q) See *ante*, § 289.

(s) See *ante*, § 296.

(u) 4 *Carr. & P.* 221.

great scrutiny, and no conviction had on it without full proof of the *corpus delicti aliunde*. Several cases have occurred of mistakes in this kind of testimony. Some years ago (1868) a man, in all probability an escaped lunatic, named Heasman, was found in a cupboard of a house in Hackney, England, dead. Great publicity had been given to the circumstances attending the discovery of his body, and the result was that a crowd of persons, most of them bringing photographs, visited the dead-house to see if the features corresponded with those of missing friends. Among the visitors was Dr. Ellis, Medical Superintendent of St. Luke's Hospital, who recognized the body, showed that the clothes were those of a patient in St. Luke's, and declared that the name of the deceased was Heasman—the name of a patient who had recently escaped from the establishment. The name on the stockings worn by deceased corresponded with this statement. On the following day the brother of the deceased confirmed the physician's view. The body, beyond all doubt, was that of his brother, Mr. B. Heasman, recently a patient in St. Luke's. One would think such a mass of evidence was beyond all doubt past any reasonable cavil, yet it is certain that one visitor, totally unconnected with the asylum, produced a photograph very like the deceased; and that another, Mrs. Mary Ann Banks, positively swore that the body was that of her husband, Mr. Ebenezer Charles Banks, a commercial traveller. She adhered to this statement upon oath in the Coroner's Court, her two sisters partially supported her, and she has one strong circumstance in favor of her statement. Before she had seen the body, she described a particular wound upon the little finger, which wound appears to have been found. No question existed as to her firm belief that the deceased was her husband.(w)

(w) “The interest felt in the case, an interest out of all proportion to the importance of the facts, reveals a curious doubt which is always latent in the public mind, and which has, we suspect, as much justification as popular instincts usually have, a doubt whether appearance is conclusive, or even strong evidence of identity. The doubt is probably based upon tradition, which deals much in stories of mistaken identity, but we are inclined to believe it much more solid than either policemen or artists would be willing to allow. A large proportion of ordinary persons, it may be even a majority, but certainly a very large proportion, are very untrustworthy witnesses to

§ 1240. *Objections to evidence identifying dead bodies goes not to admissibility but to weight.*—From what has been said here,

identify when dependent on appearance alone. They are, either from nature or habit, incapable of appreciating form, and form alone is the unerring proof of personal identity. The difficulties in the way of identification, more especially of the dead, are to them insuperable. In the first place, people are much more similar than we always remember. Without accepting or disputing the extraordinary idea which exists in so many countries, and is the basis of so many fables, that every man has his "double" somewhere, an individual absolutely identical in appearance with himself, it is quite certain that the most extraordinary likenesses do exist among persons wholly disconnected in blood; that there are faces and forms in the world which are rather types than individualities, people so like one another that only the most intimate friends and connections can detect the difference. The likeness of Madam Lamotte to Marie Antoinette is a well-known historic instance, and there are few persons who have not, in the course of their own experience, met with something of the same kind. The writer has twice. In one case, he was on board a ship in which were two passengers, who neither were, nor by possibility could be, connected by birth or any other circumstance whatever, except, indeed, caste. Oddly enough, they were unaware of a likeness which was the talk of the ship, dressed in the same style, but from some inexplicable repulsion—we are stating mere facts—disliked and avoided one another. The writer, in a six weeks' voyage, and with a tolerably intimate acquaintance with one of the two, never succeeded in distinguishing them by sight; and of the remaining passengers, certainly one-half, say thirty educated persons, were in the same predicament. In the second instance, the evidence is far less perfect, but sufficient for the argument we are now advocating. The writer stopped short in Bond Street utterly puzzled by the apparition of one of his closest connections, not two yards off. Clearly it was he, yet he could from circumstances by no possibility be there. Still it was he, and the writer advanced to address him, when a momentary smile broke the spell, leaving, however, this impression: 'I would have sworn to Blank in any court of justice. His double must be walking about Bond Street.' The likeness was really astounding, quite sufficient to have deceived any number of policemen unacquainted previously with either man.

"The writer has a faculty for likeness, or a stupidity about identities. That is a plausible, though an erroneous explanation, and it brings up just the point we want to make. Is it not just possible—it is rather a serious supposition, when our criminal procedure is considered—but is it not just possible that something like color-blindness affects this matter of identification—that there is a large number of persons, whose evidence upon any question of identity, though perfectly honest, is worthy of very little trust—that men upon this, as upon most other matters, are guilty of an unconscious carelessness, like that which makes testimony about figured statements so often valueless? We are all apt to think that we observe faces very carefully; but it is quite certain, more certain than almost any assertion of the same kind,

and in the chapter in which the physiological bearings of this question are discussed, it will be seen that evidence as to the

that we do not so observe them. We are also apt to believe that the difference in faces is very great, is radical, and not dependent upon accidental features, yet it is almost certain that no such difference exists; that men are in reality as nearly alike as animals appear to be. Take, for instance, in evidence of both these propositions—of the carelessness of our usual glance, and of the similarity among men—a fact which a number of our readers can test for themselves. No man, on landing at an Indian or Chinese port for the first time, can, for a few days, tell one man from another. The natives are more decisively unlike than so many Englishmen, because, in addition to every other distinction, their complexions cover a wider range of color; but, being similarly dressed, they seem for a few days as much alike as so many sheep, who are all alike to a Londoner, but among whom a shepherd or a dog makes no mistake. Now, if men were much unlike, more unlike than the sheep are, no such curious haziness would be possible; nor would it be, if the observer were unconsciously in the habit of studying the form and character of each face. He has, as a rule, no such habit; but, unless an artist or a policeman, relies unconsciously on accidental circumstances, color, hair on lip or chin, gait, expression, or peculiarity of some one feature, and should that by any accident disappear, he is utterly puzzled. One-tenth at least of Western mankind is, consciously or unconsciously, short-sighted, and never *sees*, in any true sense of seeing, any face whatever; never quite catches its *nuances* of expression; never is quite sure about its minor features; never quite ceases to idealize according to a preconceived theory of character. Even of those who do see perfectly, a large proportion are not artists; never catch the specialty of the face they are looking at enough to caricature it—some faces will not submit to caricature, Lord Derby's, for instance, and Mr. Gladstone's, in both of which the caricaturist invariably intensifies the whole expression—and really recollect it mainly by its accidents of color, or the like, accidents which may disappear in life, and do disappear in death. It is not easy to recognize the photographs of men whose appearance depends on color; and death does its work in destroying color even more perfectly than the sun. Fatness and thinness, too, are great aids to recognition; yet they are temporary, dependent sometimes on mere accidents of health. We have all of us met friends whom we have not seen, say for three years, who have grown wider, if not wiser, in the interval, and whom we should not, without speech, have recognized. Death, as a rule, while it leaves much unchanged, absolutely destroys every distinction, based either upon color or upon fatness, and modifies thinness in the most unexpected way, revealing unsuspected depths about brow and mouth, while leaving the cheek untouched. No child is recognizable in death by mere acquaintance, because in children's faces the prominent points are color and contour. An actor cannot change his real face, but only the accidents of the face; yet Mr. Webster, for example, has once or twice deceived his audience for some minutes, and could, we suspect, deceive them, if that were his object, altogether.

identity of dead bodies is to be carefully scrutinized, and is not entitled, if resting simply on resemblance of features, to be regarded as sufficient to sustain a verdict. But this operates not to exclude such testimony, but only to diminish its credibility. Thus, in a case in Iowa, where a man had been murdered and the head severed from the body, and was by a physician preserved in alcohol, many witnesses were called to identify it. The prisoner proposed to prove, by two witnesses,

“Think, again, of the excessive difficulty with which the memory retains a face. Portrait painters of half a century’s standing will tell you that they hardly retain the impression of a sitter five minutes, though they have been studying him keenly; that their own first touches from him as he sits are invaluable helps; that they would all, if it were convenient for art reasons, like to keep a photograph in full view for their work when the original is away. We think we remember, but in five minutes we forget the half of a friend’s face nearly as perfectly as we forget the whole of our own. Clearly, if identification were as easy as we are apt to believe, we should not so forget faces. And their expression? Doubtless, expression, being, so to speak, an intellectual rather than a physical fact, stirring and rousing the intellect of the observer, his secret and almost instinctive likes and dislikes, remains longer fixed in the mind than mere feature. The witness who arrested Judge Jeffries might have forgotten his face, did forget it, in fact, for Jeffries, when seized, had only changed his wig, but he could not forget the ferocious glare of those insufferable eyes. But expression changes quickly, may change permanently. We all say, every now and then, ‘His face quite changed,’ while nothing is changed except, perhaps, the expression and the color. Madness, extreme anger, drink, will all change a well-known face till it is almost unrecognizable; and though, no doubt, it requires a combination of circumstances to deceive a wife as to her husband’s identity, still there is one expression which, in a case like that of Hackney, she has never seen, and that is death, of all influences the one which may most modify expression, both by altering the set of the features, and changing the emotional medium through which we regard them. No doubt there are faces so marked and so individual, so completely isolated from any type, and so independent of accident, that it is almost impossible they should ever be forgotten or mistaken. It would have been nearly impossible for Sir Thomas More to disguise himself, and we question if Dr. Newman or Mr. Tennyson could abolish the expression of eye and brow sufficiently to baffle recognition; and there are artists, and as the public believes detectives, who would recognize any face under any disguise. But the majority of men trying under changed circumstances to recognize ordinary faces from their memories of feature alone are liable, we feel convinced, to self-deceptions as extraordinary, and yet as natural, as that we may charitably attribute to Mrs. Banks, or that which prompted the evidence against the marine so nearly hung for his share in the recent Manchester *emeute*.”—*London Spectator*.

who were physicians and surgeons, and whose knowledge and attainments in their profession made them familiar with the natural changes through which a human body must necessarily pass after death, that on account of such natural and inevitable changes, it was not possible for any one to identify the head. The court properly refused to permit the evidence of the physicians to go to the jury. It would have been competent, so it was declared, for the witnesses to have stated the nature and character of the changes in the human body produced by death, within certain periods of time, and to have explained to what extent these changes had operated upon the head of the deceased, and to have stated their usual and necessary effect, according to the laws of nature. The progress of decay, the distortion and discoloration of the features, and the consequent change or destruction of the peculiar expression of the countenance, by which human faces are usually distinguished and identified, as shown by the head in question, would have been proper facts for the witnesses to have pointed out and explained to the jury. But the fact of such changes existing cannot be used to exclude the testimony of witnesses seeking to prove such identity.(x)

(x) *State v. Vincent*, 24 Iowa 570.

BOOK X.

LEGAL RELATIONS OF EXPERTS.

[As to qualifications of experts, see vol. i. § 275.

Their duties in conducting examinations, see vol. i. § 300.

vol. ii. §§ 327, 682, 119-21.

Medico-legal examinations, vol. ii. § 1006.

Mode of drawing up reports, vol. ii. § 1022.]

- (a) Distinction between experts and non-experts, § 1242.
- (b) Experts may be asked as to hypothetical fact, but not as to conclusion of law, § 1243.
- (c) They may be examined as to conclusions of science, § 1244.
- (d) But not as to their opinions outside of science, § 1245.
- (e) *Ex parte* examinations under certain circumstances inadmissible, § 1246.
- (f) But not when notice to opposite side would not have enhanced their accuracy, § 1247.
- (g) Proposed revision of legislation as to experts, § 1248.

§ 1241. THE law of experts is, in some relations, so closely connected with that of insanity, that in treating of the latter it has been found necessary to discuss much that includes the former. To these discussions the reader is now referred. (a) At present it will have to suffice simply to announce, sometimes by way of recapitulation, sometimes by way of independent statement, the following points:—

§ 1242. (a) *Distinction between experts and non-experts.*—Whether such a distinction exists is the subject of much conflict of opinion. In some jurisdictions, all persons acquainted with the facts, and capable of reasoning on them, are admissible. In others, the witness, to be admissible as an expert, must have made the distinct topic under consideration his specialty. But whether the distinction is to be made at all, and whether the particular witness is an expert in the par-

ticular case, is exclusively for the judge trying the case, subject to correction by the appellate court.

§ 1243. (b) *Experts may be asked as to hypothetical fact, but not as to conclusion of law.*—Experts may be asked their opinion as to the scientific bearing of a particular fact and as to a hypothetical case, but not as to the inferences to be drawn from the whole trial, for this would be to invade the province of the jury, nor as to conclusions of law, for this would be to invade the province of the court.(b)

§ 1244. (c) *They may also be examined as to conclusions of science drawn from particular experiments.*(c)

§ 1245. (d) *But not as to their opinions on matters not of their particular science.*—Opinion as a rule is not admissible testimony; and the only exception to this rule exists when the witness gives certain conclusions which it requires special study of a particular abstruse science to reach. Where, however, the jury is equally competent with the expert to draw conclusions from facts, then the expert must restrict himself to stating the facts, leaving it to the jury to draw the inferences. Thus, an expert is not to be asked whether certain disturbances of clothes about a dead body argued death at a particular period;(d) whether a rape was effected in a way requiring no special scientific knowledge to decide;(e) or whether the position of a dead body can be inferred from the character of a wound.(f) The reasons for this rule are obvious. The parties have a right, when this is practicable, to hear the conclusions or facts on which their rights depend determined, not by experts who from their present mode of selection often only represent the party employing them, but by a jury chosen irrespective of the particular case, and acting as arbiter of the conflicting interests.

§ 1246. (e) *Examinations made ex parte, when there could have been notice to the opposite side, are inadmissible.*—Examinations, for instance, of an alleged lunatic, conducted by a professed specialist, or examinations of blood on clothing, or of alleged

(b) See vol. i. §§ 287-292.

(c) See vol. i. § 283.

(d) *People v. Bodine*, 1 Denio 281.

(e) *Cook v. State*, 4 Zab. 843.

(f) *Kennedy v. People*, 5 Abbott N. S. 147.

poison contained in the stomach of a deceased person, or in bottles or utensils, can in most cases as readily be made upon notice to the opposing interest as without notice. For various reasons such notice, if practicable, should be given. *First*, it is a familiar principle of law that depositions purely *ex parte* are inadmissible; such testimony being liable to be affected by fraud or prejudice, and, from want of cross-examination, being necessarily imperfect. *Secondly*, there are peculiar reasons why *ex parte* examinations, of the character here noticed, should be undertaken only upon notice to the opposing interest. In such examinations everything depends upon the accuracy of the tests employed; the exhaustiveness of the exploration; the fidelity and cautiousness of the examiner. In questions of poison and of blood-stains, in particular, it is important that there should be on the spot, at the time of the examination, the representative of the adverse interest, for the purpose of seeing that the objects examined had not been previously tampered with, that no foreign elements were interposed, that the investigation was conducted with scrupulous conscientiousness. (g) Of course, when investigations are conducted by a coroner or magistrate, immediately after the commission of a crime, the public action of such functionary is adequate notice to all parties that the procedure is taking place. The very fact, also, that such examinations must necessarily be made on the instant, before the traces of crime are defaced, brings such cases within the operation of the exception that notice is not necessary when notice is impracticable. But when, after these preliminary inquiries are over, an examination is desired by one of the parties in interest, and when this examination relates to a subject matter not fleeting but continuing, then the examination is analogous to the deposition of a witness, and the policy of the law requires that it should be taken only after notice to the opposite side. Sometimes, perhaps, testimony of value, inadvertently taken, will be excluded by the application of this rule. But this will be abundantly compensated for by the suppression of those inquisitorial and im-

(g) See some striking observations on this point from Dr. Reese, *ante*, vol. i. § 296, note *y*.

perfect investigations by which the administration of public justice has been so much disgraced,^(h) and by the investing of expert testimony with checks and sanctions by which alone can its dignity be restored. Heretofore the courts, in applying those limitations, have confined themselves mostly to general statements that precautions such as are here specified are necessary to give expert examinations weight.⁽ⁱ⁾ But there can be no question that when the question comes fairly up, such examinations, when taken flagrantly *ex parte*, at a time when there could readily have been notice to the opposite side, will be ruled out as inadmissible.

§ 1247. *(f) But investigations by persons having intimate and continuous opportunities of examination, are not excluded because ex parte when these investigations would not be enhanced in accuracy and authoritativeness by being preceded by notice to the opposite side.*—This is commonly the case with regard to investigations by medical attendants (as distinguished from special visiting experts called in *post litem motam*) in cases of insanity.^(j) It also applies to investigations as to facts of nature (*e. g.*, forces of tides, habits of animals);^(k) as to certain physical peculiarities touching identity;^(l) and as to the value or condition of property.^(m)

§ 1248. *(g) Proposed revision of legislation as to experts.*—The application by the courts of the tests just stated will relieve expert testimony of some of the difficulties under which it now labors, and tend to restore to it a large measure of public confidence. The radical defect, however, of our present Anglo-American practice in this respect is the volunteer position of experts, which makes them, to a large measure, the mouth-pieces of a party who often only selects them because

(h) See vol. i. § 296a.

(i) See the cases examined in seventh edition of Wh. Cr. Law, § 821a.

(j) See *ante*, vol. i. § 283.

(k) *Porter v. Poquannoc Man. Co.*, 1 Camp. 117; *Folkes v. Chadd*, 3 Doug. 157; *Cottril v. Myrick*, 3 Fairf. 222.

(l) *Com. v. Dorsey*, 103 Mass. 413; see *ante*, §§ 1218–31.

(m) *Vendine v. Burpee*, 13 Metc. 288; *Walker v. Boston*, 8 Cush. 279; *Dwight v. County*, 11 Cush. 201; *Swan v. County*, 101 Mass. 173; *Spear v. Richardson*, 34 N. H. 428.

their pre-ascertained views suit his purposes, or who only presents them with such materials as subserve his interests. In what way this defect can be removed is one of the most important questions to which social science can now be addressed. In elucidation of this question the following remarks, condensed from the fifth (1871) edition of Liman's Casper, may be of use.⁽ⁿ⁾

§ 1249. "The advantage possessed by most German States of established medical experts in matters of medical jurisprudence and of sanitary economy is one not universally enjoyed. Even in countries so highly civilized as England and France the most arbitrary voluntarism obtains. In some cases (*e. g.*, in France), the judge calls in experts according to his discretion. Sometimes he is guided by personal confidence in his family physician; sometimes by the popular reputation of a distinguished practitioner, without any assurance that the expert thus called has made the particular subject matter of the trial his specialty. This practice has been beneficially modified in Paris by the appointment by each court of a specific number of permanent experts, whose duty it thus becomes to familiarize themselves with the particular learning of this department, and to devote to it a special interest. Even here, however, there is no fixed system binding imperatively the courts.

In Germany it is fortunately otherwise. In criminal cases, the experts first summoned are exclusively those whom the State, after prior examination of their competency and skill in such particular inquiries, has duly authorized to act for this purpose; while in addition to this there is organized a tribunal of experts to which the opinions of expert witnesses can be referred.

The first officer in this tribunal is the county or city physician (*Kreis-oder Stadt-physicus, Gerichtsarzt Landgerichtsarzt, u. s. w.*). In Prussia and other countries it is requisite to his appointment that he should be scientifically trained (*rite promovoirter*) in the three primary branches of medicine, surgery, and obstetrics. In addition to this, he must have duly passed

(n) Casper's *Gericht. Med.*, Berlin, 1871, I. § 3.

examination in the specialty of medical jurisprudence, such examination, under a ministerial edict of February 20, 1863, being conducted by the supreme medical board of the State. With him in Prussia and other German States is associated the county surgeon (Kreis-Wundarzt), who, in present practice, is the assistant of the official physician above described. In Berlin this distinction was, in 1865, done away with, and two physicians (Physici) were appointed, who were to alternate in dissections, while all other duties were imposed on them by specific assignment."

From Holtzendorff(o) we have the following additional details:—

For every county (Kreis) are appointed a governmental physician and a surgeon. These may differ in their opinions; and for such cases, and for cases of appeals, a medical college is appointed for the province; a college to which are assigned men of peculiar experience and knowledge in medical jurisprudence. And for purposes of final correction, are final appellate courts (dritte Instanzen), established for the entire State. . . . Thus, in Prussia, we have (1) the county physician and county surgeon; (2) the Medical College of the Province, consisting of the chief-president, the governmental medical counsellor, two medical counsellors, a pharmaceutical assessor, and a physician whose specialty is the diseases of animals (Departments thierarzt); and (3) an appellate medical commission for the whole monarchy.

§ 1250. A similar system could be readily grafted on our American practice. We are familiar with army physicians and army surgeons, and of subordination in rank in these officers. There would be no difficulty in providing in each county for a county physician, who, by the tests of an adequate competitive examination, shall show his general and special competency for this particular post. In addition to the duties devolved on him of conducting post-mortem examinations, and of pursuing any other investigations that may be required in a litigated issue, such a physician might be made the arbiter in those moot questions by which the law has been

(o) Rechts lexicon, Leipzig, 1870, I. 478.

kept in a state of such distressing incertitude. Is there such a disease as moral insanity or as *mania transitoria*? Can human blood-stains be distinguished after having become dried? If a question of this kind arise on the trial of a cause, it would not be inconsistent with the analogies of the law to refer it to an official expert, just in the way that a chancellor sends a question of fact to be determined by a master in chancery or by a common law court and jury. But if this be done it should be done with the checks which attend the chancery system, which has just been noticed. The official physician who acts as referee must be placed under judicial restraints. He should owe his appointment to neither party, but to the State, irrespective of any particular case. His duty it should be to take testimony, if needed, on the case, and to hear counsel, so that he will be in no danger of hazarding one of those rash and ignorant opinions which have so much disgraced this branch of medical practice. After thus judicially hearing the case, it should be his further duty to judicially certify his opinion to the court by whom the reference is made. In proper cases there might be allowed an appeal from such opinions to a supreme court of governmental experts appointed by the State at large. It may be said that this may be productive of occasional delay. This is true; but the difficulties thus arising would not be so great as those which almost every contested medical issue now involves,^(p) and which, in cases of insanity, have led courts so often to grant new trials from sheer despair of drawing a decisive conclusion from the jargon thus introduced. Soon, also, the delays of appeals would be reduced; for certain great cardinal questions would be settled beyond dispute. We should soon know whether there is such a thing as moral insanity, and whether it is practicable to distinguish human blood after the expiration of a week from the period of its drying. Settle a few such points as these, and we relieve criminal justice of a large part of the uncertainties by which it is now beset, and we will have a series of rules by which cases can be intelligently, consistently, and humanely conducted. * Nor will this be all. We will be

(p) See vol. i. § 296a.

able to get the judicial utterances of science as to vexed issues of fact, instead of the interested arguments of experts who are virtually employed as counsel by the party calling them, or the wild utterances of philosophic monomaniacs who are called simply because of their absorption in some unique theory of their special concoction. Such men need not be silenced. Experts as counsel, indeed, will find a proper and important office in presenting the two sides of the issue to the expert who acts as referee. But the expert who fills this last judicial post will be disembarassed of all personal relations. He will have no client to serve, and no past partisan extravagances to vindicate. He will render his opinion as the advocate neither of another nor of himself. When he speaks, he will do so judicially, as the representative of the sense of the special branch of science which the case invokes, governed by the opinion of the great body of scientists in this relation, and advised of the most recent investigations. When this is done, we will have expert evidence rescued from the disrepute into which it has now fallen, and invested with its true rights as the expression of the particular branch of science for which it speaks.

INDEX TO VOL. II.

[The figures refer to sections.]

A.

ABDOMEN,

wounds of the, 827-8.

ABORTION AND FCETICIDE,

natural causes, 84.

drugs as means of producing abortion, 85.

ergot, 85.

savin and oil of tansy, 86.

venesection, 91.

mechanical means, 92.

legitimate medical practice as inducing premature labor, 96.

blows upon the abdomen, 97.

signs of abortion, 98.

from an examination of the body expelled, 98.

from an examination of the female, 107.

ABSORPTION OF POISONS, 329.

ACETATE OF LEAD,

poisoning by, 469-79.

ACETIC ACID, 374.

fatal results from, 374.

ACID,

in general, 345.

arsenious, 399.

arsenic, 399-501.

hydrochloric, 361-3.

tests for, 363.

nitric, 355-360.

prussic, 558.

sulphuric, 345.

tartaric, 373.

ACONITE,

poisoning by, 627-9.

symptoms in poisoning by, 628.

tests for, 629.

AGE,

in relation to impotence, 210.

relative to identity, 287.

- ALCOHOL,
 poisoning by, 596.
 post-mortem appearances in poisoning by, 600.
 symptoms in poisoning by, 598.
- ALKALINE POISONS, 376-382.
- ALMONDS,
 oil of bitter, 580.
- AMMONIA,
 poisoning by, 379.
 tests for, 379-80.
- ANATOMICAL LESIONS, 539.
- ANIMAL BLOOD,
 distinguished from human, 724-753.
- ANTIMONY,
 chloride of, 495-501.
 in organic mixtures, detection of, 498.
- APOPLEXY,
 distinction from narcotic poisoning, 538-541.
- APRICOT KERNELS,
 poisoning by, 581.
- ARSENIC,
 form of, most commonly used, 398
 arsenious acid, 399.
 symptoms of poisoning, 400.
 chronic poisoning, 405.
 external application, 403.
 kobbalt, arsenic greens, aniline red, aniline, orpiment, realgar, savon
 de Bécœur, etc., 409.
 fatal dose of, 410.
 eaters of (toxicophagi), 411.
 post-mortem appearances caused by, 412.
 external application causes same appearance, 414.
 effects upon putrefactive process, 415.
 can be found in tissues a long time after death, 416.
 chemical examination, special tests, etc., 417 *et seq.*
 when mixed with organic matter, 426.
 value of Marsh's test, 431.
 report of Sherman trial, 435.
 poisoning by papers colored with, 444.
 antimonial and arsenical mirrors, 498.
 differential table of chemical properties of antimony and arsenic, 500.
 of combinations of arsenic and antimony, 501.
- ARTERY, CAROTID,
 ruptured in hanging, 926.
- ASPHYXIA,
 in drowning, 954.
- ATROPA BELLADONNA (deadly nightshade), 646.
 atropia or atropine, 647.

- ATROPA BELLADONNA, *continued*.
 post-mortem appearances, 648.
 recovery from organic mixtures, 649.
 AUTOPSY,
 how to be made, 1007-1022.

B.

- BARYTA,
 carbonate of, 382.
 poisoning by, 382-4.
 tests for, 382.
 BEALE, DR.,
 case of, 343.
 BELLADONNA,
 poisoning by, 646.
 BISMUTH,
 subnitrate of, poisoning by, 514.
 BITTER ALMONDS,
 essential oil of, 577, 580.
 oil of, symptoms of poisoning by, 580.
 poisoning by, 580.
 strength of oil of, 580.
 BITTERSWEET,
 poisoning by, 606.
 BLADDER,
 wounds of the, 831.
 BLOOD,
 arterial and venous, distinguished, 724-753.
 coagulation of, after death, 724-753.
 corpuscles of man and animals, 755.
 extravasation of, in wounds, 691.
 menstrual characters of, 750.
 microscopical characters of, 753.
 stains of, 724-752.
 chemical examination of, 726.
 color of, 724.
 human distinguished from others, 726-7-9.
 microscopical evidence, 753.
 on clothing, etc., 726.
 BRAIN,
 concussion of the, 793.
 extravasation of blood upon the, 793-5.
 wounds of the, 791-793-795.
 BROMINE,
 fatal results from, 392.
 properties of, 392.

BURNED,

- post-mortem appearances in the, 847.
- wounds upon the, 840-3.

BURNS AND SCALDS,

- how classified, 839.
- appearance of burns upon dead body, 840.
- wounds upon the burned, 843.
- effects upon the system, 846.
- post-mortem appearances, 847.

C.

CADAVERIC CHANGES AFFECTING THE EVIDENCE FROM
WOUNDS, 689-691.

- lividity, character of, 691-700.

CAMPHOR,

- poisonous effects of large doses, 601.

CANTHARIDES,

- small quantity fatal, 525.
- symptoms in poisoning by, 524.
- poisoning by, generally, 523.
- post-mortem appearances in poisoning by, 526.

CARBONIC ACID GAS,

- effects of poisoning, 666.
- cause of death generally accidental, 668.
- coal-gas a blood poison, 670.
- pure carbonic acid not poisonous, 671.
- explanation of its action, 672.
- physical characters, 673.

CASTOR SEEDS AND BEANS,

- fatal results from, 519.

CASTRATION,

- a cause of impotence, 203.

CATAMENIA,

- suppression of the, 46.

CEDAR OIL,

- poisoning by, 632.

CHEESE,

- poisoning by, 634.

CHERRY-LAUREL WATER, 583.

CHEST,

- wounds of the, 815.

CHILD,

- active movements of, 7.
- new-born, causes of death in the, 108-178.

CHLORAL-HYDRATE, 655.

- atal dose, 657.
- symptoms of poisoning, 657.

CHLORAL-HYDRATE, *continued.*

- chemical characters of chloral, 658.
- of chloral-hydrate, 659.

CHLORINE,

- poisoning by (see *Poisoning*), 396.

CHLOROFORM, 585.

- symptoms of poisoning, 586.
- phenomena of etherization, 587.
- internal administration, 588.
- mode of death occasioned from inhalation of, 589.
- post-mortem appearances, 590.
- detection of, 591.
- chemical examination, 592.
 - in organic mixtures, 593.
- Dr. Kidd on medico-legal bearings, 594.
- to facilitate robbery, 595.
- to facilitate rape, 245.

CICATRICES,

- disappearance of, 300.
- identification from, 300.

COAL-GAS,

- a poison, 670.

COCCULUS INDICUS,

- symptoms of poisoning, 639.
- results of experiments, 642.
- post-mortem appearances, 643.
- used to adulterate liquors, 644.
- detection, 645.

COITION, 233-263.

COLCHICUM AUTUMNALE, 516*a*.

- detection of after death, 516*a-b*.
- post-mortem appearances in poisoning by, 516.
- smallest quantity fatal, 517.
- symptoms in poisoning by, 516-7.

COLD,

- as retarding putrefaction, 305, 982.
- death from, 880-2.
- post-mortem appearances in death from, 882.

COMBUSTION,

- spontaneous, 849.

COMPRESSION,

- effect of, on inflated lungs, 132-4.

CONCEPTION,

- time of, 1-22.

CONCUSSION OF THE BRAIN, 791.

- distinguished from intoxication, 791-5.

CONIUM MACULATUM,

- poisoning by, 616-19.

- COPPER COINS,
 poisoning by, 482-8.
 in organic mixtures, detection of, 480-8.
 post-mortem appearances in poisoning by, 482.
 salts of, 480-8.
 symptoms of poisoning by, 481.
 tests for, 485.
 utensils, poisoning from the use of, 486.
- CORD,
 mark of, in hanging, 922.
 umbilical, compression of and by, 157-160.
- CORPUS DELICTI, 1114, 1213. (See *Homicide*.)
- CORROSIVE SUBLIMATE (bichloride of mercury), 446.
 form administered, 448.
 post-mortem appearances, 449.
 external application of, 450.
 value of symptoms in evidence of poisoning, 451.
 danger of confounding these with arsenic, 452.
 with copper, 453.
 chemical examination, 454.
- CYANIDE OF POTASSIUM, .
 poisoning by, 584.

D.

- DAPHNE MEZEREUM,
 poisoning by, 654.
- DALTON, DR.,
 on Corpora Lutea, 29.
- DATURA STRAMONIUM,
 poisoning by, 607.
 post-mortem appearances in poisoning by, 608.
- DEFORMITIES,
 identification from, 298.
- DEATH,
 length of time since, 304.
 signs of,
 cessation of the respiration and circulation, 960.
 filmy aspect of the eyes, 961.
 pallor of the body, 962.
 extinction of animal heat, 963.
 relaxation of the muscles, 964.
 relaxation of the cornea, 965.
 flattening of the fleshy parts, 966.
 suggillations, 967.
 external, 968.
 internal, 970.
 lungs, 971.

INDEX TO VOL. II.

DEATH, *continued.*

- sugillations of brain, 972.
 - kidneys and intestines, 973.
 - heart, 974.
- cadaveric rigidity, 975.
- putrefaction, 977.
 - fat, etc., 978.
 - women after childbirth, 979.
 - newly-born infants, 980.
 - manner of death, 981.
 - effect of external agents, 982.
 - exposure in the open air, 305-109, 83.
 - moisture, 309, 956, 983.
 - heat, 984.
 - external signs, 985.
- saponification, 986.
- mummification, 987.
- decomposition of internal organs, 988.
 - windpipe, 989.
 - brain of infants, 990.
 - stomach, 991.
 - intestinal canal, 992.
 - spleen, 993.
 - omentum and mesentery, 994.
 - liver, 995.
 - brain of grown persons, 996.
 - heart, 997.
 - lungs, 998.
 - kidneys, 999.
 - urinary bladder, 1000.
 - œsophagus, 1001.
 - pancreas, 1002.
 - diaphragm, 1003.
 - arteries, 1004.
 - uterus, 1005.

DECOMPOSITION,

- in coffins, 310-7.
- progress of, after death by drowning, 956 *et seq.*
- in vaults, 310-7.

DELIVERY,

- feigned, 37.
- protracted, 41.
- sign of, 23-28.
 - in the dead, 29-30.
- unconscious, 175.

DEVELOPMENT OF FÆTUS,

- premature, 7, 20, 67.

INDEX TO VOL. II.

- DIAPHRAGM,
wounds of the, 830.
- DIGITALIS,
poisoning by, 650.
poisonous properties of, 651.
- DISEASE,
as modifying the action of poisons, 325-330.
- DOUBTFUL SEX, 181-8.
- DRASTIC PURGATIVES,
fatal results from, 518.
- DROWNING,
how producing death, 943.
time when body will float, etc., 945.
signs of death by drowning, 947.
pale ness and coldness of skin, etc., 948.
abrasion of the hands, etc., 949.
water and froth in the lungs, 950.
water in the stomach, 952.
signs of asphyxia, 954.
marks of violence, 955.
putrefaction, etc., 956.
accidental or otherwise, 958.
of new-born child, 172.
- DURATION OF PREGNANCY,
legal decisions, 40-66.
statistical results, 50.

E.

- EARLY VIABILITY, 67.
- ECCHYMOSIS,
caused by umbilical cord, 150-8.
from natural causes, 700.
in wounds, 700-2.
- EMPHYSEMA,
an objection to hydrostatic test, 132.
- ERGOT, 85.
- ERYSIPELAS FROM WOUNDS, 783.
- ETHER AND CHLOROFORM,
physical effects of, 245.
- ETHERIZATION,
external phenomena of, 587.
- EXAMINATIONS, MEDICO-LEGAL,
locality, 1007.
identity, 1008.
indications of violence or unnatural death, 1009.
manner of conducting the autopsy, 1010.
natural aspect of the organs at different ages, 1012.
mode of drawing up reports, 1022.

INDEX TO VOL. II.

EXAMINATION OF THE BODY IN DEATH FROM WOUNDS, 689.

EXECUTION BY HANGING, 919.

EXHALATIONS FROM THE DEAD, 684.

EXPERTS,

qualifications of, 327, 682. (See Vol. I., 275.)

duties in conducting examinations, 327, 682, 1119-21.

medico-legal examinations generally, 1006.

mode of drawing up reports, 1022.

legal relations of, 1241.

distinction between experts and non-experts, 1242.

expert may be asked as to hypothesis, but not as to conclusions of law, 1243.

may be asked as to conclusions of science, 1244.

but not as to opinion outside of science, 1245.

ex parte examinations, when admissible, 1246.

proposed revision of legislation as to, 1248.

F.

FACE,

wounds of the, 800.

FISH,

poisonous, 535.

FETAL HEART,

pulsation of, 19.

FETICIDE. (See *Abortion.*)

FETUS,

age of, 43-50.

blighted, 84.

first movement of, 19, 67.

FRACTURES,

identification from, 298.

of the skull, 793.

during birth, 161.

FUNGI,

poisoning by, 520-2.

G.

GANGRENE,

death from, 784.

GASES EVOLVED IN HUMAN DECOMPOSITION, 684.

GAS,

poisonous. (See *Poison.*)

GENITAL ORGANS,

wounds of the, 835.

condition of in hanging, 927.

GESTATION,

protracted, 41.

GOLD,
 terchloride of, 511.
 GUNSHOT WOUNDS, 707-714.
 character of, 708.

H.

HABIT,
 as modifying the action of poisons, 324-333.
 HAIR,
 fraudulent discoloration of the, 303.
 identification by means of the, 303.
 HANGING,
 general symptoms, 919.
 marks of the cord, 922.
 rupture of artery, 926.
 tumefaction of genital organs, 927.
 condition of eyes, 908.
 suicidal or homicidal? 929.
 position and condition of body, 930.
 marks of violence, 936.
 HASHISH,
 poisoning by, 604.
 HEAD,
 injuries of the, 790-5.
 HEART,
 pulsation of fetal, 289.
 rupture of the, 825-6.
 wounds of the, 820-6.
 HEAT,
 as a cause of putrefaction, 984.
 as retarding putrefaction, 984.
 death from, 869-72.
 HEMLOCK,
 its action, 616.
 symptoms of poisoning, 617.
 conia, or conicine, 618.
 effects of, 619.
 detection in organic mixtures, 620.
 HEMORRHAGE,
 as evidence of the vital origin of a wound, 770.
 from umbilical cord, 157.
 internal, 770.
 HENBANE,
 poisoning by, 602-3.
 HERNIA,
 as a cause of impotence, 207.

HERMAPHRODITISM, 181.

- female, 184.
- male, 181.
- real, 188.
- surgical interference in, 188.

HOMICIDE,

elementary definitions, 1093.

murder, 1095.

general definition of, 1095.

malice the essential ingredient, 1096.

malice either express or implied, 1096.

when malice to be presumed, 1096.

murder from general malice, 1096.

when homicide is committed from general malevolence
it is murder, 1096.

but when from wantonness, but manslaughter, 1096.

murder from individual malice, 1097.

in reference to the party killed, 1097.

how such malice to be proved, 1097.

in what it consists by the civil and common law,
1097.

intent to kill, 1099.

in this case the offence is always murder,
1099.

how such intent may be proved, 1099.

declarations and acts of defendant ad-
missible for this purpose, 1099, 1161.

intent to do bodily harm, 1100.

in this country such homicide generally is
murder in the second degree, 1100.

the grade therefore depends on the intent,
1100.

in reference to the party killed, when the blow falls on
the deceased by mistake, 1101.

when in an attempt to produce abortion, the mother
is unintentionally killed, 1101.

from collateral malice, 1102.

this includes those cases where the malice is directed to
an object other than that of human life or limb, 1102.

manslaughter, 1103.

general definition of, 1103.

involuntary manslaughter, 1104.

excusable homicide, 1105.

where a man doing a lawful act, without any intention of hurt,
by accident kills another, 1105.

where a man kills another in self-defence, 1105.

the distinction between excusable and justifiable homicide
is in this country merely theoretical, 1106.

HOMICIDE, *continued.*

justifiable homicide, 1107.

when committed by unavoidable necessity, 1107.

when committed in advancement of public justice, 1107.

murder in the second degree, 1108.

object of distinction is the restriction of capital punishment to these cases only in which there is an intent to take life, 1108-9.

the distinguishing feature between the two degrees is a specific intent to take life, 1108-9-10.

homicide by poisoning not necessarily murder in the first degree, 1110.

homicide collateral to rape, robbery, etc., is necessarily murder in the first degree, 1111.

homicide of A., when the intent was to kill B., is murder in the second degree, 1112.

specific intent to take life to be inferred from circumstantial evidence, and from declarations, etc., 1113.

corpus delicti.

that a death took place, 1114.

universal rule of civil and common law, that the fact of death should be proved, 1114.

cases of conviction of innocent parties, from neglect of this precaution, 1114-6.

exceptions to the rule, 1117.

possession of body is unnecessary when deceased is proved by eye-witnesses, 1117.

and so where it is proved that the body was destroyed by chemical or mechanical agents, 1118.

that the death was from violence.

poisoning.

measures to be taken by the prosecution when poisoning is suspected, 1119.

chemical proof of poison in stomach not essential, 1127.

importance of chemical examination of stomach and its contents, 1128.

when, however, this is prevented by the accused, he cannot set up the want of it, 1128.

on the other hand, neglect by the prosecution to procure it, if in its power, is a powerful presumption in favor of the accused, 1128.

facts on which a verdict of guilty can be supported, 1130.

duties of counsel for prosecution and defence, 1135.

wounds and blows, 1137.

legal definition of wounds, 1137.

under what circumstances wounds imply criminal agency, 1140.

character of the wounds themselves, 1140.

INDEX TO VOL. II.

HOMICIDE, *continued.*

- adaptation to a particular instrument, 1140.
- shape and direction, 1143.
- particular class, 1144.
 - gunshot, 1144.
 - punctured, 1145.
 - incised, 1146.
 - contused, 1147.
- number, 1148.
- situation, 1150.
- expression of countenance, 1151.
- inferences from surrounding objects, 1152.
 - clothing, 1152.
 - agent commensurate to the effect, 1153.
 - place where found, 1154.
- position and appearance of the body, 1155.
 - attitude, 1155.
 - marks of blood, 1156.
 - bruises, 1157.
- probability of infliction of injury before death, 1159.
- connection of the wound with the death, 1160.
- intent and design, from what to be inferred, 1161.
 - prior attempts, preparations, and threats, 1161.
 - evidence of such admissible, 1161-2.
- marks of violence, 1166.
 - presumptions to be drawn from such, 1167.
 - it must appear that the alleged violence was the cause of death, either in part or in whole, 1167.
- instrument of death, 1169.
 - the use of a lethal instrument leads to the presumption that death was intended, 1169.
 - suicide may be inferred from the position of the weapon, 1170.
 - other presumptions to be drawn from instrument of death, 722, 1171-2.
- liability of deceased to attack, 1174.
 - possession of money, 1174.
 - avarice and ambition, 1175.
 - old grudge, 1178.
 - jealousy, 1179.
- position of deceased, 717, 722, 1151, 1180.
 - presumption to be drawn from this as to suicide, 717, 722.
 - in cases of hanging, 1180.
 - in cases of drowning, 1180.
 - in cases of poisoning, 1180.
- materials appropriate to be converted into instruments of crime, 1182.
 - importance of indicatory evidence in this respect, 1182.
 - purchase of poison and powder ; preparation of other materials, 1182.

HOMICIDE, *continued.*

detached circumjacent bodies, 1183.

dress of deceased. Footprints. Presumptions to be drawn from the latter, 1183-5-7.

detached articles of clothing, 1186.

wadding of gun, etc., 1186.

cases illustrative of the importance of this species of evidence, 1190, etc.

possession of fruits of offence, 1198.

Illustration of the general value of indicatory evidence. 1199.

infanticide and feticide, 1200. (See, for the Medical view of this subject, 84-107, 108-178.)

how far feticide is affected by the degree to which gestation has proceeded, 1200.

at common law destruction of an unborn infant is a misdemeanor. Late differences of opinion as to whether there must be a quickening. Better opinion is, that all attempts of this character are misdemeanors, no matter what be the stage of gestation, 1200-2.

how far the offence is affected by the fact of birth, 1207.

when a child dies *after* birth, from a wound inflicted before, the offence is murder; when the death takes place *before* birth it is at common law but a misdemeanor, 1207-8.

tests of viability recognized by the courts, 1209.

viability medically considered, 41-61-7, 128.

difference of opinion as to actual degree of birth which is requisite to constitute the legal offence, 1210.

general propositions of law bearing on this topic:—

where there is a malicious wound inflicted on an infant, with intent to produce death, and death ensues *after birth*, the offence is murder, 1210.

where there is a malicious exposure of an infant, with intent to produce death, and death ensues after birth, it is murder, 1210.

where there is a wanton exposure of an infant, without the intent to procure death, but with the expectation of shifting the support of the infant upon some third person, and death ensues after birth, it is manslaughter, 1210.

where there is an exposure resulting from necessity, ignorance, or insanity, and death ensues after birth, the offence is excusable homicide, in which, in accordance with American practice, the defendant is entitled to an acquittal, 1210-13.

corpus delicti in infanticide, 1213.

difficulties arising in this respect from—

the uncertainty of the fact of pregnancy, 1214. (See 18, 1115.)

the uncertainty of the time of death, 1215.

INDEX TO VOL. II.

- HOMICIDE, *continued*.
 uncertainty of presumptions, 1213.
 casualties of gestation and delivery, 1213. (See this subject medically considered, 37-128.)
- HOSPITAL GANGRENE,
 from wounds, 784.
- HUMAN BLOOD,
 distinguished from animal, 724-753.
- HYDROCHLORIC ACID, 361-3.
 chemical examination in poisoning by, 361.
 post-mortem appearances in poisoning by, 362.
 symptoms of poisoning by, 361.
- HYDROCYANIC ACID. (See *Prussic acid*.)
- HYDROCELES,
 as a cause of impotence, 207.
- HYDROGEN,
 arsenuretted. (See *Poisons*.)
- HYDROSTATIC LUNG-TEST, 132.
 objections to the, 131-5.
- HYMEN,
 evidence from, in cases of rape, 240-252.
- HYOSCYAMUS,
 poisoning by, 602-3.

I.

IDENTIFICATION OF THE LIVING OR DEAD.

- cases of doubtful identity, 287, 1218.
 direct testimony, 1218.
 appearance, 1218.
 voice, 1218.
 daguerrotypes, photographs, etc., 1231.
 inferential proof, 1223.
 clothing, 1238.
- means of identification, 289, 1218.
 establishing age from the skeleton, 289-290, 1237.
 by means of the teeth, 292, 1236.
 determination of sex from inspection of the skeleton, 296, 1237.
 fractures, deformities, and peculiarities in the dead body, 298.
 cicatrices, 300, 1227.
 hair, 303, 1238.
 the length of time that has elapsed since death, 304.
 heat as influencing decomposition, 305, 982.
 air as influencing decomposition, 308, 983.
 water as influencing decomposition, 309, 983.
 dryness and moisture of the soil as influencing decomposition, 310, 983-4.
 putrefaction in the fetus, 319.
 influence of lime on the putrefactive process, 320.

- IDIOSYNCRASY,**
 as modifying the action of poisons, 332.
- ILLUMINATING GAS,**
 accidents from, 675.
- IMMATURITY OF THE FŒTUS,**
 signs of, 67.
- IMPOTENCE,**
 congenital absence of the testes, 202.
 castration, 203.
 diseases of the testes, 205.
 defect in size and malformation of the penis, 206.
 obstructions from large hydroceles or herniæ, 207.
 local relaxation, 208.
 causes of a psychical character, 209.
 want of age, 210.
- INDIGO,**
 sulphate of. (See *Poisons.*)
- INFANCY,**
 as causing impotency, 210.
- INFANTICIDE.**
 characteristics of stillborn and living children, 108.
 tests of live birth, 128.
 hydrostatic lung test, 132.
 static test, 144.
 causes of death in the new-born child, 149.
 causes of death *before or during* birth, 150.
 compression of, and by, the umbilical cord, 150.
 protracted delivery, 155.
 debility, 156.
 hemorrhage from the umbilical cord, 157.
 length of the umbilical cord, 160.
 fracture of the skull, 161.
 causes of death *after* birth, 165.
 exposure, 166.
 suffocation, 168.
 strangling, 170.
 drowning, 172.
 wounds, 173.
 dislocation of the neck, 174.
 unconscious delivery, 175.
 poisoning, 176.
 general considerations, 178.
- INFLATION,**
 artificial, an objection to hydrostatic test, 132-44.
 distinguished from imperfect respiration, 132-140.
 practicability of, 132-140.
- INSEMINATION AND CONCEPTION, 313.**

INDEX TO VOL. II.

- INTERCOURSE,
single act of, 313, 314.
- IODINE,
poisoning by, 393-4.
tests for, 395.
- IRON,
chloride of, poisoning by, 513.
sulphate of, poisoning by, 512.
- IRRITANT POISONS, 345-540. (See *Poisons*.)

J.

- JALAP, 518.
- JAMESTOWN WEED, 607.

K.

- KIESTEIN IN THE URINE, 22.
- KRAHMER, PROF.,
on duration of pregnancy, 317, 318.

L.

- LABOR,
induction of premature, 84-107.
precipitate, 96.
- LACTUCARIUM, 605.
- LEAD,
chronic poisoning by, 469-79.
constitutional effects of, 475.
in the tissues, detection of, 470-73.
post-mortem appearances in poisoning by, 479.
salts, poisoning by, 469-70.
tests for, 470-7.
- LEGITIMACY,
presumption of, 40.
- LEUCORRHŒA, 435, 436.
- LIFE INSURANCE,
in questions of poisoning 547.
- LIGHTING GAS,
accidents from, 675.
appearances after death by, 675.
- LIGHTNING,
death from, 878.
post-mortem appearances in death by, 879.
- LIME,
its influence upon putrefaction 310-20, 977-982.
- LIVE-BIRTH,
signs of, 128-144.

- LIVER,
 wounds of the, 829.
 LOBELIA INFLATA,
 poisoning by, 630-1.
 LOCKJAW,
 from wounds, 782.
 LUNAR CAUSTIC,
 poisoning by, 664.
 LUNGS OF NEW-BORN CHILD, 108-144.
 wounds of the, 816.
 condition of, after drowning, 950.

M.

- MALPRACTICE, MEDICAL.
 civil law practice, 1058.
 common law practice, 1062.
 in criminal prosecutions, 1062.
 in action for torts, 1086.
 MEAT, UNSOUND,
 poisoning by, 536.
 MECHANICAL INJURY,
 death from, 685. (*See Wounds.*)
 MECHANICAL MEANS FOR PROCURING ABORTION, 92-97.
 irritants, 537.
 MECONIC ACID,
 tests for, 553.
 MEDICAL MALPRACTICE. (*See Malpractice.*)
 MEDICO-LEGAL EXAMINATIONS, 1007.
 locality, 1007.
 identity, 1008.
 indications of violence or unnatural death, 1009.
 manner of conducting, 1001. (*See Experts.*)
 mode of drawing reports, 1022.
 MENSES,
 cessation of, 44.
 suppression of the, 1-47.
 MENSTRUAL BLOOD,
 characters of, 724-53.
 function, irregularity of, 12.
 MENSTRUATION, 44.
 MERCURIAL PREPARATIONS,
 poisoning by various, 462.
 MERCURY,
 bichloride of, 446.
 deleterious effects of, 462.
 effect of, on the mouth, 463-8.
 effects of, distinguished from disease, 463-8.
 nitrate of. (*See Poisoning.*)

INDEX TO VOL. II.

- METALLIC ARSENIC, 398.
 poisoning by, 398.
- METALLIC IRRITANTS, 398.
- METALLOIDAL IRRITANTS.
 phosphorus, 386.
 chemical examination, 389.
 in organic mixtures, 390.
 chronic poisoning by, 391.
- bromine, 392.
- iodine, 393.
 chemical tests, 395.
- chlorine, 396.
- MOISTURE,
 influence of, on putrefaction, 956-83.
- MORPHIA,
 poisoning by, 549-57.
 tests for, 549-57.
- MUMMIFICATION, 987.
- MUSHROOMS,
 deprivation of the poisonous property of, 520-2.
 poisoning by, 521.
 symptoms in poisoning by, 521.
 post-mortem appearances in poisoning by, 522.
- MUSSELS,
 poisoning by, 535.
- N.
- NARCOTICO-ACRID POISONS, 745-80.
- NARCOTIC POISONS, 538-595.
- NECK,
 wounds of the, 801.
- NEEDLES,
 poisoning by, 537.
- NEW-BORN CHILD,
 drowning of, 172.
 exposure of, 166.
 length of skeleton of, 289.
 strangulation of, 170.
 suffocation of, 168.
 wounds of, 173.
- NICOTINA,
 detection of in the viscera, 609-11-13.
 poisoning by, 609.
 properties of, 613.
- NITRATE OF MERCURY, 460.
- NITRIC ACID, 355-360.
 character of, 355.

INDEX TO VOL. II.

NITRIC ACID, *continued*.

- chemical examination in poisoning by, 355-358.
- post-mortem appearances in poisoning by, 355.
- stains on clothing from, 260.
- symptoms of poisoning, 356.
- stains on cloth, 360.

NITROUS OXIDE GAS, 678.

NUX VOMICA AND STRYCHNIA, 631.

- symptoms of poisoning, 622.
- fatal dose, 623.
- effects compared with tetanus, 624.
- post-mortem appearances, 625.
- chemical examination, 626.

O.

OPIUM AND ITS PREPARATIONS, 540.

- symptoms of poisoning, 541.
- fatal dose, 543.
- chronic poisoning, 544.
 - effect of habitual use, 546.
 - as to life-insurance, 547.
- post-mortem appearances, 548.
- morphia, 551.
 - chemical examination, 550.
 - salts of, 552.
 - meconic acid, 553.
- in organic mixtures, 554.
 - process of Stas, 555.
- separation by dialysis, 556.
- its value, 557.

OXALIC ACID,

- character of, 365.
- chemical examination in poisoning by, 365.
- post-mortem appearances in poisoning by, 369.
- smallest quantity fatal in poisoning by, 366-9.
- symptoms of poisoning, 365.
- rapidity of poisonous effects, 366.
- case of poisoning by, with notes on post-mortem appearances, and with experiments on animals, 369.
- chemical examination, 370.

OYSTERS,

- poisonous, 535.

P.

PENIS,

- malformation of, 206.

PERITONITIS,

- as a result of poisoning, 328-332.

PERFORATION OF THE STOMACH,

in poisoning, 328-332.

PINS,

poisoning by, 537.

PHOSPHORUS,

chemical examination in poisoning by, 389.

poisoning by, 386.

post-mortem appearances in poisoning by, 386-90.

smallest quantity fatal, 390-1.

symptoms of poisoning by, 387-8.

PLATINUM,

bichloride of, 511.

PLOCQUET'S TEST, 132-4.

POISONS.

definition of poisons, 321.

poisons most commonly in use, 324.

introduction and absorption of poisons, 325.

sources of information for the expert, 326.

value of symptoms, 326.

recovery of the poisonous agent, 326.

the value and duties of experts, 327.

the general action of poisons, 328.

absorption and elimination, 329.

nature of the symptoms, 330.

chemical analysis, 331.

diseases liable to be confounded with effects of poison, 332 *et seq.*

classification of poisons, 343.

classification of M. Tardieu, 344.

POISONS, IRRITANT.

acids.

poisoning by sulphuric acid, 345.

poisoning by ink, 350.

chemical examination for sulphuric acid, 351.

stains of acid upon clothing, 353.

nitric acid, 355.

symptoms of poisoning, 356.

chemical examination, 358.

stains on cloth, 360.

hydrochloric acid, 361.

symptoms of poisoning, 361.

chemical examination, 363.

oxalic acid,

symptoms of poisoning, 365.

rapidity of poisonous effects, 366.

case of poisoning by, with notes on post-mortem appearances,
and with experiments on animals, 369.

chemical examination, 370.

tartaric acid, 373.

POISONS, IRRITANT, *continued.*

- acetic acid, 374.
- alkaline.
 - potash and soda, 376.
 - post-mortem appearance, 377.
 - bleaching solutions, 378.
 - ammonia, 379.
 - baryta, 383.
- metalloidal.
 - phosphorus, 386.
 - chemical examination, 389.
 - in organic mixtures, 390.
 - chronic poisoning by, 391.
 - bromine, 392.
 - iodine, 393.
 - chemical tests, 395.
 - chlorine, 396.
- metallic.
 - arsenic.
 - form of, most commonly used, 398.
 - arsenious acid, 399.
 - symptoms of poisoning, 400.
 - chronic poisoning, 405.
 - external application, 408.
 - kobalt, arsenic greens, aniline red, aniline, orpiment, realgar, savon de Bécœur, etc., 409.
 - fatal dose of, 410.
 - eaters of (toxicophagi), 411.
 - post-mortem appearances caused by, 412.
 - external application causes same appearance, 414.
 - effects upon putrefactive process, 415.
 - can be found in tissues a long time after death, 416.
 - chemical examination, special tests, etc., 417 *et seq.*
 - when mixed with organic matter, 426.
 - value of Marsh's test, 431.
 - report of Sherman trial, 435.
 - poisoning by papers colored with, 444.
 - corrosive sublimate (bichloride of mercury), 446.
 - form administered, 448.
 - post-mortem appearances, 449.
 - external application of, 450.
 - value of symptoms in evidence of poisoning, 451.
 - danger of confounding these with arsenic, 452.
 - with copper, 453.
 - chemical examination, 454.
 - nitrate of mercury, 460.
 - deleterious effects of mercurial preparations, 462.
 - description of mercurial stomatitis, 468.

INDEX TO VOL. II.

POISONS, IRRITANT, *continued.*

- salts of lead, 469.
 - symptoms of poisoning, 470.
 - forms generally administered, 474.
 - acute and chronic poisoning, 475.
 - chemical examination, 476.
 - in organic mixtures, 477.
 - post-mortem appearances, 479.
- salts of copper.
 - forms generally administered, 480.
 - symptoms of poisoning, 481.
 - post-mortem appearances, 482.
 - chemical examination, 485.
 - in organic mixtures, 486.
 - fatal dose of, 488.
- tartar-emetic, 489.
 - symptoms of acute poisoning, 490.
 - fatal dose, 491.
 - anatomical lesions, 493.
 - chronic poisoning, 494.
 - chemical examination, 496.
 - in organic mixtures, 497.
 - antimonial and arsenical mirrors, 498.
- differential table of chemical properties of antimony and arsenic, 500.
 - of combinations of arsenic and antimony, 501.
- salts of zinc.
 - oxide of zinc, 504.
 - not a poison, 505.
 - sulphate of zinc, 506.
 - cases, 507.
 - chemical examination, 508.
 - chloride of zinc, 509.
- tin, 510.
- silver, gold, and platinum, 511.
- iron.
 - sulphate of iron, 512*a*.
 - chemical examination, 512*b*.
 - chloride of iron, 513.
- bismuth.
 - subnitrate of bismuth, 514.
- chromic acid.
 - bichromate of potash, 515.
- vegetable.
 - colchicum autumnale, 516*a*.
 - post-mortem appearances, 516*b*.
 - chemical examination, 517.
 - drastic purges; jalap, scammony, etc., 518.

POISONS, IRRITANT, *continued.*

- castor seeds or beans, 519.
- fungi (mushrooms), 520.
 - symptoms of poisoning, 521.
 - post-mortem appearances, 522.
- animal.
 - cantharides, 523.
 - symptoms of poisoning, 524.
 - fatal dose, 525.
 - post-mortem appearances, 526.
 - sausages, 527.
 - symptoms of poisoning, 528.
 - post-mortem appearances, 530.
 - trichinosis, 532.
 - symptoms of poisoning, 533.
 - poisonous cheese, 534.
 - poisonous fish, 535.
 - unsound meat, 536.
- mechanical irritants.
 - pins, needles, glass, etc., 537.

POISONS, NARCOTIC.

- narcotism, 538.
- anatomical lesions, 539.
- opium and its preparations, 540.
 - symptoms of poisoning, 541.
 - fatal dose, 543.
 - chronic poisoning, 544.
 - effect of habitual use, 546.
 - as to life-insurance, 547.
 - post-mortem appearances, 548.
- morphia, 549.
 - chemical examination, 550.
 - salts of, 552.
 - meconic acid, 553.
 - in organic mixtures, 554.
 - process of Stas, 555.
 - separation by dialysis, 556.
 - its value, 557.
- hydrocyanic acid (prussic acid), 558.
 - symptoms of poisoning, 559.
 - fatal dose, 562.
 - recovery after very large doses, 563.
 - post-mortem appearances, 564.
 - origin of, 566.
 - effects of eating bitter almonds, 567.
 - chemical tests, 568.
 - the iron tests, 569.
 - for the vapor, 570.

INDEX TO VOL. II.

POISONS, NARCOTIC, *continued.*

- the silver test, 571.
- the sulphur or Liebig's test, 572.
- order of applying the tests, 573.
- manner of applying the sulphur test, 574.
- the use of the spectroscope, 576.
- absence of odor does not prove absence of Prussic acid, 577.
- chemical examination, 578.
- oil of bitter almonds, 580.
- apricot kernels, 581.
- peach kernels, 582.
- cherry-laurel water, 583.
- cyanide of potassium, 584.
- chloroform, 585.
 - symptoms of poisoning, 586.
 - phenomena of etherization, 587.
 - internal administration, 588.
 - mode of death occasioned from inhalation of, 589.
 - post-mortem appearances, 590.
 - detection of, 591.
 - chemical examination, 592.
 - in organic mixtures, 593.
 - Dr. Kidd on medico-legal bearings, 594.
 - to facilitate robbery, 595.
- alcohol, 596.
 - symptoms of poisoning, 598.
 - producing sudden death, 599.
 - post-mortem appearance, 600.
- camphor, 601.
- hyoscyamus niger (henbane), 602.
 - forms of administration, 603.
- haschisch, 604.
- lactuca, 605.
- solanum (bittersweet), 606.
- datura stramonium (Jamestown weed).
 - nature and effects, 607.
 - post-mortem appearances, 608.
- nicotiana tabacum (tobacco), 609.
 - post-mortem appearances, 611.
 - nicotina, 612.
 - chemical character, 613.
 - recovery of, 614.
 - discovery of any liquid or volatile alkaloid, 615.
- conium maculatum (hemlock).
 - its action, 616.
 - symptoms of poisoning 617.
 - conia or conicine, 618.

POISONS, NARCOTIC, *continued.*

- effects of, 619.
- detection in organic mixtures, 620.

POISONS, MISCELLANEOUS.

- nux vomica and strychnia, 621.
 - symptoms of poisoning, 622.
 - fatal dose, 623.
 - effects compared with tetanus, 624.
 - post-mortem appearances, 625.
 - chemical examination, 626.
- aconite, 627.
 - symptoms of poisoning, 628.
 - post-mortem appearances, 629.
- lobelia inflata (Indian tobacco), 630.
 - lobelina, chemical character, 631.
- cedar oil, 632.
- savin, 633.
 - post-mortem appearances, 634.
 - detection, 635.
- taxus baccata (yew), 636.
- oil of tansy, 637.
- cocculus Indicus.
 - symptoms of poisoning, 639.
 - results of experiments, 642.
 - post-mortem appearances, 643.
 - used to adulterate liquors, 644.
 - detection, 645.
- atropa belladonna (deadly nightshade), 646.
 - atropia or atropine, 647.
 - post-mortem appearances, 648.
 - recovery from organic mixtures, 649.
- digitalis purpurea (foxglove), 550.
 - digitalin, 651.
- quinia, 653.
- daphne mezereum, 654.
- chloral-hydrate, 655.
 - fatal dose, 656.
 - symptoms of poisoning, 657.
 - chemical characters of chloral, 658.
 - of chloral hydrate, 659.
 - its recovery, 660.
- veratrum, 661.
 - album, 662.
 - viride, 663.
 - veratria and other alkaloids, 664.
 - differential table for strychnia and veratria, 665.

POISONOUS GASES.

- carbonic acid gas.

INDEX TO VOL. II.

POISONOUS GASES, *continued.*

- effects of poisoning, 666.
- cause of death generally accidental, 668.
- coal-gas a blood poison, 670.
- pure carbonic acid not poisonous, 671.
 - explanation of its action, 672.
 - physical characters, 673.
- lighting-gas, 675.
- sulphuretted-hydrogen gas, 676.
- nitrous-oxide gas.
 - explanation of its action, 678.
- method of analysis of gases.
 - preliminary experiment, 679.
 - on collecting gases, 680.
 - analysis of gases, 681.
 - preliminary formalities in a judicial examination, 682.
 - exhalations from the dead, 684.

POST-MORTEM EXAMINATION.

- locality, 1007.
- identity, 1008.
- indications of violence or unnatural death, 1009.
- manner of conducting autopsy, 1010.
- natural aspects of the organs at different ages, 1012.
- mode of drawing reports, 1022.

POTASH,

- bichromate of, poisoning by. (See *Poisoning.*)
- binoxalate of. (See *Poisoning.*)
- nitrate of, poisoning by. (See *Poisoning.*)
- poisoning by, 366-8.

POTASSIUM,

- cyanide of. (See *Poisoning.*)

PREGNANCY,

- signs of,
 - suppression of the menses, 1.
 - enlargement of the abdomen, 3.
 - changes in the mouth and neck of the womb, 6.
 - quickening, 7.
 - sympathetic phenomena, 12.
 - pulsation of the foetal heart, 19.
 - other sounds indicative of pregnancy, 20.
 - kiestein in the urine, 22.
- duration of,
 - presumption that the child born in wedlock is legitimate, 40.
 - protracted gestation, 41.
 - usual duration of pregnancy, 41.
 - mode of reckoning duration of pregnancy, 43.
 - cause of conception, 44.
 - cessation of the catamenia, 46.

INDEX TO VOL. II.

PREGNANCY, *continued.*

arrest of monthly discharge, 47.
statistical results, 50.

legal decisions, 66.

early viability, 67.

PREMATURE LABOR,

induction of, 92-7.

PRIORITY OF DEATH. (See *Survivorship.*)

PRUSSIC ACID, 558.

symptoms of poisoning, 559.

fatal dose, 562.

recovery after very large doses, 563.

post-mortem appearances, 564.

origin of, 566.

effects of eating bitter almonds, 567.

chemical tests, 568.

the iron tests, 569.

for the vapor, 570.

the silver test, 571.

the sulphur or Liebig's test, 572.

order of applying the tests, 573.

manner of applying the sulphur test, 574.

the use of the spectroscope, 576.

absence of odor does not prove absence of Prussic acid, 577.

chemical examination for, 578.

oil of bitter almonds, 580.

apricot kernels, 581.

peach kernels, 582.

cherry-laurel water, 583.

cyanide of potassium, 584.

PURGATIVES, DRASTIC,

poisoning by, 518.

for procuring abortion, 85-6.

PUTREFACTION, 132.

by cold, 310-17, 984.

by heat, 310-17, 984.

by moisture, 983, 310-17.

by water, 982-3.

as affecting evidence of strangulation, 907-11.

as influenced by temperature, 305.

in the fœtus, 132, 319.

influence of lime upon, 320.

Q.

QUICKENING, 7.

period of, 7.

value of, as a sign of pregnancy, 7-22.

QUINIA,

poisonous effects of, 653.

R.

RAPE, 213-270.

medical evidence in case of, 213.

on adult females, possibility of, 233-240.

on adults in an unconscious state, 233-48.

on old women, 244.

on persons asleep, 242.

on persons under the influence of ether or chloroform, 245.

upon children, 213.

frequency of, 217.

marks of violence in, 219.

transmission of gonorrhœa, 219-22.

physical evidence of, 249.

condition of the hymen, 250.

it is not always destroyed by the first connection, 251.

it may be lost from other causes than coition, 252.

seminal stains, 253.

microscopical examination of semen, 254.

feigned rape, 259.

rape by females, 260.

legal relations of, 263.

submission of prosecutrix, 264.

from artificial stupefaction, 264.

from ignorance of the nature of the act, 269.

from mistake of person, 275.

from fear, 276.

prior want of character of prosecutrix, 277.

subsequent suppression of the fact by prosecutrix, 279.

extent to which coition was carried, 280.

want of age of defendant, 285.

want of sexual capacity of defendant, 286.

REPORTS, MEDICO-LEGAL,

how to be drawn up, 1007.

RESPIRATION,

causes of imperfect, 19-128.

signs of imperfect, 19-128.

S.

SALTS OF LEAD, 469.

symptoms of poisoning, 470.

forms generally administered, 474.

acute and chronic poisoning, 475.

chemical examination, 476.

in organic mixtures, 477.

post-mortem appearances, 479.

- SALTS OF COPPER,
 forms generally administered, 480.
 symptoms of poisoning, 481.
 post-mortem appearances, 482.
 chemical examination, 485.
 in organic mixtures, 486.
 fatal dose of, 488.
- SAPONIFICATION, 986.
- SAUSAGES,
 poisoning by, 527-8.
 post-mortem appearances in poisoning by, 530.
 symptoms in poisoning by, 527-30.
- SAVIN,
 as producing abortion, 86, 633.
 detection of, after death, 635.
 poisoning by, 86, 633.
 post-mortem appearances in poisoning by, 634.
- SCALDS,
 effects of, 839-47.
- SCAMMONY, 518.
- SCARS,
 disappearance of, 298-300.
 identification from, 298.
- SEMINAL STAINS.
 analysis of, 253.
- SEX,
 doubtful, 181.
 identification of, 296.
- SEXUAL DISABILITY, 191-210.
 organs, absence of, 188, 202.
- SHELLFISH,
 poisonous, 535.
- SHOCK,
 death from, 774.
- SILVER,
 nitrate of, poisoning by, 511.
- SKELETON,
 female, peculiarities of. 296.
 identification by the, 289-98.
- SKIN,
 condition of, after drowning, 948.
- SKULL,
 fractures of the, 793.
 during birth, 161.
 in delivery, 143.
- SODA,
 poisoning by, 376.
- SODOMY, 261

INDEX TO VOL. II.

- SOLANUM, 606.
- SPECTROSCOPE,
use of, 576.
- SPINE,
dislocation of the, 808.
wounds and injuries of the, 808.
- SPONTANEOUS COMBUSTION, 849.
- STARVATION,
death from, 884-8.
post-mortem appearances in death from, 888.
- STAS, PROF.,
process for the detection of nicotina, 612-5.
detection of opium, 555.
- STATIC TESTS,
conclusions, 144.
of live birth, 144.
- STERILITY, 191-210.
causes of, 191.
- STILLBORN CHILDREN,
appearance of, 108.
- STRANGULATION,
death by, 907-11.
marks of violence upon the neck in, 908-9.
before or after death, 908-11.
evidence of design in death by, 911.
suicidal, 911-2.
of new-born child, 170.
homicidal, 915.
- STRYCHNIA,
poisoning by, 621-36.
post-mortem appearances in poisoning by, 623.
recovery from large doses, 622.
symptoms in poisoning by, 622.
tests for, 626.
- SUDDEN DEATH AS PRESUMPTIVE OF POISONING, 332.
- SUFFOCATION,
accidental, 897-902.
death from, 896.
homicidal, 902.
of new-born child, 168.
post-mortem appearances in death by, 896.
suicidal, 899.
- SUGGILLATIONS, 967.
- SUICIDAL WOUNDS,
tests of, 717.
and homicidal hanging distinguished, 929-930.
suffocation distinguished, 899-902.
drowning distinguished, 958.

INDEX TO VOL. II.

- SUICIDE. (See *Homicide*.)
- SULPHURETS OF ARSENIC. (See *Poisons*.)
- SULPHURETTED HYDROGEN GAS,
accidents from, 676.
appearances after death by, 676-7.
- SULPHURIC ACID, 345-53.
characters of, 345.
chemical examination in poisoning by, 351.
post-mortem appearances in poisoning by, 345.
smallest quantity fatal, 347.
symptoms of poisoning by, 352.
aromatic, 352-3.
- SUNSTROKE,
death from, 869-72.
post-mortem appearances in death from, 872.
- SUPERFETATION,
twin pregnancies in which the children have had different fathers, 73.
parturition of children at the same time, but of different degrees of
development, 77.
short intervals between births of equally matured children, 77.
- SURGICAL INTERFERENCE,
refusal of, 788.
- SURGICAL OPERATIONS,
as influencing fatality of wounds, 786-7.
- SURVIVORSHIP,
presumptions as to, 1024.
from sex, 1025.
from age, 1027.
from size, etc., 1028.
from health, 1030.
from mode of death, 1031.
from drowning, 1031.
from asphyxia, 1046.
from heat, 1047.
from cold, 1048.
from starving, 1049.
from poison, 1052.
from crushing alive, 1053.
from childbirth, 1054.
from wounds, 1056.
tests where bodies are found dead, 1057.
- SYMPATHETIC PHENOMENA OF PREGNANCY, 12-14.

T.

- TANSY OIL,
as producing abortion, 86.
poisoning by, 637.
post-mortem appearances in poisoning by, 638.

INDEX TO VOL. II.

- TARTAR-EMETIC, 489.
symptoms of acute poisoning, 490.
fatal dose, 491.
anatomical lesions, 493.
chronic poisoning, 494.
chemical examination, 496.
in organic mixtures, 497.
- TARTARIC ACID, 373.
fatal results from, 373.
- TARTRATE OF ANTIMONY AND POTASSA, 489-655.
- TATTOO-MARKS,
disappearance of, 301-2.
- TAXUS BACCATA,
poisoning by, 636.
- TEETH,
identification by the, 292.
- TEMPERATURE,
influence of, on putrefaction, 305, 982.
- TESTES,
congenital absence of, 202.
diseases of the, 205.
- TETANUS,
in wounds, 782.
- TIN,
chloride of, 510.
- TOBACCO, INDIAN,
poisonous properties of, 630.
poisonous effects of, 609-15.
post-mortem appearances in poisoning by, 610.
- TRICHINOSIS,
poisoning by, 533.

U.

- UMBILICAL CORD,
compression of and by, 150.
desiccation of, 150.
evidence from, 150-2.
hemorrhage from the, 157.
mark left by the, 158.
strangulation by, 158-9.
usual length of, 160.
- UNCONSCIOUS DELIVERY, 175.
- URINE,
kiestein in the, 22.
- UTERINE RESPIRATION, 19-108, 128.

V.

- VAGINA,
 absence of, 184, 191.
- VAGINAL RESPIRATION, 19, 108, 128.
- VEGETABLE POISONS,
 colchicum autumnale, 516*a*.
 post-mortem appearances, 516*b*.
 chemical examination, 517.
 drastic purges; jalap, scammony, etc., 518.
 castor seed or beans, 519.
 fungi (mushrooms), 520.
 symptoms of poisoning, 521.
 post-mortem appearances, 522.
- VENESECTON,
 as an abortive, 91.
- VERATRUM, 661.
 album, 662.
 viride, 663.
 veratria, and other alkaloids, 664.
 differential table for strychnia and veratria, 665.
- VIABILITY,
 early, 67. (See *Homicide*.)
- VINEGAR,
 poisoning by. (See *Poisons*.)
- VIOLENCE,
 marks of, in bodies found drowned, 955.
- VITRIOL.
 elixir of. (See *Poisons*.)

W.

- WATER,
 as affecting putrefaction, 309, 956-8.
- WOMB,
 changes in the mouth and neck of, 6.
- WOUNDS,
 general considerations, 685.
 what a wound is, 685.
 general definitions, 686.
 how far dangerous, 687.
 examination of the body, 689.
 external phenomena, 690.
 internal phenomena, 690.
 wounds made before or after death, 691.
 ecchymoses from natural causes, 700.
 classification of wounds, 702.
 incised and punctured wounds, 703.

INDEX TO VOL. II.

WOUNDS, *continued.*

- lacerated and contused wounds, 704.
- gunshot wounds, 707.
- wounds from wadding and gunpowder, 714.
- homicidal, suicidal, and accidental wounds, 717.
 - situation of wounds, 717.
 - direction, 719.
 - position of body and of weapon, 722.
- blood-stains,
 - general appearance, 724.
 - chemical examination, 726.
 - microscopical evidence, 753.
- cause of death in wounds, 769.
 - hemorrhage, 770.
 - shock, 774.
 - mechanical injury, 775.
 - diseased condition of body, 777.
 - wounds inflicted on pregnant women, 779.
 - indirect complications, 780.
 - tetanus, 782.
 - erysipelas, 783.
 - hospital gangrene, 784.
 - nervous delirium, 784.
 - surgical operations, 786.
- wounds in various parts of the body.
 - injuries of the head, 790.
 - concussion of brain, 791.
 - fractures of the skull, 793.
 - wounds of the substance of the brain, 795.
 - wounds of the face, 800.
 - wounds of the neck, 801.
 - wounds and injuries of the spine, 808.
 - wounds of the chest, 815.
 - wounds of the lungs, 816.
 - wounds of the heart, 820.
 - wounds of the abdomen, 827.
 - superficial wounds, 827.
 - penetrating wounds, 828.
 - wounds of the liver, 829.
 - wounds of the diaphragm, 830.
 - wounds and rupture of the bladder, 831.
 - wounds of the genitals, 835.

Y.

YEW,

- poison by, 636.

more

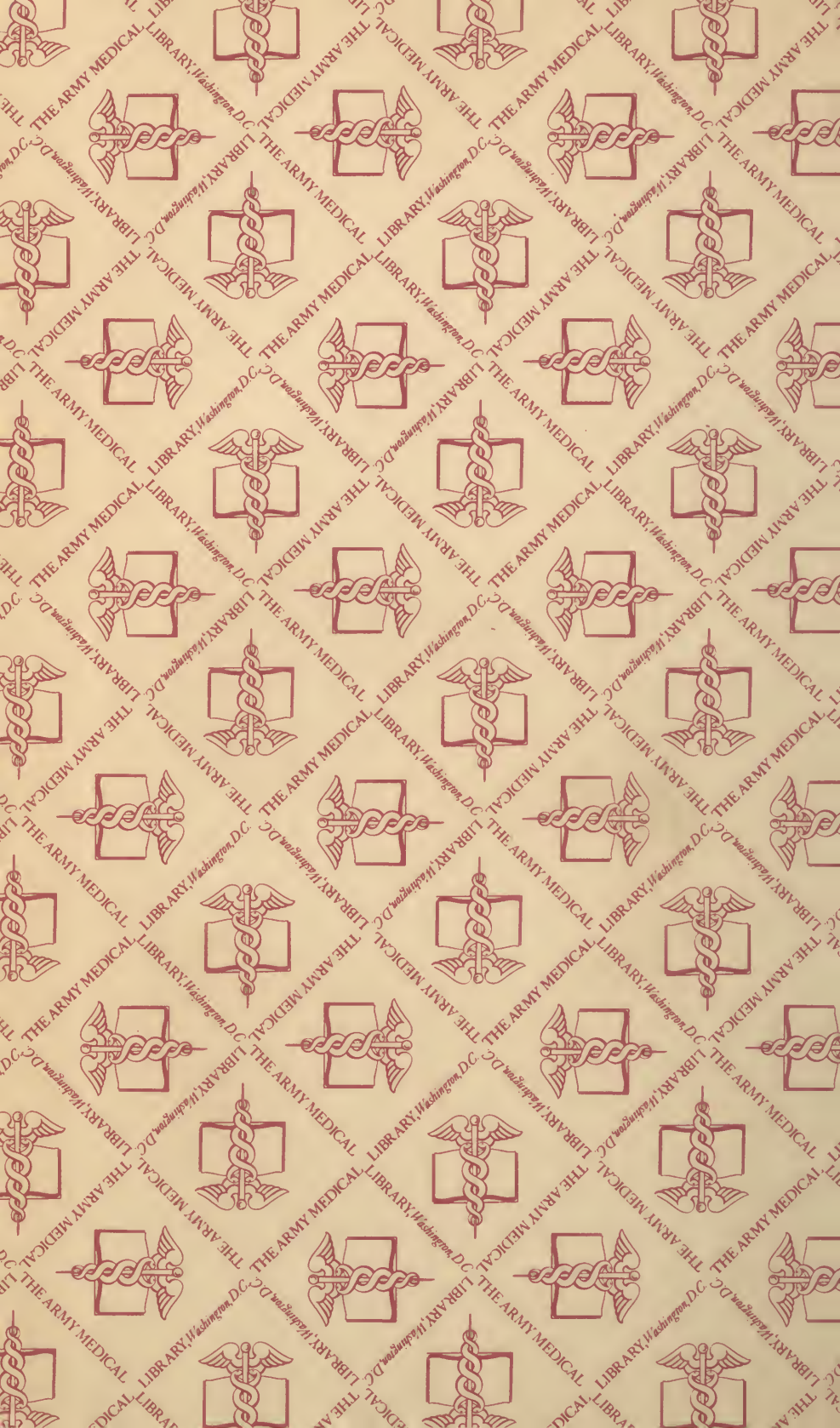
INDEX TO VOL. II.

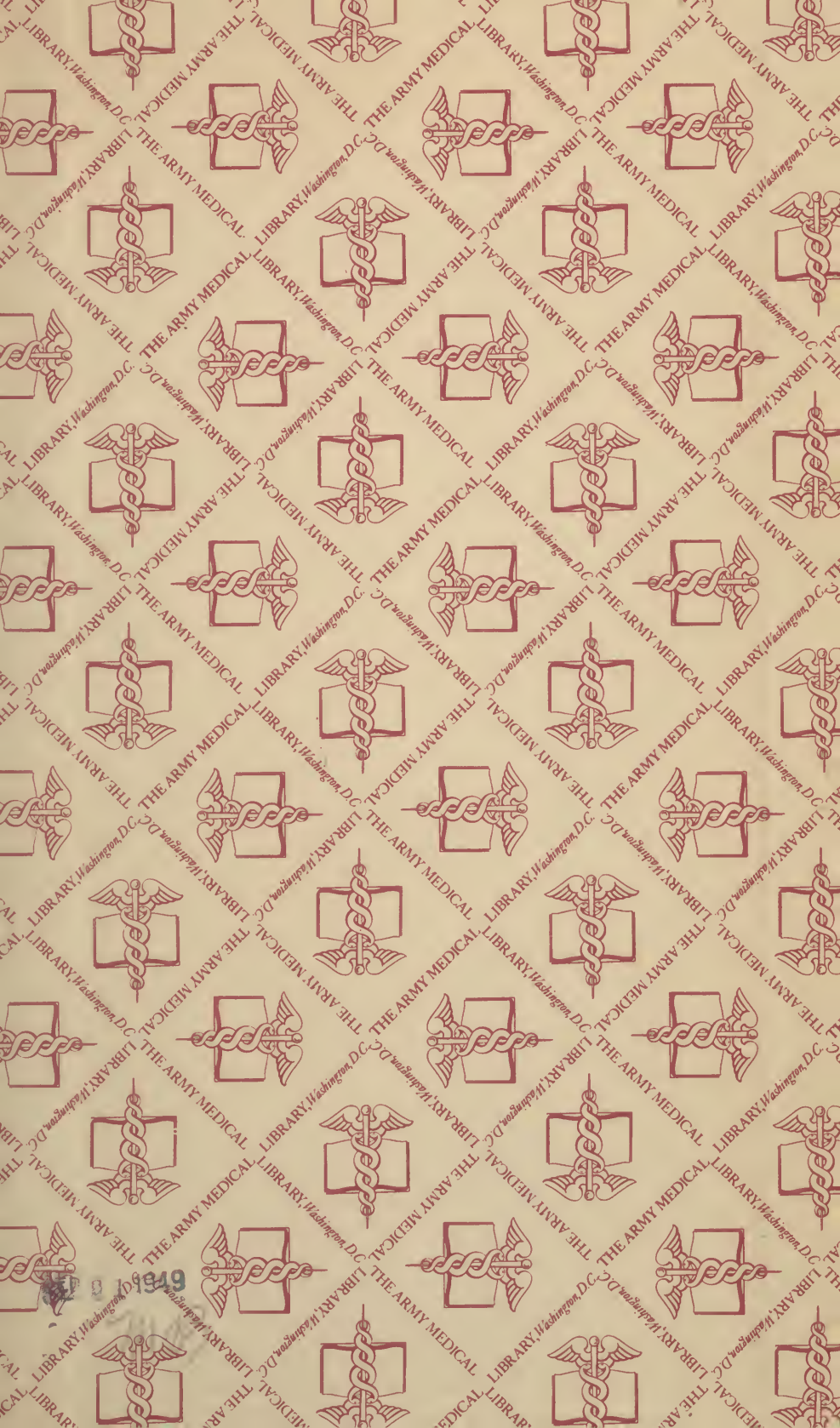
Z.

ZINC,

- chloride of, poisoning by, 509.
- in organic mixtures, detection of, 509.
- oxide of, poisoning by, 504.
- sulphate of, poisoning by, 506.
- tests for, 508.

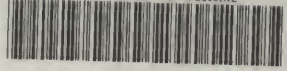






6949

NATIONAL LIBRARY OF MEDICINE



NLM 00078543 0