

breast. I cannot believe that that is a result to be depended upon.

An important point in determining whether a pistol wound is self-inflicted is the presence of powder smut on the hands. I have lately seen a case of suicide by shooting in the right side of the head, in which the fingers and palm of the left hand were blackened by powder. This bullet wound in the right side of the head was much bruised and blackened. This individual must have steadied the muzzle of the pistol with his left hand.

### SUDDEN DEATH DUE TO ALCOHOLISM.<sup>1</sup>

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THE following cases illustrate the difficulties which sometimes present themselves to the medical examiner when called to diagnosticate sudden death due to alcohol poisoning from death by some other poison, as opium, or by apoplexy.

CASE I. A. B., age thirty-five years, a Swede, hired man and farm-worker, residing in Shepton, Canada, was found one evening dead by the roadside not far from his home. The body was recognized by a passer-by and removed to a barn. Being summoned, I viewed the body and the situation where it was found, and noted that there was no blood on the ground, and that there were no marks of violence on the corpse. The coronor was notified, and arrived early the next day.

The following facts were brought out at the inquest: B. was of intemperate habits, and had been for several days on a spree. On the evening of his death he had been to the neighboring village, and after taking several drinks at the hotel, he had started for home with a whiskey bottle replenished at the bar in his pocket. This was found, nearly empty, by the roadside near the place where he died.

The coronor ordered an autopsy, the details of which are as follows: A man of medium height, light complexion, rather stout and of bloated appearance. Post-mortem rigidity very pronounced. Large ecchymoses on dependent parts (hypostatic congestion), great turgidity and purple aspect of face and lips, a frothy sanguinolent fluid escaping from mouth. Stomach exhibited a patchy inflammation and some ecchymoses; contained half a pint of a sour, sanguinolent liquid smelling of whiskey. Diffuse redness of the mucous membrane of the small intestines. Liver and spleen congested, the spleen softened. Heart and kidneys normal. Lungs edematous; mucosa of bronchi injected.

Cerebral meninges congested; sinuses turgid; venous network of pia distended; punctiform hemorrhages on surface of cortex in both hemispheres. No apoplectic effusion in centrum ovale or in ventricles.

The fact of alcoholism was proved by the autopsy, for these lesions were undoubtedly due to alcohol. The coronor's jury, therefore, brought in a verdict of sudden death due to alcohol poisoning. Query: Why did A. B., a robust man, with sound heart and no disease of viscera incompatible with a much longer existence, come to his death so suddenly? It was said that he had often withstood more liquor than he had imbibed in this drunken debauch. This was in

the month of October, and the deceased was thinly clad, with summer suit and no overcoat. May the chilliness of the season have had something to do with this sudden death? It is known that alcohol retards processes by which animal heat is produced, hindering the transformations of oxyhemoglobin in the blood, and inebriates poorly resist a severe chill. It has been proved that blood cooled below a certain point has a paralyzing influence on the nerve centres, including the cardiac and respiratory centres in the bulb.

CASE II. D. F., aged seventy-five years, farmer, of good early antecedents, had for several years been an inebriate. When I called, on the evening of March 16, 1868, to see him, I found him in bed, in deep coma, with heavy, stertorous breathing, bloated, livid countenance, feeble, flickering pulse—in fact, nearly dead. There was a perceptible alcoholic odor in the breath. That afternoon, as appeared from the testimony of one of his family, D. F. had drunk heavily. It was said that he had lived on whiskey, as, owing to a bad stomach, he had been unable to take food. The autopsy, performed next day, showed a stomach thickened and inflamed with hemorrhagic extravasations and erosions of the mucous membrane. About four ounces of thick mucus was removed from the stomach, and somewhat less of a prune-juice liquid redolent of alcohol. A cirrhotic liver with sclerotic changes not advanced and a fatty heart were also found. The membranes of the brain were thickened and hyperemic, and there was a large subdural clot on the left side covering a large part of that hemisphere. The ventricles were distended with blood and serum, and there was some edema of the convolutions of the right hemisphere. This case was entered as sudden death by apoplexy of which the exciting cause was alcohol.

As physicians and as medical examiners, we are continually meeting instances where the diagnosis of the coma lies between apoplexy, narcotic poisoning, and alcohol poisoning—that condition of the latter where the person is supposed to be dead drunk. In former days when bleeding was in vogue, I have known a person to be bled for apoplexy who was simply dead drunk, and who recovered completely after several hours. I have also known patients to be regarded as dead drunk who were in the coma of apoplexy. As Watson says: "Coma is coma, from whatever cause, and you must seek to ascertain the cause in the history and other circumstances of the case. You inquire whether he is known to have been drinking; you try if you can perceive the odor of wine or brandy in his breath; you endeavor to make out whether he has been low-spirited or in known difficulties; in short, whether it is likely that he may have swallowed poison. But from the symptoms and actual condition of the sensorial and motor functions you cannot solve the question."

The two cases above reported occurred many years ago, and no chemical analysis was made of the contents of the stomachs; it was, however, sufficiently apparent from the odor and from other circumstances that the liquid found in the stomach was impregnated with alcohol.

The following case of sudden death in an inebriate was undoubtedly due remotely to alcohol.

CASE III. F. F., a Norwegian, silversmith, aged forty years, was admitted to the Houston Institute, Newburyport, July 4, 1893. He came of a healthy,

<sup>1</sup> Read at the Annual Meeting of the Massachusetts Medico-Legal Society, June 8, 1897.

long-lived family, and had never been sick prior to entering the institute. He had been a hard drinker for twelve years — daily drams, frequent spree. He had been also an inveterate smoker. The physician at the institute had noticed a weak, intermittent pulse and diagnosed a "tobacco heart." He was placed under the usual treatment for inebriety, tobacco and alcohol being soon completely withdrawn.

August 7th he left the institute "cured" but with more or less pain and discomfort in precordial region with shortness of breath, and complete inability for exertion; he could no longer work at his trade. The night of the 17th of August he was unable to sleep on account of severe stabbing, burning pain in heart, general restlessness and distress. In the morning, he walked to the institute (a short distance) for relief, became rapidly worse, was taken to his home, and died on the way.

On requisition of the mayor, I performed an autopsy on the afternoon of the 18th. Death appeared to be due to fatty disease of the heart muscle, unaccompanied by any fibrosis or occlusion of the coronaries. The accumulation of fat exterior to the sarcolemma was phenomenal, considering that adipose development elsewhere was not up to the normal in a spare, anemic subject; the interfascicular connective tissue was infiltrated with fat in the form of yellowish streaks and deposits crowding and compressing the muscular fibres, which presented a yellowish or fawn color; the heart walls were soft and flabby, and the myocardium in places could be easily torn through or broken down by pressure of the finger. The whole of the left ventricle seemed enveloped in a fatty layer under the visceral pericardium, thinning out and disappearing toward the apex; the coronary arteries, though normal in appearance, were buried in adipose substance in the first part of their course. A section through the middle of the left ventricular wall showed the myocardium interpenetrated by and stuffed with adipose matter. The solid organs of the abdomen were congested and more or less altered. The spleen was enlarged and softened; its pulp of the consistence of *bouillie*. The liver was enormously swollen, firm and hard, cutting with great resistance. The kidneys were enlarged and hyperemic, blood flowing freely on section. Stomach empty and normal in size; no thickening of walls and only a little patchy redness of mucosa about greater curvature. I returned this death as the result of fatty disease of the heart and other lesions, probably due to chronic poisoning by alcohol.

After much reflection on this case and careful study of my notes made at the time, I am convinced that this was a true case of what the French writers call *surcharge graisseuse* — first, fatty increase, second, fatty transformation. It was not primarily fatty degeneration or parenchymatous myocarditis. Doubtless other factors besides alcohol were operative here to, so to speak, submerge this heart by adipose. When this man went to the institute he was comparatively well, able to work, though under the dominance of his evil habits. In one month's time the organ most essential to the sustenance and nutrition of the whole economy was hopelessly smitten in its vitality.

Interesting questions present themselves here; but they are all unsolvable. How far were the lesions in this case due to alcohol, and what part, if any, had tobacco in their causation? What is the explanation of this etiological rôle (now acknowledged by the best

pathologists) of alcohol in the production of cardiac lipomatosis and steatosis? How far, if at all, were the morbid changes described in this case, and especially the cardiac steatosis, due to suppression of the stimulus of alcohol and tobacco; in other words, did abstinence precipitate the fatal issue?

#### APPEARANCES OF THE ALIMENTARY CANAL IN SUDDEN DEATH BY ALCOHOLISM.

The effect of alcohol on the digestive tube varies with the dose, the quality and the degree of dilution. That this organ is in some instances very tolerant, long preserving its structure and function unimpaired despite great excesses, is a fact, notwithstanding the asseverations of certain of our school text-books. That the abuse of any alcoholic stimulant does eventually entail inflammatory changes in the alimentary canal is certain. Dujardin-Beaumetz and Audigé, in their experiments on acute and chronic alcoholic poisoning, in animals (principally hogs), found that toxic doses inflame the stomach and intestines even when injected under the skin. Of all the alcohols, ethylic is the least baneful, eight grammes per kilogramme of the animal's weight being a fatal dose. Amyl alcohol (fusel oil) is much more baneful, a dose equal to two grammes per kilogramme being speedily fatal. The effects of ethyl alcohol (spirits of wine) on the stomach are much less pronounced than those of propyl, butyl and methyl alcohol; the latter violently congest and irritate the stomach, cause hemorrhages and obstinate vomiting. The practical lesson is that impure alcohols, such as new rum, and whiskey that has not ripened in casks, and are impregnated with fusel oil (the bane of new liquors), and all such spirits as are fraudulently sophisticated with fusel oil, are much more deleterious than wine and spirits containing only ethyl alcohol, produce more intense inflammatory changes in the digestive tube, and are more likely to be followed by sudden death, generally in coma and sometimes in convulsions.

There are no constant appearances of the stomach and other viscera in alcohol poisoning. In other words, the lesions give no absolutely infallible criteria. There may be uniform redness or there may be redness in patches; there may be petechiæ and ecchymoses of the mucous membrane and punctiform hemorrhages into the gastric cavity, or there may be large extravasations of blood and hemorrhagic erosions, the stomach may be of normal thinness and but slightly injected, or it may be thick and rugous, intensely red in places and black and sloughy in others; and the abdominal viscera may be hard or soft, hypertrophied or shrunk, and yet the death shall have been caused by alcohol poisoning.

It cannot be too much borne in mind that alcohol has a special affinity for the nervous system; or we might say that the nervous system has a sort of chemotoxic affinity for alcohol. In some inebriates the nervous phenomena of alcoholism are far the most marked and the visceral lesions are inconspicuous; even the entire absence of such lesions in a given case would not warrant the affirmation that the sudden death was not due to alcohol. Nor would the failure to obtain a history that the deceased person had prior to death passed through the classic phases of drunkenness (excitement, then perversion, then depression of the faculties and forces) warrant the conclusion that the individual did not die from alcoholism.

"In some cases," says Boehm, "the effects of alcohol

are diametrically opposite [that is, from excitement] having a depressing effect from the very first; and the person goes on to a state of narcotism without any of the ordinary outward signs of drunkenness. The amount of consciousness and rationality retained by the drunken man varies greatly, and is by no means always proportioned to the quantity of poison imbibed. Men who are manifestly drunk often act and transact business for a time with complete reflective faculties, and with a good deal of consideration. Death may occur early in the first stage of drunkenness in consequence of asphyxia and paresis of the heart, but it may occur in the later stages."<sup>2</sup>

These observations will serve as an introduction to my fourth case.

CASE IV. E. J. C. died suddenly at Grape Island, in Plum Island River, between Newburyport and Ipswich, on the afternoon of August 6, 1896. This woman, considerably under the middle age, strong and robust and of fine physique, was left at the hotel in the afternoon of the date mentioned by her companion, a gentleman from Rowley, in a state of intoxication. The two persons had come down from Rowley in a boat together, and C. had taken copious draughts of whiskey on the way. M., the male companion, stated that he had left C. at the hotel because she was drunk, and he did not know what else to do with her. From an examination of all the evidence, I am inclined to take M.'s statement as the truth. There was, at the same time, the testimony of two parties at the hotel that C. when she entered the hotel did not walk, act or speak like a person actually drunk, nor was any smell of liquor noticed in the breath. There was evidence that the woman took some liquor (furnished by M. from the bar) after arriving at the hotel. M. returned to Rowley in his boat. Shortly afterwards, Mrs. C. rose from her chair, walked across the room, then fell heavily on the floor, and instantly died.

I was summoned by the police from Newburyport, this place being accessible by a straight road over the sand meadows. Dr. Clark, medical examiner of Ipswich, was also summoned, and we both arrived at Grape Island at nearly the same time, my arrival antedating that of Dr. Clark. It was agreed by us to remove the body to Newburyport for an autopsy. The autopsy was held in the afternoon of August 7th. To confine myself to essentials, I may state that we found in the viscera of the abdomen and in the encephalon lesions which could properly be ascribed to chronic alcoholism. The stomach and small intestines were intensely hyperemic, as manifested by a diffuse redness of the mucous membrane and extreme vascular dilatation; there was nothing there to indicate chronic lesion. The liver and spleen were enlarged and softened; the kidneys were very hyperemic, large and soft; blood freely oozed on section. There was some congestion and edema of the lungs and bronchi (perhaps altogether hypostatic). In the encephalon was found an old pachymeningitis existing as a limited lesion along the longitudinal fissure. There was an ecchymosed spot as large as a silver dollar back of the right ear and a corresponding spot within the cranium, and extending to the dura mater, but no free blood; this was evidently produced by the fall, being the part that struck the floor. It was judged that a fall producing a lesion of this kind in a rather stout and heavy woman might cause considerable cerebral concussion. The meninges

were unduly vascular and the sinuses were engorged, but there was no hemorrhage. The heart was normal; the ventricles were empty. Death evidently occurred in systole.

There was found in the stomach a small quantity (about half a pint) of a turbid, somewhat bloody, fluid; this was collected in a bottle and along with the stomach sent to Professor Hills, of Harvard Medical School. In another bottle was sent the urine drawn from the bladder, and in a third, portions of the liver, the spleen and the kidneys. The general public manifested great interest in this case, and there was a wide belief that this woman had died from some poison other than alcohol.

Professor Hills in his report stated that he failed to find any toxic agent excepting alcohol. The presence of that spirit was detected in the stomach, in the urine, and in the other organs. Professor Hills gave as his opinion that the woman died of alcoholism. My own theory was that the fall on the head was an important factor, giving a powerful adjuvant influence to a paralyzing noxa already existing. If this be not so, I fail altogether to understand the suddenness of this death, and can only suggest that now and then alcohol may act as chloroform in rare instances acts — by paralyzing the medulla oblongata before the upper brain is completely subjected to the influence of the poison.<sup>3</sup>

#### THE PRESERVATION OF SPECIMENS WITH THEIR NATURAL COLORS BY KAISERLING'S METHOD.<sup>1</sup>

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THE necessity for preserving anatomical specimens with their natural colors has always been felt, and the impossibility of retaining the delicate shades which are indicative of many of the morbid processes has always been a great bar to proper teaching of pathology. With the introduction of formaline as a hardening agent and the modifications in its use recently published by Kaiserling,<sup>2</sup> it seems as if the collections of the future would be able to present something for the student besides variations in shape and size and fractures; for this is all that can be readily seen by him now, and his imagination has to supply the rest.

But it is not only for the instructors, but also for the medical examiner, that this promises to be of advantage; for the soft parts of the body that have been injured can be preserved in this way and shown in court, if necessary, and would often convey much more meaning to the average jury than lengthy technical descriptions.

The method is simple; the only precaution to be observed is not to put too large pieces in the preserving fluid, and to be careful to change them at the

<sup>1</sup> Read before the Massachusetts Medico-Legal Society, June 8, 1897.

<sup>2</sup> C. Kaiserling: Virchow's Archiv, Bd. 147, s. 389.

<sup>3</sup> I add in a footnote that this is the case where the Board of Health of Ipswich, thinking their rights interfered with by the removal of this body to Newburyport (that is, from one town to an adjoining town) without their permission, and believing that the law defining the functions of boards of health gives such boards authority over medical examiners in such cases, who must apply to these boards for consent before they can legally remove bodies out of one town into another — this board, I say, appealed to Justice Sayward, of Ipswich, who sustained the view of the board, and fined the undertaker who took the body from Grape Island to Newburyport ten dollars and costs. An appeal was made to the Superior Court, and the case was *nolle prossed* by District-Attorney White, so that, according to this judgment, medical examiners are not amenable to boards of health in the discharge of their duties within the limits of their districts.

<sup>2</sup> Quoted from Ziemssen's Cyclopaedia, vol. xvii, p. 393, Am. ed.