

ASPHYXIA.

DROWNING.

CHAPTER LVIII.

DROWNING—CAUSE OF DEATH—DEATH FROM SECONDARY CAUSES—PERIOD AT WHICH DEATH TAKES PLACE—APPEARANCES IN THE DEAD BODY—CHANGES PRODUCED BY PUTREFACTION—WAS DEATH CAUSED BY DROWNING?—STATE OF THE SKIN—SUBSTANCES GRASPED IN THE HANDS—AVATER IN THE STOMACH—MUCOUS FROTH IN THE TRACHEA AND LUNGS.

WHEN a person falls into water, and is exposed to this kind of death, vain attempts are in the first instance made to respire: at each time that he rises to the surface a portion of air is received into the lungs, but owing to the mouth being on a level with the liquid, water enters into this cavity. A large quantity of water thus usually passes into the mouth, which the individual feels himself irresistibly compelled to swallow. The struggle for life may continue for a longer or shorter period, according to the age, sex, and strength of the person; but the result is, that the blood in the lungs is not oxygenized, and the individual becomes exhausted. The mouth then sinks altogether below the level of the water, air can no longer enter into the lungs, and the portion of that which they contain is expelled, and rises in bubbles to the surface: an indescribable feeling of delirium, with a ringing sensation in the ears, supervenes; the person then loses all consciousness, and sinks asphyxiated. Before death, and while the body is submerged, frequent attempts are made to breathe, but at each effort air escapes from the lungs, so that these organs may, according to the duration of the struggle, become more or less emptied, and even be found collapsed after death. During the state of asphyxia dark-colored blood is circulated, convulsive motions of the body follow, and the contents of the stomach are sometimes ejected prior to dissolution. There is not the least sensation of pain, and, as in other cases of asphyxia, there is a total unconsciousness of suffering during the period when the access of air is cut off from the lungs. I state this from having accidentally experienced all the phenomena of drowning up to the complete loss of sensibility and consciousness. (See, in reference to the phenomena of asphyxia from drowning, a paper by Mr. Eccles, *Med. Gaz.*, vol. xlv. p. 657.)

Some persons who fall into water are observed to sink at once without making any attempt to extricate themselves. This may arise from the stunning or shock produced by the fall; and if the fall take place from a great height, the effect is probably aided by the forcible compression which the thorax then sustains, whereby the lungs are in great part emptied. Should the person be intoxicated or otherwise incapacitated, as by striking his head in falling, he may not again rise. These different conditions under which death may take place will sufficiently account for the great difference in the appearances met with in the bodies of those who have been said to die by drowning. Some medical jurists have considered that they who are sub-

merged while living, frequently perish by syncope, and in other instances by what has been termed syncopal asphyxia a mixed condition. It has been supposed that the state of terror into which a person may be thrown prior to submersion, would be sufficient to bring on syncope; and this, it was presumed, offered an adequate explanation of the recovery of the apparently drowned, when the body had remained a long time in water. It may readily be admitted that in some instances the mental shock may be so great to a person falling into water, as to induce syncope, especially in females; but the occurrence of this state appears to be founded rather upon presumption than upon actual observation.

Death from secondary causes.—Drowning may operate indirectly as the cause of death. Thus it has been repeatedly remarked that persons who have been rescued from water in a living state, have died, in spite of the application of the usual restoratives, after the lapse of some minutes or hours: others have lingered for one or two days, and then have sunk apparently from exhaustion. In those who perish soon after removal from the water, death may arise from the exhaustion produced by the struggles for life, aided by the long contact of the body with a cold medium. In the case of *Mr. Gudge* (May, 1857) death was owing to the secondary effects of submersion. The deceased was removed from the water and conveyed to the Westminster Hospital. He was cold and insensible, but he breathed tolerably well and had a fair pulse. In about three hours, he became conscious and spoke a little. The insensibility subsequently returned accompanied by great difficulty of breathing, and he died in about twenty hours from the time of submersion. Dr. Marcet states that spasm of the glottis has been among the severe secondary symptoms in those who have been removed from water apparently drowned. A severe spasm of this kind manifested itself in one case while placing the person in a warm bath. (*Med. Times and Gazette*, Feb. 7, 1857, 148.)

When death occurs at a remote period, it may be due to disease; and the question will then be, whether the disease was produced by the immersion in water or not. Such cases occasionally present themselves before our Courts of Assize'. In one of these (*Reg. v. Pulham*, Gloucester Summer Assizes, 1845), the prisoner was charged with the death of deceased by pushing him into a pond of water, from the effects of which he died. The deceased was an old man; he was taken out of the water in an exhausted condition, and he died a few weeks afterwards. One medical witness referred death to the effects of the immersion; but as he had not attended the deceased after the violence, and there was no clear account of the cause of death, the prisoner was acquitted. In most of these cases it will be found exceedingly difficult to connect death with the immersion, when the fatal result does not take place until after so long a period of time. We must on such occasions rely, for the basis of our evidence, upon the nature of the disease alleged to have been caused by immersione. g., inflammation of some cavity or organ, and on its progress until death without intermediate recovery or aggravation by improper treatment.

According to Mr. Devergie (*Med. Leg.*, vol. ii. p. 336), of one hundred individuals who fall into the water, or are exposed to the chances of drowning, the following may be taken as the numerical ratio of the causes of death:

Asphyxia, pure	25.0		
— — — — and Syncope..				
— — — — — Cereb. Congestion..	62.5	Asphyxia..	87.5	
Syncope, Apoplexy, or Concussion		12.5	
			100.0	

From this table we learn that out of one hundred bodies removed dead from water, where death was due either directly or indirectly to immersion the dead body were removed immediately after death, and examined soon after removal, the signs of drowning would be present in about 25: they would be imperfectly apparent (asphyxia more or less marked) in about 62, and they would be wholly absent in about 12. This table may not represent the actual truth, but as the medical jurists of Paris have ample opportunities of examining the drowned, it is probably as near an approximation as the present state of science will permit us to reach. (For a full examination of the causes of death in drowning, by Dr. Loeffler, see Henke, *Zeitschrift der S. A.*, 1844, vol. i. p. 1.)

Period at which death takes place.—Some persons who are strong, who are good swimmers, and retain their presence of mind, may support themselves for a length of time in water, while others who are weak and delicate may struggle only for a few seconds, and then sink exhausted and lifeless. There are two very different points involved in this inquiry: 1. How long can a person remain beneath the surface of water without becoming asphyxiated (drowned?), and 2. After what period of entire submersion of the body may we hope to resuscitate a person? In regard to the first point, it may be remarked, that when the mouth is so covered that air cannot enter, asphyxia supervenes in the course of one or two minutes at the furthest, and the time at which this occurs does not appear to vary materially with the individual. It has been observed that perfect insensibility has supervened after a minute's submersion, and it is probable that in most cases a few moments would suffice for the commencement of asphyxia. In the case of a healthy diver who was accidentally submersed, at Spithead, in July, 1842, for *a minute and a half* without the power of breathing, at the depth of eighty feet, it was observed that when drawn up he was faint but sensible. (*Med. Gaz.*, vol. xxxi. p. 90.) Observations made upon sponge and pearl-divers show for how short a period a human being, even when practised in the art of diving, can continue without breathing. Dr. Lefevre, of Rochefort, found that among the Navarino sponge-divers, accustomed as they were to the practice of diving, there was not one who could sustain entire submersion of the body for *two consecutive minutes*. The average period of entire submersion was seventy-six seconds. (*Med. Gaz.*, vol. xiv. p. 608.) According to Mr. Marshall, the best pearl-divers of Ceylon could rarely sustain a submersion of more than fifty seconds. Thus, then, it would appear from these and other observations, that asphyxia is probably induced in most persons in the course of a few seconds, and that at the furthest it occurs in from a minute to a minute and a half. But asphyxia is not synonymous with death, and while in many persons asphyxia may commence at or about the same period of time, there are probably few in whom, under complete submersion, the circulation would be arrested or death take place at precisely the same instant of time. Such a simultaneous arrest of the action of the heart in two individuals must of course be the result of a pure coincidence. This medical question may be occasionally of importance in reference to presumption of survivorship, as when husband, wife, and children have died from drowning under a common calamity. As to the period at which a person may be resuscitated there are cases on record in which recovery has taken place under treatment, after thirteen and fourteen minutes' submersion.

Appearances after death When a person dies in the water, the body generally sinks—the specific gravity of the dead body being greater than that of water. In some instances, however, the bodies of the recently drowned have been observed to float on the surface. This may arise from various accidental circumstances—the lightness of the skeleton or the osseous part—the predominance of fat—the effect of air retained by the clothes—or the

presence of gases either from natural causes during life or as a result of putrefaction after death in the contents of the stomach and intestines. The normal specific gravity of the body differs but little from that of water, so that slight causes will prevent it from sinking, or bring it to the surface, if it has already sunk.

In conducting an examination of the body of a drowned person, it is necessary to remember that the external and internal appearances vary much, according to the length of time during which it may have remained in the water, or the period that may have elapsed after its removal and before it is examined. Two subjects may be taken out of water at the same time one may be examined immediately, while the examination of the other may be deferred for several days. In these cases the appearances after death will be no longer similar; and the differences will be particularly great, when the last-mentioned body has been exposed to a high temperature and to the free access of air. *Externally*.—Supposing that the body has remained in the water only a few hours after death, and the inspection has taken place immediately on its removal, the skin will be found cold and pallid sometimes contracted, under the form of cutis anserina. (*Ed. Med. and Surg. Journ.*, Jan. 1857.) This contracted state of the skin furnishes strong evidence of the body having gone into the water living (see post, p. 548). The skin is often covered to a greater or less extent by livid discolorations. The face is pale and calm, with a placid expression, the eyes are half-open, the eyelids livid, and the pupils dilated; the mouth closed or half-open, the tongue swollen and congested, frequently pushed forwards to the internal edges of the lips, sometimes indented or even lacerated by the teeth; and the lips, together with the nostrils, covered by a mucous froth which oozes from them. A singular external appearance has been noticed by Kanzler in reference to the male subject namely a remarkable retraction of the penis. In men who have gone living into the water and been drowned, this appearance has been observed by Casper and Kanzler; and the former states that he has not met with this condition of the male organ after any other form of death. In strong and robust men, the organ has been found very short, and strongly retracted into the skin. (*Ger.-Leich.-Oeffn.*, vol. ii. p. 109.)

In general, when the dead bodies of the drowned are taken from water, the limbs are found relaxed; but this must depend on the period at which they are removed. Convulsions are known to precede death by asphyxia, but the effects of these on the body are generally lost when the person dies. Rigidity of the muscles takes place after death in water, perhaps more rapidly than in air. If the water is intensely cold, and the individual has struggled violently, the last struggles of life may be indicated by the contorted state of the limbs persisting through rigidity. Mr. Beardsley, a former pupil, has communicated to me the following case. A young man, while skating, fell through the ice of a pond about seven yards deep. This was in February, 1847. He was not totally immersed, for he kept his head and shoulders out of the water above the ice, with his arms resting upon it; and as the ice gave way under his weight, he sprang to a fresh portion. Before assistance could be rendered, he sank to the bottom. The body was removed the next day; it was found at the bottom of the pond, beneath the hole in the ice. The arms of the deceased were quite stiff, and still retained the position in which he had rested upon the ice: his legs were quite extended, and the muscles on the fore part of the thigh were very much contracted, as if they had been powerfully exerted in keeping him erect while he was hanging on the ice. There was no appearance of his having attempted to breathe after he had gone below the water. His countenance was quite natural, and there was no water or froth in his mouth; the external appearances resembled those which are seen in a body immersed after death from some other cause. There

was no internal inspection. Mr. Beardsley's opinion was, that the water being about 32°, the man was in reality killed by cold, or frozen; and there is no doubt, that if this did not operate as the direct cause of death, it materially accelerated it.

This case is of interest in reference to the fact of drowned persons being often discovered with substances firmly grasped in their hands. A contracted state of the muscles at the time of death may pass into perfect rigidity by the effect of cold water: and thus the attitude, or the last act of life of the individual, may be preserved. It is precisely analogous to that condition which has been called cadaveric spasm.

If the body has been submerged for a long period, or has remained long exposed before inspection, the skin will be found variously discolored, according to the degree to which putrefaction may have advanced. If three or four months have elapsed before its removal from water, the skin covering the legs may be, in the first instance, of a deep blue color: but when the body is exposed to air, this color gradually disappears, and the skin becomes of a dirty brown with a tinge of green. The influence of air upon the skin of a drowned subject is most remarkable in the face and thorax. When the body has remained for some days in water, and has been exposed for a few hours only after its removal, the temperature of the atmosphere being moderately high, the face will commonly be found livid and bloated, and the features so distorted that they will be with difficulty recognized. The change chiefly consists in the skin becoming at first of a livid brown color, which gradually passes into a deep green. That these effects are to be ascribed to the free contact of air, appears evident, from the fact that they are most fully developed in those parts of the body which are the most exposed to the atmosphere. Thus the changes of color in the skin are not commonly met with where any parts of the cutaneous surface have been in close contact, as in the armpits and inner surfaces of the upper and lower extremities, where the former have been closely applied to the sides of the trunk, and the latter have remained in close proximity to each other. For the same reason, the discoloration is not commonly observed at the back of a subject, or in those parts where the body has been closely wrapped in clothes. The changes from *putrefaction*, even when these are comparatively slight, may, as Casper justly remarks, seriously affect the value of medical evidence. The blood becomes decomposed, acquires a darker color, and produces congestions in the liver, lungs, right side of the heart, and other parts of the body, so as to render it difficult to form a conclusion on death from apoplexy or asphyxia. (*Gerichtliche Leichen-Oeffnungen*, vol. i. p. 89.)

The special researches on drowning made by Casper and Kanzler show that putrefaction of the bodies of the drowned generally commences at the upper part and extends downwards. Thus, after a few days, while the lower part of the body may be in a tolerably fresh condition, the face, head, neck, and upper part of the chest may present a reddish color passing into patches of a bluish-green, first seen on the temples, ears, and nape of the neck, thence spreading to the face, and afterwards to the throat and chest. These changes may be observed in summer when a body has remained in water from eight to twelve days, and in winter at a still later period. The head of a drowned person is sometimes much discolored from putrefaction, when the rest of the body may preserve its ordinary condition. Casper considers that this inverted order of the putrefactive process may be taken as a strong indication of death from drowning (*Ger. Leich.-Oeff.*, vol. ii. p. 103); but while it may be admitted that attention should be given to this circumstance, it yet remains to be proved whether a dead body thrown into water (when death has taken place from asphyxia by suffocation or strangulation) would not undergo decomposition in a precisely similar manner. It is worthy of remark that the

uterus resists decomposition more than other internal organs. In a case in which the body of a female, who had been missing nine months, was found and examined, although all other parts were completely decomposed, the uterus was of a reddish color firm in structure, and its parts were recognizable, so that Casper, who examined the case, was able to affirm that the female was not pregnant at the time of her death. (*Ger. Leich.-Oeff.*, vol. i. p. 93.)

There is another external appearance which is sometimes met with in the drowned; the fingers or surface of the body may occasionally present *abrasions*; and gravel, sand or other substances, may be found locked within the hands or nails of drowned subjects; for in the act of drowning, as common experience testifies, an individual will grasp at any object within his reach, and in his efforts to extricate himself, he may excoriate or wound his fingers. There are, however, many cases of drowning, in which this appearance is absent. There may be no substance for the drowning person to grasp; this will depend in a great degree upon the fact of the water being deep or shallow, of its being confined within a narrow channel or not, and many other contingencies. In all cases, when the person is senseless before he falls into the water, or when his death is occasioned by syncope from sudden terror, he will, of course, be incapable of making those exertions which are necessary to the production of this appearance, and it is probable that this frequently occurs among females who are accidentally drowned. When the body has remained several days in water, the skin of the palms of the hands and soles of the feet is found thickened, white, and sodden, as a result of imbibition.

Internally.—On examining the body internally, we may expect to find, in a recently drowned subject, that the viscera of the chest will present the appearances usually indicative of asphyxia. The venous system is generally gorged with dark-colored blood. If death has not taken place from asphyxia, or if the subject has remained a long time in water before an inspection is made, the viscera of the chest will not present the characters about to be described. Some physiologists have asserted that the *blood* remains fluid in the bodies of the drowned. Orfila has stated, that, with one exception, he had not met with blood in a coagulated state. Much more importance has been attached to this appearance than it really merits. Some observers have found the blood coagulated in the drowned; and I have repeatedly seen coagula, like those usually met with after death, in the bodies of animals which were drowned for the sake of experiment. If the blood be generally found liquid, this may be due to the imbibition of water, or to putrefactive changes. The state of the blood in the drowned formed a subject of inquiry in the case of *Reg. v. Barker and others* (York Winter Assizes, 1846). From the remarks above made, it will be perceived that it may be found either coagulated or uncoagulated in those who go into the water living, and die by drowning. The state of the *lungs* is of considerable importance; they are more frequently found distended than collapsed. According to Dr. Riedell, they are very flabby and greatly increased in weight. The accurate observations of Casper and Kanzler show that the lungs of the drowned are, as a general rule, greatly increased in volume; they appear as if they were inflated, and completely fill the cavity of the chest. This increase of volume does not depend entirely on that congestion or fulness of blood which is a result of asphyxia in drowning; for Casper states he has met with this augmentation of volume in those cases where death had taken place suddenly in the water from apoplexy or other causes than asphyxia. (*Ger. Leich.-Oeff.*, vol. ii p. 112.) The state of the *heart* in the drowned has given rise to some discussion. In asphyxia, the right cavities are, I believe, generally found to contain blood; while the left cavities are either empty, or they contain much less than the

right. Out of fifty-three inspections made by Dr. Ogston, the right cavities were found empty only in two cases, and the left cavities empty in fourteen. (*Med. Gaz.*, vol. xlvi. p. 291.) In a case of drowning, which was examined by Mr. Bishop, the right side of the heart contained scarcely any blood and in another case communicated to me December, 1857, the only medical difficulty regarding death by drowning presented itself in an emptiness or non-distension of the right cavities of the organ. The facts and observations accumulated by my friend, Dr. Norman Chevers, of the Calcutta Medical Board, show that a full condition of the heart, although a common, is not an invariable, concomitant of asphyxia either from drowning, or from any other cause. (*Medical Jurisprudence for India*, 1856, p. 441.) It has been elsewhere remarked, that the action of the heart continues after the stoppage of respiration, and that the period at which this organ ceases to contract is variable. Hence, in some cases, there may be sufficient power in the right cavities to contract upon their contents, and to expel, more or less completely, the last traces of blood received by them from the body. Emptiness of the right cavities of the heart must not, therefore, be regarded as inconsistent with death from drowning; at the same time, it cannot be taken as a proof that the person has died from asphyxia. As in death from strychnia, prussic acid, and other causes, the condition of the right cavities of the heart as to fulness or emptiness is more closely connected with the mode of dying than with the actual cause of death.

A greater or less fulness of the vessels of the brain is described as one of the appearances met with in a drowned subject; but this, when it exists, is probably a consequence of a congested state of the lungs. Some remarks have been already made on this subject, and from these it is evident, that the state of the cerebral vessels can afford no presumption that death has taken place by drowning. In regard to the cases which I have had an opportunity of examining, the quantity of blood contained within the cerebral vessels has rarely been so great as to call for particular notice.

In examining the viscera of the abdomen, it will commonly be found that the stomach contains a certain quantity of water, which appears to enter into this organ during the struggle for life, by the act of swallowing. This may be salt or fresh, according to the medium in which the drowning has taken place. The quantity is subject to great variation; sometimes it is large, at other times small: and in some instances, no water whatever is to be met with. The absence of water may probably indicate a rapid death, as there could have been no power to swallow. Orfila has remarked, that the mucous membrane of the stomach and bowels is occasionally much discolored in drowned subjects. He observed, also, that when drowning took place while the process of digestion was going on, the mucous membrane of the stomach often had a pinkish red or violet tint. When the drowned subject had remained a long time in water, this membrane was observed to acquire a deep violet or brown color. A knowledge of this fact will be of importance in those cases in which the subject removed from water is suspected to have been poisoned previously to submersion. Among the other internal appearances met with in the body of a recently drowned person, which require to be mentioned, is the presence of a mucous froth, sometimes of a sanguineous hue, covering the lining membrane of the trachea, which may be itself slightly reddened. Water is, also, occasionally found in the ramifications of the air-tubes, but in variable quantity. If the body has remained a long time in water, or if, after removal, it has been exposed to the air several days previously to an inspection being made, there is commonly no appearance of mucous froth in the trachea or its ramifications. It has been said that the diaphragm is generally much raised towards the chest, but this depends on putrefaction, and the increase in the size of the abdomen by the formation of

gas in the intestines. The urinary bladder in some cases contains urine; in others it is perfectly empty. Casper found it empty in one-half of the cases which he examined. It is obvious that the state in which the bladder is found must depend on its condition at the time at which the drowning occurred. (See, in reference to the appearances in the drowned, a paper by Dr. Ogston, *Med. Gaz.*, vol. xlvii. pp. 763, 854, *et seq.*; also another by Dr. Riedell, *Med. Gaz.*, vol. xlvi. p. 478; and Casper, *Ger. Leich.-Oeff.*, vol. i. p. 87; ii. p. 105.)

Was death caused by drowning?—It is obvious that for a correct solution of this question, we shall have to consider the appearances met with in the drowned, and to determine how far they are characteristic of this form of death. Among the external signs of drowning, when the body is seen soon after death, are paleness of the surface, a contracted state of the skin (*cutis anserina*), and the presence of a mucous froth about the nostrils and lips. The absence of these appearances, however, would not prove that the person had not been drowned; for if the body has remained some time in water, or if it has been long exposed to air before it is seen by a medical practitioner, the skin may have undergone various changes in its condition and color, and mucous froth may no longer be found adhering to the nostrils and lips.

State of the skin.—The goose-skin or *cutis anserina* is frequently observed in the drowned, and according to Casper it is a common accompaniment of death by drowning. Like the other appearances it is not always met with, and a question has arisen whether, when it exists, it can be regarded as an unequivocal sign of death from drowning, or rather of a person having gone into the water living. Wagner believed that it might occur in a dead body submerged while still warm: but in Casper's opinion, the most important fallacy to which this appearance is liable, is the fact that many persons have naturally a hard, rough, or horny skin, which might be mistaken for the goose-skin, resulting from contact with cold water. (*Ger. Leich.-Oeff.*, vol. i. p. 89.)

Substances grasped in the hand.—In speaking of the external appearances of the body, it was stated that foreign substances are sometimes found locked within the hands, or lodged under the nails of drowned subjects. This fact may occasionally afford strong circumstantial evidence of the manner in which the person has died. If materials be grasped within the hands of the deceased which have evidently been torn from the banks of a canal or river, or from the bottom of the water in which the body is found, we have strong presumptive evidence that the individual died within the water. For although it is possible to imagine that the deceased may have struggled on the bank and have been killed prior to submersion, yet in the value attached to this sign we are presuming that there are no marks of violence on the person, nor any other appearances about the body sufficiently striking to lead the examiner to suspect that death has taken place in any other way than by drowning. If the substance locked within the fingers or finger-nails is sand of the same character as that existing at the bottom of the river or pond, it is difficult to conceive any stronger evidence to establish the fact of death having taken place subsequently to submersion. The abrasion of the fingers is a circumstance of minor importance no value could be attached to this state of the fingers as an indication of the individual having perished by drowning, unless it were in conjunction with the appearances above described. A witness would be constrained to admit, in many cases, that the extremities of the fingers might become abraded or excoriated after death, or even before submersion, while in no case could he be called upon to make, in regard to substances found grasped within the hands, an admission which would invalidate the evidence deducible from this condition. This must be regarded as satisfactory evidence of the individual having been alive after his body was in

the water. It is well known that when two or three persons are drowned by the same accident, they are not (infrequently found clasped within each other's arms—a fact which at once proves that they must have been living when submerged. So if a dead body be discovered still holding to a rope, cable, or oar, no further evidence is required to show that the deceased must have died by drowning. The signs upon which medical jurists chiefly rely as proofs of death from drowning, are—1. water in the stomach; and 2. water with a mucous froth in the trachea and lungs.

1. *Water in the stomach.*—It has been remarked that water commonly passes into the stomach of a living animal while drowning, as a result of the act of swallowing. It has been observed, that when an animal is stunned prior to submersion, water does not pass into the gullet, and when syncope occurs none will be found. As a proof that its entrance into this organ depends on deglutition, it may be stated that the quantity contained within the stomach is greater when the animal is allowed to come frequently to the surface and respire, than when it is maintained altogether below the surface. The power of swallowing is immediately suspended on the occurrence of asphyxia, and in this way we may satisfactorily account for the difference observed in the two cases. The water thus found is in variable quantity; and there are some cases of drowning in which water is not discovered in the stomach. It was found by Dr. Ogston, of Dundee, in five cases out of seven. (*Ed. Med. and Sur. Jour.*, Jan. 1837.) In dissecting cats, which had been drowned, I have repeatedly remarked the absence of water from the stomach; in these instances the animals had been invariably kept under water from the first moment of their submersion, and thus in a condition but little favorable to the exercise of deglutition. Water does not readily penetrate into the stomach of a body which has been thrown in after death; the sides of the gullet applying themselves too closely to each other to allow of the passage of fluid. If putrefaction has advanced to any extent, it is possible that some water may enter; but a practitioner will easily judge from the general state of the body how far this process may have been concerned in the admission of fluid into the stomach and alimentary canal. Orfila has suggested that water may be found in the stomach of a person apparently drowned, in consequence of this liquid having been drunk by deceased, or artificially injected by another into the stomach after death. It is difficult to conceive under what circumstances such an objection could be made, or what purpose it would answer. In relying upon the presence of water in the stomach, it must not be forgotten that the deceased may have drunk water before his body was submerged. The body of a child, aged two years, was taken out of a piece of water and inspected. The usual appearances of drowning, with one exception, were absent. There was no congestion in the brain or lungs, there was emptiness of the cavities of the heart, no water in the air-passages, and thus a want of evidence of death from apoplexy or suffocation. The blood was of a clear red color, and very fluid; the stomach was almost filled with water, in which a portion of the food floated. No cause of violent death was apparent on inspection. The presence of water in the stomach was explained by the fact that the child had been playing with its nurse on the banks of the stream. It complained of intense thirst, and the nurse gave it a copious draught of water. Almost immediately after this, the nurse having walked away, the child must have fallen from the bank into the water. (*Casper, Ger. Leich.- Oeff.*, vol. i. p. 91.) The discovery of water in the stomach, except under circumstances to be presently mentioned, is not, therefore, a necessary proof that it has been swallowed during the act of drowning. (See case, post, page 552.)

It is of course presumed that the liquid contained within this organ is of the same nature as that in which the body is immersed; for it is possible that

fresh water may be found in the stomach of a person drowned in salt water, and in such a case it would be obviously improper for a medical witness to affirm, from the mere presence of water, that the individual had died within the medium in which his body was discovered. If the water contain mud, straw, duckweed, moss, or any substances like those existing in the pond or river where the drowning occurred, this is a proof, when the inspection is recent, of its having been swallowed by a living person. In the well-known case of *Mary Ashford (Rex v. Thornton, Warwick Summer Assizes, 1817)*, some duckweed with about half a pint of water was found in the stomach of the deceased. The body was discovered in a pond in which duckweed was growing. This fact, notwithstanding the presence of other marks of violence, proved that the deceased must have been living when immersed. The following case occurred at Maidstone, in July, 1843. The body of a young woman was found in the Medway under circumstances that led to a strong suspicion of murder. The medical witness deposed that there were no marks of external violence, nor any sign of the deceased having struggled with the supposed murderers. There was some long grass at the back of the mouth, and in the throat. The grass was not the same as that growing on the banks of the river, but such as grew at the bottom, which the deceased had probably swallowed after having gone living into the water. On this evidence the accused was discharged. In another case, investigated by Mr. Image (*Reg. v. Carnt, Bury St. Edmund's Lent Assizes, 1851*), the body of deceased was found with her head among water-weeds, some of which were discovered in her throat, and the finger-nails were filled with sand and mud, as if clutched convulsively. These facts aided in proving that deceased had died by drowning. The absence of water from the stomach cannot, however, lead to the inference that the person has not died by drowning, because in some instances it is not swallowed, and in others it may drain away and be lost after death.

2. *Mucous froth in the trachea and lungs.*—The interior of the windpipe in a drowned body is frequently covered by a mucous froth, and this is stated in some instances to have been so abundant as to have filled the air-tubes and their ramifications. It is sometimes disposed in a layer of minute vesicles tinged with blood. The origin of this appearance has been variously accounted for; but it is probable that it is produced by the simple agitation or admixture of the air respired during the act of drowning with the mucous secretion of the air-passages, which under these circumstances may be more copiously poured out. This mucous froth is not always met with in drowned subjects: 1. It has not been found in the bodies of those who have sunk at once below the surface. 2. The appearance may not be seen when the body has remained for a long period in the water after death, since by the free passage of this fluid into and out of the air-passages, the mucous froth, although formed in the first instance, will disappear. 3. If, after removal from the water, the body is exposed to the air for several days before it is examined, it is rare that this appearance is seen. 4. The mucous froth may have been formed in the windpipe, but it may have entirely disappeared, owing to the incautious manner in which the body has been handled on its removal from the water. Thus, if removed from water with the head depending, any fluid which may be contained within the lungs will escape; and in passing through the air-passages this fluid will effectually obliterate the frothy appearance. A similar appearance has been found in the bodies of those who have been hanged, or who have died from apoplexy. The introduction of any liquid into the windpipe during swallowing, may produce it. A case of poisoning by laudanum is reported, in which water containing sulphuric ether was forced down the throat of a person after the power of swallowing had nearly ceased. On dissection a quantity of reddish froth was found filling up part of the trachea. Dr. Hiedell looks upon the presence of this froth in the

air-tubes as a constant sign of death by submersion, when the body is recently inspected. (*Med. Gaz.*, vol. xlv. p. 478.) In some cases the contents of the stomach are found in the windpipe and lungs. This occurs when the person has been drowned with a full stomach. Vomiting takes place, and the vomited matters are drawn into the lungs by the attempt to breathe.

Water in the lungs.—Many contradictory statements have appeared relative to the presence of water in the lungs of the drowned. It is an appearance only occasionally met with: for the glottis does not in every case of drowning become so effectually closed by spasm, as to prevent the introduction of a small portion of liquid into the air-passages. In certain cases no water is found in these passages after death, and when present, the quantity depends on many contingencies. It is commonly small, often about an ounce, but it is subject to variation, and is probably affected by the number of forced attempts at respiration made by the drowning animal. In experiments on animals, I have not remarked any difference in the quantity whether the animal was allowed to rise to the surface and respire, or whether it was maintained altogether below. There is but little doubt that the quantity may become increased after death, because **it is now well known that water will penetrate into the lungs, before the access of putrefaction, when a body has been thrown in dead. It is important for a medical jurist to bear this in mind, as it may influence materially the opinion which he may be disposed to form on the discovery of water in the lungs of an apparently drowned subject. Water may therefore be present in the lungs, and yet it will afford no evidence of drowning.** When the water in the lungs is mixed with weeds or mud and water presenting the same admixture is found in the throat and stomach, this is strong evidence that the body has been plunged into the medium when the power of breathing and swallowing still existed, and hence that the deceased has been drowned. An attention to the condition of the stomach and lungs together will therefore be of importance in cases of alleged child-murder by drowning, since it may aid in proving or disproving the charge. In a case tried at the Central Criminal Court, April, 1861, in which I was consulted by Mr. Tyte, of Harrow, some greenish-colored mud was found in the throat, lungs, and stomach of an infant whose body had been removed from a pond. The prisoner was acquitted, because it was suggested that she might have thrown the body of her child into the water, when she believed it to be dead, and one or two gasps might have accounted for the appearances presented by the stomach and lungs!

Dr. Xorman Chevers, of Calcutta, was required to examine the body of a child found in a tank at a distance from the house of the parents. The internal appearances showed that the child had died by drowning. The air-passages contained green vegetable matter, and the right air-tube was almost completely filled with so large a portion of an aquatic weed doubled together, that it appeared astonishing how such a body could have passed into the windpipe. It was proved that no weed of this kind grew in the tank where the body was found. Further inquiry led to the discovery, that the body of the boy had been found by a woman in a tank near his home, in which the weed found in the air-passages grew abundantly. This female conveyed the corpse to the more distant tank which belonged to a person against whom she bore a grudge! (*Medical Jurisprudence for India*. 1856, p. 351) It has been suggested that water may be injected into the lungs after death, in which case an incorrect opinion might be formed from its presence, if the body were discovered on the bank of a river or canal. This, however, is an obstacle but little likely to interfere with any medical investigation. On the other hand, the absence of water from the lungs of a body found apparently drowned, must not be considered to indicate that death was not a consequence of drowning; for if the body of a drowned person be allowed after removal to remain

with the head depending, the water originally contained within the air-passages will drain out; or if it be long exposed before undergoing an examination, the probability is that none will be discovered in these organs, since in the progress of time, it may disappear by imbibition and evaporation.

It may be considered that after the lapse of five or six weeks, especially if the body has been removed from the water for the greater part of that period, none of the usual appearances of drowning will be met with: in the present day, no practitioner would think of seeking for evidence under such circumstances.

Summary of medical evidence.—I have now reviewed the whole of the evidence which the examination of a drowned subject after death is capable of affording to a medical witness. It will be seen that the only characters met with *internally*, upon which any confidence can be placed to indicate that the person has been drowned, are the presence of water in the stomach, and the presence of a mucous froth on the lining membrane of the trachea; but at the same time, the restrictions to the admission of these signs as positive evidence of drowning, may be such as to throw great uncertainty on the correctness of a medico-legal opinion founded simply on their existence. The practitioner must then determine, before he decides positively in a question of this nature, whether there is any appearance about the person which would lead to the suspicion that death had been caused in another manner. When he has provided himself with this negative evidence, and he finds that the characters of drowning, already enumerated, are present, or, if absent, he can, with any reasonable probability, account for their absence, he is then justified in giving a decided opinion on the subject.

A man died suddenly in the Rue St.-Antoine, at Paris, in February, 1830, and the body was soon afterwards brought to the Morgue. It there underwent a minute examination; but there was no mark of violence externally, nor was there any morbid change to account for death internally. In the course of the dissection, it was found that the larynx, trachea, and air-tubes contained a frothy mucus. In the larynx this was white, but it had a red color in the air-tubes. M. Devergie, who conducted the inspection, states, that it only differed from the froth, as it exists in the trachea of the drowned, in the circumstance of its being in larger vesicles: but he candidly owns, that had he not been certain of the contrary, he should have presumed that he was examining the body of a person who had died by drowning. Besides this appearance, there was a large quantity of water in the stomach, amounting to almost a pint; and the lungs were gorged with blood, as in cases of asphyxia. Supposing that this body had been thrown into the river after death, it is clear that most medical men, relying upon what are usually regarded as well-marked proofs of this kind of death, would have declared this to have been a case of drowning. A practitioner could not be censured for forming such an opinion, since it would be founded upon the best ascertained rules of past experience; and there are no others by which a medical jurist can be guided. In the meantime, we learn by the occurrence of such a case, how cautious we ought to be in expressing a positive opinion in a question of this nature, even when medical circumstances exist to support it.

If, however, a case of this kind is of rare occurrence, we will take an instance of a different description. An individual may be suffocated, or may die from epilepsy, apoplexy, or from a sudden attack of any fatal disease which may not be indicated by well-marked appearances after death; the body is thrown into or falls into water, and remains there a few days. When taken out, water may be found in the lungs, but there may be none in the stomach; and there may be no mucous froth in the windpipe while the lungs are more or less congested; how is a practitioner to determine whether death has actually taken place within the water or not? In the case of a suffocated

body, without traces of external violence, it would be impossible; since we have seen that individuals may die in the water, or at the moment of immersion, and, therefore, under circumstances in which the appearances of drowning would be either obscure or entirely wanting. Dr. Ogston, of Aberdeen, relates an instructive case of death from epilepsy, under circumstances which might have led to a strong suspicion of violent death, from the position in which a dead body was found. 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. (*Med. Gaz.*, vol. xlvii. p. 763.)

If, in examining a body taken from water, we discovered traces of mortal disease, or marks of external violence sufficient to destroy life, then there is always room for suspicion. Why the body of a person, who has really died from *natural causes*, should be afterwards thrown into water, it would not be easy to explain; but we can readily appreciate the motive when murderous violence has been used.

In consequence of the uncertainty attendant on the appearances of drowning, barristers have considerable advantage in cross-examining those medical witnesses who appear to support this view. Legal ingenuity is here often carried to the utmost, to show that there is no positive or well-defined sign of drowning; and, therefore, the inference is drawn that the deceased must have died from some other cause. It is undoubtedly true, that there is no constant or certain sign of death from drowning. The general impression among non-medical persons appears to be, that, whether in drowning or suffocation, there ought to be some particular *visible change* in the body to indicate at once the kind of death; but it need hardly be said that this notion is founded on false views; and if the reception of medical evidence on the cause of death be made to depend on the production of some such positive and visible change, then it would be better at once not to place the parties charged with the offence upon their trial, because the crime could never be proved against them. A medical inference of drowning is founded upon a certain series of facts, to each of which individually it might be easy to oppose plausible objections; but, taken together, they often furnish evidence as strong as is commonly required for proof of any other kind of death. A trial took place at the Central Criminal Court, April, 1841, in which the witnesses were severely cross-examined on the appearances caused by drowning. (*The Queen v. Longley.*) The mother of the deceased child was charged with murder by drowning it. When the body of the child was removed from the water, the mouth was closed; the prisoner's counsel endeavored to make it appear that it was most usual to find the mouth open in cases of drowning; and then went on to say, "that the only proof of suffocation by drowning which had been adduced by the medical witness was the frothy mucus found in the air-cells; that it could not have gone through the mouth was quite certain, because the mouth was proved to have been closed. The air might have passed into the air-cells of the child, whilst struggling in its mother's arms, just as well as whilst struggling in water!" After what has been stated, it is not necessary to point out the fallacy of the assumptions involved in this argument; but it is much to be regretted that medical evidence should be allowed to be presented to a jury in such a perverted form. The wonder is, that even in a case of undoubted criminality (as in that particular instance) a conviction should ever occur. (See also the case of the *Queen v. Owen, Thomas and Ellis*, Stafford Lent Assizes, 1840.) In a case in which Mr. Image, of Bury St. Edmunds, gave evidence (*Reg. v. Carnt*, Suffolk Lent Assizes, 1851), the medical facts, although

furnishing conclusive evidence of drowning when taken together, were individually objected to. The deceased was found dead in a pond. The body was removed after it had been lying about four hours in the water, and was carefully examined by Mr. Image forty-one hours after death. The hair was hanging back, wet, very muddy, with leaves and weed entangled in it; the ears were muddy, the right eye ecchymosed, pupils slightly dilated, lips bluish, and there were bluish patches on the face. Slight scratches were observable on the right side of the face. The skin had a dull leaden hue. The jaws were fixed, teeth tightly clenched, and the tongue not protruding. The nails were filled with sand and mud. There were severe bruises on both arms near the elbow, equal in extent and intensity. The tongue was greatly congested, and covered with froth and mud, which extended backwards to the throat and nostrils as well as into the larynx and trachea or windpipe, and the upper divisions of the air-tubes of the lungs. The lungs were engorged and greatly distended: when cut in any part frothy mucus was abundantly poured out, and much fluid escaped on pressure. The heart was healthy: the right and left cavities were filled with black fluid blood. There were no coagula. There were small pieces of green weed in the air-tubes (corresponding to weed in the pond.) The vessels of the neck were distended with dark-colored liquid blood, without any coagulum. The stomach was healthy; it contained partially digested food, with about a pint of liquid mixed with mud and sand. The liver was enormously congested, bleeding profusely at every section. The bladder was quite empty, and contracted to the smallest size. The sinuses of the brain were not much distended, and the substance of the organ was not greatly congested. Mr. Image gave an opinion, which was perfectly justified by these appearances, that the deceased had died by drowning, and that she had probably been held forcibly under water. The accuracy of this opinion was established by the confession of the criminal before execution.

Marks of violence on the drowned—The chief inquiry with regard to marks of violence on the bodies of the drowned, is, whether they have resulted from accident or design. In forming an opinion, a witness must give due value to the accidents to which a body, floating loosely in water, may be exposed. Ecchymoses of considerable extent are sometimes seen on the drowned, when the bodies have been carried by a current against mechanical obstacles in a river or canal. If the deceased fell from a considerable height into water, his body in falling may have struck against a rock or projection, and have produced extensive marks of violence. Dead bodies taken out of wells, often present considerable marks of violence of a vital character, when the deceased persons have fallen in accidentally, or have thrown themselves in intentionally. The presence of these marks must not create a hasty suspicion of murder. It is manifestly impossible to lay down any specific rules for forming a decision in cases of this kind, since probably no two instances will be met with which will be perfectly similar. In clearing up these doubtful points, everything must depend on the tact and acumen of the practitioner who is called upon to conduct the investigation. The first point which he has to determine is, whether the injuries on the body were produced before or after death. (See WOUNDS, *ante*, p. 182.) If after death, then they ought to be obviously of accidental origin. Accidental violence may sometimes be of a serious nature so serious that a practitioner might well doubt whether it did not indicate that the deceased had been violently injured prior to submersion. If a dead body were taken out of water, with one or both extremities dislocated, or the cervical vertebra fractured, and a surgeon was asked whether such injuries could be accidental and coincident with, or consequent on drowning, the answer would probably be in the negative: but an instance has occurred in which both arms were accidentally dislocated at the shoulders

in the act of drowning. I allude to the case of a man, who, some years since, jumped from the parapet of London Bridge into the Thames. This exploit, it appears, the man had previously performed with impunity, but on this occasion he sank and was drowned. Both his arms were found dislocated, in consequence, it is presumed, of his having fallen with them in the horizontal position, instead of placing them closely to his sides. The concussion on falling into the water had sufficed to produce the accident. (*Smith's For. Med.*, p. 228.) Here, then, we have a proof that even the mechanical resistance offered by water alone, may give rise to marks of violent injury on the person. Extravasation of blood may take place into the cavities from this cause. Dr. N. Chevers has informed me that he assisted in examining the body of a sailor who fell into the water, with his head downwards; and it was found that there was an extravasation of blood in the head, beneath the arachoid membrane.

It has been observed, with respect to superficial marks of violence, that bruises or contusions are not always visible on the bodies of the drowned, when they are first removed from water. This may be owing to the skin having abundantly imbibed water the color of the ecchymosis being thereby concealed. After a short exposure to air, the water evaporates, and the bruise or contusion becomes visible. The great point with regard to all marks of violence on the drowned, is to throw light upon the questions: 1. whether drowning was really the cause of death; and 2. whether, if so, the act was the result of accident, suicide, or homicide. This last question does not concern a medical witness so much as the jury, who will determine it from the facts proved before them.

There is one case of rare occurrence, in which a practitioner would be apt to be misled by trusting to appearances found on the drowned. If a dead body were removed from water with a deep ecchymosed circle round the neck, evidently produced by a cord or ligature, but no traces of which could be found, it is not improbable that a suspicion would be at once raised, that the deceased had been murdered by strangulation, and the body afterwards thrown into water. An accident occurred a few years since in which a gentleman and his wife were thrown into the water by the overturning of a small boat. The lady was drowned. On an examination of the body, subsequently made, a livid circle was found round her neck, as if she had been strangled. She had evidently died by drowning, but the mark had been produced by the string of a cloak which she wore at the time of the accident. In her struggles to reach the boat, it is presumed that the tide had drifted the cloak in an opposite direction, and had thus produced the appearance of strangulation. It is not improbable that this accelerated death. Barzellotti mentions the case of a man who was drowned in the Po, while being escorted along the banks of the river, as a prisoner, by a party of soldiers. The man attempted to escape and was drowned. Besides the ordinary marks of drowning, there was a deep livid circle, extending completely round the neck, and immediately below this, another mark but paler in color. The skin over the windpipe was ecchymosed. It was supposed that the deceased had been strangled by the soldiers and his body thrown into the water, but from the appearance of the marks, and other circumstances, Barzellotti gave it as his opinion that they had been produced by the collar of a coarse linen shirt which had been tightly buttoned around the deceased's neck the collar had retracted from the imbibition of water, and had thus caused the appearance of strangulation, like any other ligature. (*Questioni di Medicina Legale*, i. p. 329. For another case, see *Henkel Zeitschrift*, 1840, vol. i. p. 126, Erg. H.) The following case was communicated to me as having occurred during the heavy floods in the winter of 1839. A man was carried away and drowned in attempting to ford a swollen stream. When the body was tumid, it had been

so placed by the current, that the forepart of the neck was locked against the stump of a tree, giving rise to an ecchyraosed patch like that which is commonly produced by manual strangulation. [For the report of a case, a which there was much violence to the neck, see *Henke's Zeitschrift*, 1842, vol. i. p. 258, Erg. H.]

It might be said that in cases of this description circumstantial evidence would commonly show how the mark had originated. In admitting the truth of this observation we must remember that circumstances, as matters of proof, do not always present themselves to our notice, or occur to our judgment, at the precise time that the law stands most in need of them. While, then, we use great caution in drawing an inference when there are such strong grounds for suspicion, we should not neglect to examine carefully the most trivial appearances. In a remarkable case of murder, in which the body of the deceased was discovered in a mill-stream, there was only one slight ecchymosed depression in the forepart of the neck, as if from a finger. The surgeon suspected from this that the deceased had been strangled. The marks of drowning in the body were wanting; and the suspicion of the real cause of death was afterwards confirmed by the confession of the criminal.

Accidental fractures in the drowned.—*Fractures* are not often met with in the drowned as the result of accident. Certain fractures likely to be followed by immediate death may forbid the supposition of their having occurred after drowning; and a careful examination of the body may show that they were not likely to have arisen from accident at or about the time of submersion. This point was raised in the case of *Reg. v. Kettleband* (Nottingham Winter Ass., 1843), where the prisoner was charged with the murder of his son, a boy aged ten years. The deceased was found dead in a pond soon after he had been seen healthy and well. An inquest was held, and as usual no inspection of the body was required by the coroner, and the jury were directed to return a verdict of "found drowned." An inspection was, however, subsequently made. The neck was observed to be very loose, and on further examination the processus dentatus was found to be separated from the atlas, and the ligaments were ruptured. The three medical witnesses who gave evidence at the trial, deposed that this displacement had caused death by compressing the spinal marrow; that the injury had occurred during life that it was not likely to have been caused by accident from a fall into the water, as there was no mark of a bruise about the head, and the pond was proved to be small, with a soft muddy bottom. All agreed that such an injury was not likely to have arisen from a blow or a fall under any circumstances, because it required for its production that the body should be fixed, and the head forcibly rotated on the trunk. It was in itself sufficient to account for immediate death, and it could not occur by accident after death from any other cause. Hence it was inferred, 1, that death could not have been caused by drowning; 2, that it had resulted from the compression of the spinal marrow, by displacement of the second vertebra; and, 3dly, that this injury must have been intentionally produced by some person. Circumstances fixed the crime on the prisoner, and the jury returned a verdict of manslaughter; although the nature of the injury, admitting that it was not the result of accident, proved that the prisoner must have acted with a most cool and deliberate intention to destroy life! This case furnishes a serious commentary on the practice of some coroners, in denying the necessity for an inspection, and in directing what is called an open verdict of "*found drowned*," when a body is taken out of water.

It is an important medico-legal question, whether fractures of the cervical vertebrae can occur from accident alone, about the time of drowning. In the above case, the medical witnesses had probably good reasons for denying that the injury was accidental, although such an opinion cannot always be

expressed merely from the absence of marks of violence on the head. In August, 1858, a gentleman, in jumping from a bathing machine head foremost into water more shallow than he had expected, caused a fracture and displacement of the cervical vertebrae, which led to death. Mr. South quotes the case of a man who threw himself into a river to bathe from a height of seven or eight feet, the water being only three feet deep. He rose to the surface, but fell back senseless. When he recovered his consciousness, the account he gave of the accident was, that he felt his hands touch the bottom of the river, but to save his head drew it violently back, upon which he lost all consciousness. He died in about ten hours, and on examination the back of the neck was ranc ecchymosed the interspaces of the muscles were gorged, and the vertebral canal filled with blood. The body of the fifth cervical vertebra was broken across about the middle of its depth, and the two pieces were completely separated from the lateral parts. As there was no mark of contusion or dirt on the head, Rveillon, who reports the case, believes that the fracture arose from muscular action, and not from a blow received by striking the bottom: but this is doubtful. In another instance related by Mr. South, a sailor jumped headlong into the sea to bathe, a sail being spread three feet below the surface. He immediately became motionless, and died in forty-eight hours. The fourth and fifth cervical vertebrae were found extensively fractured, and the spinal marrow was crushed and lacerated. (*Chelius's Surgery*, Part vi., Fractures.) In this case the fracture must have resulted from contact with the water or the sail; but as the latter was freely floating, this would be a yielding medium: hence this serious injury may occur accidentally in cases in which we might not be prepared to look for it. (For an important medico-legal case, involving many questions connected with marks of violence on the drowned, see *Ann. d'Hyg.*, 1839, vol. ii. p. 195.)

Was drowning the result of homicide, suicide, or accident?—Although the question, whether the act of drowning was the result of suicide or murder, properly falls within the province of a jury, there are certain points in relation to it which here require to be noticed by a medical witness. In the first place, it is not to be imagined that an examination of the body will develop any differences in either of the three supposed kinds of death. So far as the phenomena of drowning are concerned, they are the same; and they are accompanied by the same appearances after death in each case. In drowning which is accidental or suicidal, it is not usual, as it has already been observed, to meet with marks of violence on the person, except such as are purely of *accidental origin*, and have commonly been produced *after death*. In accidental drowning, this is almost a constant rule: but if the individual has fallen from any height, his person may be injured in the fall either by projecting bodies on the banks of a river or canal, or by mere concussion on the water, allowance for either of which we must be prepared to make, according to the situation of the spot from which the party is supposed to have fallen.

It is calculated that drowning is the cause of death in nearly *one-half* of all suicides; but this of course will vary according to localities. In *suicidal* drowning we have a difficulty to encounter which we do not meet with in that which is *accidental*. A man may have attempted suicide by some other means, previously to precipitating himself in the water: thus, then, besides the accidental violence of accidental drowning, we may meet with violence on the person evidently indicating wilful perpetration. What is the nature of this violence? Is it to be defined? Can it always be distinguished from that which is positively *homicidal*? The answers to these questions must depend on the circumstances proved in each case.

Drowning in shallow water.—Homicide has been sometimes presumed from the peculiar circumstances under which the body has been discovered. Thus,

for instance, it has been a debated question, whether a person intent on suicide can actually drown himself in shallow water. This question has been long since settled in the affirmative by the occurrence of some well-authenticated cases: it appears to have been raised originally on the theoretical view, that the resolution of a suicide would fail him in such a situation, and that having the means of escape, he would lose no time in extricating himself. It need hardly be stated that the mere immersion of the month in water not more than a few inches deep, will produce all the phenomena of death by drowning, with the exception that little or no water would probably be found in the stomach. Devergie mentions an instance which occurred in May, 1833, where a man was found drowned in a small stream, his face towards the ground, and his head just covered by the water, which was not more than a *foot* in depth. On dissection, there were all the appearances of drowning present, and a large quantity of sand and gravel was found occupying the trachea and bronchial ramifications. (*Op. cit.*, vol. ii. p. 332.) A case is mentioned by Dr. Smith, in which a woman committed suicide by breaking a hole in the ice of a pond, during the winter, and thrusting her head into the water, the rest of her body being out. In May, 1837, a man was found dead near Mitcham in Surrey. He was discovered lying on his face in a small stream of water only six inches deep. The water was so shallow that it did not cover the deceased's body or his head. There was clear evidence that this was a case of suicidal drowning. In November, 1855, a man was found drowned in a water-cistern, which at the time had in it only fourteen inches of water.

The discovery of bodies under these circumstances does not necessarily establish that the act was suicidal. It is quite possible that one or more assailants may hold a person's head in such a position sufficiently long to destroy life; but as the person might be capable of making resistance, we ought then to find marks of violence on the body. So, again, such a position is by no means incompatible with accidental drowning; and on this it may happen that a medical practitioner will be called to express an opinion. A man, in a state of deep intoxication, or when suddenly attacked with syncope, epilepsy, or apoplexy, may fall with his face in a gutter, ditch, or small pool of water; he may die in this position, not having the power to extricate himself (*ante*, page 552). Even marks of violence on his person must not be too hastily construed into proofs of murder. Not long since, a case of this description gave rise to a trial for murder in one of our midland counties. A man was found dead with his face in some melted snow; and there were several severe contusions on his body. The evidence showed that, after a quarrel, he had left a neighboring inn deeply intoxicated; and it was rendered extremely probable that he had perished accidentally on his way home. There was no reason to suppose that he had been murdered. Infants, from mere helplessness, may be drowned under similar circumstances.

Drowning from partial immersion.—There is no doubt that murder by drowning may be perpetrated without the *whole of the body* being immersed in water. A case of this kind, which was the subject of a criminal trial, was referred to me by Mr. Aldred, of Norwich, in March, 1841. The case was tried at the Norwich Lent Assizes of that year (*The Queen v. Yaxley*), and the prisoner was convicted. It appears that the mode in which the prisoner destroyed her infant child was by immersing its head for a few minutes in a pail of water. She removed it before it was quite dead; but it soon died, with slight convulsive motions of the limbs. The case was rendered obscure by the fact that the whole of the body had evidently not been immersed; and the only conceivable means of drowning were in a small duck-pond adjoining the house, which was covered with weeds; but no weed was found in the stomach of the child, although a quantity of water was there present. In

April, 1854, a case occurred in London, in which a woman was charged with causing the death of a child by drowning it. The child was found dead, with its face in a basin of dirty water. The prisoner had placed the child in this position, and had then locked the door. The death of a child under these singular circumstances is, however, quite compatible with accident. Mr. Tnbbs has communicated to me the following case, which fell under his notice in April, 1848. He was called to see a child, cet. 18 months, which was stated to be dying. On his arrival at the cottage, he found it dead; the skin was cold, and the countenance calm and pale, with the exception of a livid discoloration in the centre of each cheek. The eyelids, as well as the mouth, were half open. The pupils were largely dilated. A frothy mucus, tinged with blood, was escaping from the mouth and nostrils. The tongue was swollen, and protruded forwards. The mother of the infant, a respectable woman gave the following account: She was washing in one room, while the child was in an adjoining room, the door between the rooms being kept open by a pail half full of water. She went out of the house for about two minutes, and on her return she found the child with its head downwards in the pail of water, the heels and part of the body hanging over the side of the pail. She snatched it out and tried to revive it, but without effect. There was no reason to doubt the truth of her statement, and at the inquest the jury returned a verdict of accidental death. The helplessness of an infant at this age, and the rapidity with which asphyxia supervenes, sufficiently account for death under these circumstances. A case occurred in London, in 1841, in which a drunken man was drowned by falling on the bank of the Surrey Canal, with his head partly in the water, while the greater part of his body lay on the bank out of the water. It was by partial immersion that the Italian boy, Carlo Ferrari, was destroyed some years since, by *Bishop* and *Williams*, who afterwards attempted to sell the body for the purposes of dissection. The murderers first intoxicated the deceased, and then suspended him by the heels in a well, so that his mouth was but a few inches below the level of the water. A medical man, therefore, must not allow himself to be deceived respecting the cause of death on finding that the whole of the body has not been immersed. In this form of murder, when the inspection is recent, water, with or without weeds or other foreign matters, may be found in the ear passages.

Ligatures on the hands and feet.—When a drowned body is removed from water with the hands and feet bound by cords, it is usually considered that we have therein strong presumptive evidence of homicide; but numerous cases are recorded in which suicides have actually bound themselves in this manner before throwing themselves into the water, probably for the express purpose of preventing any chance of their escaping death. In July, 1832, the body of a full-grown man was removed from the Seine, his neck, legs, and hands being secured together by a cord furnished with slip-knots. There was no doubt that he had died by drowning, and that the act was one of deliberate suicide, the cord being so placed on his body that an individual could easily place it on himself. In this case there was no great degree of ecchymosis produced by the cord; and it was not probable that there should have been, when it was arranged by a suicide, since his object would be merely that of rendering himself helpless by securing his arms and legs. This he would doubtless accomplish without giving himself much pain. If the marks bear the evidence of violent constriction, especially on *both wrists* or on the fore part of the neck, the presumption of murder becomes strong. In a case of this kind, it would be obviously of great importance to determine whether the deceased had really died by drowning or not; since, if his death had not been due to drowning, the fact of his body, so bound, being discovered in water, would

furnish the strongest possible evidence of murder. (*Ann. d'Hyg.*, 1833, vol. i. p. 207.)

Weights attached to the body.—If a body is taken out of water with heavy weights attached to it, the question of accident, as in the former case, is done away with. It must be either homicide or suicide; and doubtless many would be apt to suspect that it was a case of murder. Several instances have, however, occurred, in which persons have committed suicide by drowning, and heavy weights have been found attached on their feet and hands, or in or about the dress.