ORDER III.—SACCHARINE. Sugar, treacle, liquorice, figs, raisins; glycerine.

ORDER IV.—OILY AND WAXY. Lard, spermaceti, wax; oils of olive, almond, and linseed.

ORDER V.—ALBUMINOUS. Egg.

CLASS XII.—ANTHELMINTICS.

Pomegranate; oil of turpentine; quassia; cowhage; tin powder; male fern; kousso.

No classification of medicines can pretend to freedom from errors and defects, which are unavoidable in the present imperfect state of the science of therapeutics. I hope simply to have founded the foregoing on true principles, of which a good proof will be, its capability of assuming, without violence to its fabric, such corrections as are rendered necessary by the progress of knowledge.

ART. XIII. — *Observations on permanently Slow Pulse and Fatty Degeneration of the Heart.* By BEN. WILLS RICHARDSON, Fellow and Licentiate of the Royal College of Surgeons in Ireland.

IN the latter part of the last century Dr. Heberden published two cases of slowness of the pulse, in one of which he tells us, the chief distemper was the age of fourscore, in whom for the last two years of his life he only counted so many as 42 pulsations, but they were seldom above 30, and sometimes not more than 26; and though he seemed heavy and torpid, yet he could go out in a carriage, and walk about his garden, receive company, and eat with a tolerable appetite. He saw another whose pulse, as he was told, was sometimes, in the beginning of his illness, not above 12 or 16 in the minute^a. Dr. Heberden, however, did not allude to the pathology of this

^a Medical Transactions of London College of Physicians, vol. ii. p. 29. 1772.

remarkable symptom, and this is the more peculiar when we consider that the connexion between a fatty state of the heart and slowness of the pulse was known, at least to one of his contemporaries, for we find Dr. Macbride, of Dublin, writing in the same year on this subject, and in the following words: "When we find the pulse unnaturally slow, we infer that the heart and arterial system are less irritable than they ought to be, which may happen from a want of proper supply of subtile nervous fluid to enliven the fibres, as seems to be the case when the vessels or ventricles of the brain are surcharged with blood or serum, or when it is pressed upon by the skull, beat in, or fractured. *The irritability of the heart may also be lessened, and the power of its fibres weakened, from an accumulation of oily, gelatinous, or watery fluid in the cellular interstices, as happens in the cases of over-corpulent or hydropic habits.*" Again, "the accumulation of fat about the basis of the heart and the large vessels connected therewith incumber it so that neither the systolic nor subsultory motions can be performed with sufficient freedom, *whence the weakness and slowness of the pulse*"^a.

A few years later the following case was published, in which there is strong evidence of the connexion between slowness of the pulse and a softened state of the heart, and which it is fair to assume was one of fatty degeneration of the organ, since all the flabby hearts which Dr. Quain examined were affected with this disease^b.

"Dr. James Johnstone read the history of the case of a clergyman before the Medical Society of London, in whom *the pulse was remarkably slow*, though very regular, which circumstance made him intimate to his family, considering his make and age, the propriety of precautions if anything like giddiness or pain in the head should appear to threaten apoplexy. Nothing, however, of this kind happened.

"In June of that year he complained of shortness of

^a Macbride's Practice of Physic, p. 217. London, 1772.

^b Medico-Chirurgical Transactions, vol. xxxiii. p. 181.

breathing, with pain in his chest and across to his arms on walking, especially if up any ascent; he had frequent returns of these symptoms in the months of June and July, notwithstanding bleeding, the administration of a brisk cathartic or two, and some other medicines. On the evening of the 2nd August same year, he seemed cheerful and well, went to bed; early the following morning his wife was roused by the noise of his expiring groan, in fact he was dead in an instant. This gentleman was in his seventy-first year.

“ His body was opened on the 4th of August. The intestines were in a natural state, but much inflated with wind; stomach covered with a very black mucus, quite empty, very much discoloured, in many places black, particularly about the pylorus; the blood-vessels over it very much distended; liver indurated in every part, but mostly so about its edges; the heart very *putrid*, *admitting the fingers to pass through it with very little pressure*, it was quite empty, and the vessels going to and from it perfectly sound, and no ossification; kidneys very much diseased, hardened in every part, the pelvis with difficulty distinguished, it was covered very much with fat*.

We have here, then, an undoubted case of a softened heart in connexion with slowness of the pulse; but it is of further interest, in that we are told the vessels going to and from the heart were perfectly sound, and no ossification, which shows that slowness of the pulse may occur in such cases without aortic disease.

I have taken the next case from the Medical Commentaries, and although we are told by the writer that nothing morbid was found in the thorax, yet if we compare the symptoms with those now so well known as belonging to a softened or degenerate state of the heart, we shall see the probability of its having been a case of this disease which was overlooked. Indeed the writer himself did not consider the appearances found in the head sufficient to account for death. Under any

* Memoirs of the Medical Society of London, vol. i. p. 376. 1787.

circumstances, however, this case and the two succeeding are of great interest, as presenting us with such a very remarkable slowness of the pulse; they may without any apology be introduced here.

Dr. Spens was called "on the 16th of May, 1792, to see a mechanic who was in the fifty-fourth year of his age. He was surprised to find his pulse only 24 in a minute; he informed him that about three o'clock in the afternoon he had been suddenly taken ill while standing in the street, that he had fallen to the ground senseless, in which state he continued about four minutes. From the time of this first attack till he saw him he had been affected with three other fits, nearly of a similar nature; these, however, were attended with some convulsive motions of his limbs, and with screaming during the fit. When Dr. Spens saw him he was somewhat drowsy, but perfectly collected, and his voice was as strong as when he enjoyed a state of perfect health, nor had he at that time any other complaint.

"17th. He had several fits during the night, which were of longer duration and more violent; and his pulse was only 23 in the minute. At 9 in the evening he found that he had no return of the fits or of fainting since 5 A. M.; at this hour, feeling one of his fits coming on, he was given a teacupful of wine, and the uneasiness went off; his pulse continued in the same state.

18th. He fainted frequently during the night, and his pulse beat 26 in the minute.

"After Dr. Spens saw him, he got up and walked about his workshop. Finding himself well, he sat down to dinner; but on taking some broth, he almost instantly felt faint. About eight o'clock in the evening he took a bit of newly-toasted bread, and as soon as he tasted it he instantly cried out, fell back senseless, with smart convulsions of all his muscles. He apparently recovered in a few seconds; but hardly any pulse could be felt for a few moments.

"19th. The report was, that he had been very faint almost the whole night, having had frequent fits, with convulsions. He now felt, at their commencement, a violent pain in the head; but when free from the fit he was perfectly collected and distinct. The pulse was now found to be only 10 strokes in the minute, though regular and strong. He was given a glassful of whiskey, and his pulse rose again to 24. But at three o'clock in the afternoon the pulse was found by Dr. Spens to be only 9 in the minute. The patient was in great distress from constant sickness and faintness, but perfectly sensible and collected. At 7 in the evening the pulse was still 9, but much weaker. He was sensible, but unable to speak. During the whole of the following night he was observed never to have moved his right arm and leg; and he expired on the 20th at 9 in the morning.

"About two ounces of a watery fluid were found in the ventricles of the brain, and a gelatiniform appearance was observed in some parts of the pia mater. A small ossification existed on the back part of the dura mater."

We are told that nothing morbid was found in the thorax.

"This man's pulse, a couple of years before his death, when examined by his medical attendant after an illness, beat from 60 to 70."

As I mentioned before, Dr. Spens did not attribute death to the appearances found in the brain, not considering them sufficient to account for it. Now, if we consider that a large amount of serum is, even in health, found in the ventricles and membranes of the brain, as well as disseminated throughout its substance, and that this serum appears to be, as Dr. Burrowes maintains^a, "supplemental to the other contents of the cranium; at one time giving place to an increased quantity of blood; at another, making up for a deficiency of blood in the vessels of the head." And if we further take into consideration the great probability that, owing to the slowness of the pulse,

^a Disorders of the Cerebral Circulation, pp. 50, 56.

the brain may not have received a sufficient quantity of blood to maintain the normal pressure upon the organ, the serum found in the brain, in Dr. Spens' case, may not have been in abnormal quantity.

This opinion receives additional support from that of Rokitansky, who writes: "When an empty space is formed within the skull, by a reduction of the volume of the brain, it is filled up by an increase of the volume of the inner membranes of the brain, and especially by an extraordinary exhalation of serum into the tissue of the pia mater, the sac of the arachnoid, and the internal cavities of the brain, more particularly the lateral ventricles." And again: "The great frequency of chronic effusions, and their similarity, render it one of the most difficult duties of the pathologist to recognise fatal effusions of this kind, and to determine that serous apoplexy has occurred in any particular case"^a.

"If there be much blood," say Drs. Todd and Bowman, "the surrounding fluid will be totally, or in a great measure deficient; if the brain be anæmic, the quantity of surrounding fluid will be large." And further on: "The brain may receive too little blood. In such a case, if the surrounding fluid do not increase too rapidly, the requisite degree of pressure will be maintained, and the healthy action of the brain preserved. But if the brain be deprived of its due proportion of blood by some sudden depression of the heart's power, there is no time nor source for the pouring out of new fluid, and a state of syncope or of delirium will ensue"^b. Lastly, Dr. Burrowes states, that there may be most extensive serous effusion in the cranium, and no apoplectic symptoms at all^c.

If, then, the idea is correct, that the appearances found in the head were not sufficient to account for death, is it not

^a Rokitansky, *Pathological Anatomy*, Sydenham Society's Edition, vol. iii. pp. 364 and 405.

^b *Physiological Anatomy*, vol. i. p. 298.

^c *Op. cit.*, p. 91.

probable that this was a case of fatty degeneration of the heart which was overlooked, and that the syncopal attacks, convulsions, and headach, were owing to insufficient vascular pressure on the brain; an opinion which receives support from the effect that wine and whisky had in warding off the attacks. The case also presents us with a pulse at 9 in the minute, and yet compatible for many hours with integrity of the intellectual functions.

The case I am now about to give was published some years afterwards by, I believe, the same writer, and is called by him a case of conversion of the heart.

“ A lady returning from church on Sunday, the 5th November, 1815, fainted in the street. She could not be said to be in very good health, having lately had a severe illness, the principal symptoms of which were frequent and long-continued attacks of acute pain in the lower part of the belly and back, extending down the thighs, with a bloody discharge from both the rectum and vagina, and incontinence of urine. The seat and nature of this disease was obscure, but she recovered, and was so well for months as to be able to walk about, and take an active share in the management of her house and family. The only symptom previous to this syncope was a degree of dyspnœa lately felt on motion or exertion. She fainted two other times on Sunday evening, and had frequent vomiting.

“ Nov. 6th. She had almost constant nausea and frequent vomiting, and a feeling of faintness and oppression, or anxiety about the breast, which was most distressing. Notwithstanding these feelings, however, the motions of expiration and inspiration were apparently going on quite regularly. Pulse 75.

“ 7th. Continued in the same state; but the pulse now varied from 24 to 30, regular, and not feeble; respiration apparently natural.

“ 8th. Was quite easy from 7 A. M till 9 P. M., but her pulse continued the same

"9th. Pulse as before; great and persistent uneasiness, but sometimes aggravated for a short time, with intermission of pulse. She complained of constant palpitation, but this could hardly, if at all, be felt by the hand. No nausea or vomiting; and she frequently took a little beef-tea, or brandy and water, loathing every other kind of food or medicine.

"10th. Nearly in the same state as yesterday. Her bowels were kept open by laxative pills or injections.

"11th. These fits of aggravation of distress were attended with turning up of the eyes, clenching of the hands, cessation of pulse, and insensibility, continuing ten or twelve seconds; they were almost incessant from midnight to 4 A. M. She described her feelings, at the time of their accession, as those of going into a faint, and said she suffered very great uneasiness on the return of sensibility. Her pulse was felt repeatedly as low as 10 in the course of last night; but early this forenoon the palpitation became excessive and constant; the beating of the heart and carotids so rapid as hardly to be counted (I think about 200), and strong, while the pulse was scarcely to be felt at the wrist.

"12th. 10, A. M. Palpitation has been constant, and of the same rapidity, attended with very great distress, and almost constant screaming, but no more convulsive fits; no pulse at the wrist; hands somewhat swelled, and at times of a darkish colour, also cold, as well as the feet, but all at present warm; voice strong; mind entire and firm, though quite aware of her danger. Forty drops of laudanum were given, and within an hour she became quiet, and remained so the whole day, though the palpitation continued undiminished. Thirty drops of laudanum were given at 10, P. M.

"13th. Lay quiet all night. About 8 A. M., being more uneasy, thirty drops of laudanum were given. 10 A. M. Palpitation continues nearly as rapid; hands cold; feet warm; breathing quick; speaks seldom, and with difficulty; takes

some drink frequently, and the glass in her own hand. Between 7 and 8 P.M., when a drink was offered her, she said, 'Stop a little,' had a smart convulsion, and expired."

The body was inspected by Dr. Gordon. "The cavities of the chest and abdomen were examined. The lungs were healthy, both in their substance and on their surface; there was a slight effusion of a yellowish serum into each cavity of the pleura. The heart appeared a little larger than is usual in proportion to the stature of the individual; a large portion of the middle of its anterior surface was covered with a loose flocculent matter, which adhered at one or two points to the pericardium. A large portion of the muscular coat of the right ventricle was converted into a firm, whitish matter, like that which is found in scrofulous mesenteric glands. This conversion was confined to the anterior side of the ventricle, and to about an inch square of the septum, close to the orifice of the pulmonary artery. In the anterior side of the ventricle it did not extend quite to the apex, but occupied chiefly the parts next the tricuspid valve, and there the sides of the heart were thickened, in consequence, fully a quarter of an inch. The tricuspid valve, however, as well as all the fleshy columns connected with it, were in a healthy state. In the septum of the ventricles, the conversion did not penetrate to the left ventricle; but seemed to occupy only the half next the right. In consequence of the disease towards the orifice of the pulmonary artery, this opening was considerably diminished. The right auricle was a little larger than usual, and its fleshy columns were considerably thicker. The left ventricle presented a perfectly natural appearance, except in one circumstance: close to the orifice of the aorta a little sac sprung from the surface of the ventricle, and projected into its arterial orifice, lying on the inferior semilunar valve; the sac looked as if composed of fibrine, and, when perforated, a greyish, cream-looking matter issued out of it; its connexion to the surface of the ventricle was very firm. The left auricle was quite healthy, as well as

the mitral valves. The semilunar valves, both of the pulmonary artery and aorta, were in a natural state. There was about a tablespoonful of yellowish serum in the pericardium. The sides of the uterus were a little thicker than usual, but everything else in the abdomen was healthy"^a.

The symptoms in the following case, which I have taken from the Medico-Chirurgical Transactions, resemble very strongly those of a softened and degenerated heart. It is but right, however, to admit that the state of the medulla oblongata may have had some effect on the heart's action; still there can be no doubt that there was a lesion of the heart itself.

"A gentleman, aged 64, in December, 1834, whilst hunting, fell from his horse on his head, with his chin thrown violently on his sternum; he was stunned, and on recovering himself he said that he had broken his neck. He was attended by Mr. Dix, of Long Buckley, in Northamptonshire. He complained of general soreness and stiffness, and of great pain in the neck about the cuneiform process and condyles of the os occipitis; he was helpless, and could not move in bed, and was totally unable to rotate the head. He was cupped, &c., and the head supported by an air-collar. The pain in the head continued about six weeks. At the end of three months he was enabled to be removed to London, and was seen, as the writer believed, by Mr. Keate.

"Mr. Dix saw this gentleman, about a year afterwards, looking very well, and in excellent spirits, but still complaining of a difficulty in moving the head.

"There was no further particular observed in this case until January, 1837, when he had a fainting fit whilst walking out. Mr. Jackson, of Stamford, was sent for, and he found the pulse at 20 in the minute.

"In the same year, after having been at the spring races at Newmarket, and excited, and having fasted for several hours, this gentleman had a second fit.

^a Edinburgh Medical Journal, vol. xii. p. 192. 1816.

“ In the following June, after a similar excitement, he had another attack. On this occasion he was attended by Dr. Mitchell, and his pulse was then 25 in the minute.

“ At the time the writer first saw this gentleman, in March, 1837, his pulse, when he was free from excitement or casual disorder, was 33, but it was easily altered. Mental excitement usually increased it, and in general this was followed by a corresponding slowness of the pulse, and often by a fainting fit; and a sudden rise of the pulse, or even a gradual increase above the point, which might in his state be called the healthful standard, usually indicated mischief, and was found to be a bad symptom. Costiveness, and disorder of the stomach and bowels, always affected the pulse, by increasing or diminishing it, and were most invariably exciting causes of a fainting fit. Gout^a, to which he was very subject, was another cause of this disturbance of the circulation. The general character of the pulse, when he felt well and was free from disorder, was firm, full, and free; sometimes quite regular, sometimes intermittent.

“ The attacks increased in frequency as well as in degree as time advanced, and the first most severe and alarming succession of fits occurred in June, 1838. On the previous day this gentleman had eaten heartily of a variety of substances at his dinner, and on the following day, about one o'clock, P. M., syncope came on, and a succession of fits continued till half-past six or seven in the evening, with intervals of one or two to fifteen minutes between the attacks. I gave him brandy and other stimuli, without stopping or even abating the fits; on the contrary, they seemed to increase the mischief, for they made him sick, and disordered his stomach. His pulse on this occasion sunk considerably, it chiefly ranged between 20 and 15 per minute, but at times it fell to 12, 10, 9, 8; and at three or four different times, when the patient was quite sensible, and not in

^a Fatty degeneration of the heart plays a prominent part in the natural history of gout.

a fit, the writer counted his pulse as low as $7\frac{1}{2}$ in the minute. Dr. Mitchell on a subsequent occasion also observed this very low state of the pulse, as did Mr. Cullen, who was then acting as Mr. Holberton's assistant.

"If the finger were placed on the radial artery, the approach of a fainting fit might always be known, sometimes for a second or two before it manifested itself by any change of the countenance. The pulse would cease before the syncope took place, and the fit would continue till the heart again beat, when the face would redden and consciousness return with a wild stare, and occasionally a snorting, a slight foaming at the mouth, and a convulsive action of the muscles of the mouth and face.

"The frequency of the attacks was uncertain, sometimes one in a week, sometimes one in a fortnight, or three or four weeks. Sometimes the fit would be severe and all consciousness be lost, at other times there would be a mere threatening or giddiness. Stimulants, nervous and antispasmodic medicines, were had recourse to, for the purpose of warding off the attacks, but without any marked advantage, and the treatment that was found at length to be the best, consisted in carefully regulating the bowels, preventing the formation of acid in the stomach, giving plain nutritious diet, with three or four glasses of wine a day, or a proportionate quantity of brandy and water."

"As before stated, the frequent exhibition of stimulants not having the desired effect of stopping the attacks, but rather being productive of injury, by exciting the system and disordering the stomach, the treatment that Dr. Mitchell and Mr. Holberton found to be the best, during a fit, was simply to fan the face, apply *eau de Cologne*, &c. to the nostrils, forehead, and temples, and, if there were a disposition to a continuance, to give coffee or tea.

"The most severe single attack this gentleman had, except the one which destroyed him, occurred at his dinner, about six months before his death. He had hastily eaten a mutton chop, and was taking a second, when he was suddenly seized, and

was, to all appearance, for a few seconds dead. His last attack, in April, 1840, occurred also at his dinner, and was attended with no convulsive movement or other symptom, either in character or degree, that had not been noticed in the previous fits; it differed only in its termination.

“The body was examined by Mr. Liston and Mr. Ancram thirty-six hours after death.

“MR. LISTON'S REPORT. *Chest.*—Lungs healthy; heart large; the parietes of left ventricle rather thin. The lining membrane was much thickened generally. The left auriculo-ventricular opening was rather enlarged, and admitted three fingers very easily. The valves of the aorta were healthy. The lining membrane of the right ventricle was slightly thickened in several places. The right auriculo-ventricular opening was extremely large, and admitted the points of four fingers and thumb. The valves of the pulmonary artery were quite healthy.

“*Head.*—The dura-mater was very firmly united throughout its whole extent to the cranium, which was dense, and unusually thin. There was a large quantity of serum contained in the cavity of the arachnoid. The substance of the brain was slightly congested; it was in other respects perfectly healthy. The medulla oblongata was small in size, and extremely firm in consistence. The foramen magnum was altered in shape; the antero-posterior diameter much diminished. The superior part of the odontoid process of the axis appeared to have been pushed back, and somewhat raised above its usual situation. The antero-posterior diameter was so much narrowed that it would not admit of the little finger. The dura-mater and ligament covering the posterior part of the body of the axis were very much thickened. The atlas was in its usual situation, but the articular cavities were firmly ossified to the condyles of the occipital bone, and permitted no motion whatever between the atlas and skull. There was a slight unnatural projection on the lamina on the right side, between the spinous process and articular process of the axis.

"No ossification or calcareous deposit was found in any part of the vascular system. The blood was in a fluid state. The pneumogastric nerves were large, and the middle cervical ganglion of the right side was unusually developed"^a.

Although the account of the heart is not so minute as would be required at the present time, yet it is sufficiently so to warrant the idea that it was a large, dilated, weakened, and, most probably, a degenerated organ. I have selected these cases, as the pulse was lower in them than in any others I can find recorded. The symptoms so accurately correspond with those described by Mr. Robert Adams, Drs. Stokes, Ormerod, Quain, and others, as belonging to a degenerated state of the heart, that I was induced to place them here.

Mr. Adams' cases have been so recently alluded to in Dr. Stokes' valuable paper in this Journal^b, and by Dr. Quain in his admirable memoir already referred to, that it would be a useless repetition introducing them here. These papers are well worthy the perusal of all interested in this subject. Rouchoux likewise mentions that slowness of the pulse indicates a general weakness of the parietes of the heart; and he gives some cases of slowness of the pulse. In one it was reduced to 25; in another, a man of eighty-eight years of age, a patient of Richerand, to 29 in a minute; in a third, a woman of eighty, it was 36; and in a fourth, a man of eighty-five years of age, who entered the infirmary afflicted with giddiness and fainting, the pulse only beat 20 strokes in a minute. After having remained during three or four days at the same "*rareté*," it descended one morning to sixteen or eighteen pulsations, and death occurred at this period. The same writer also states that Napoleon's pulse was only 40 in the minute, and was, besides, feeble^c. As it is now well known that he was exceedingly fat, this substance being upwards of an inch thick upon his

^a T. H. Holberton, *Medico-Chirurgical Transactions*, vol. xxiv. p. 76.

^b *New Series*, vol. ii. p. 73.

^c *Dictionnaire de Médecine*, Art. "Pouls." Deuxième Edition. Paris, 1842.

sternum, and one inch and a half upon his abdomen, when he died^a,—is it not probable, therefore, that his heart was also incumbered with this hydrocarbon, particularly when we associate his obesity with the slowness of his pulse?

The two following cases came under my own immediate observation, and present some interesting features. One assists in showing the connexion sometimes subsisting between cardiac and cerebral affections; and they both illustrate the relation of slow pulse to a softened and degenerated state of the heart. They also serve to throw some light on the preceding cases.

Mr. W——, aged 78, a gentleman of sedentary habits, in the year 1850, when standing before the fire, suddenly became faint, and fell, but recovered immediately; he had no unpleasant after-symptom, and was able to resume his professional occupation next day. In some days afterwards, however, he remarked that whenever he made any exertion, his breathing became oppressed, particularly by walking or ascending stairs.

August 5, 1850. Pulse only 38 in the minute, and jerking; visible pulsation of the brachial, radial, carotid, and temporal arteries, which are thrown out in bold relief; dulness in the cardiac region, more extensive than natural; heart's impulse pretty strong,—a muffled *bruit* accompanies its first sound, which is audible at the apex, and becomes very distinct over the aorta. After each beat of the heart, as in Dr. Law's case^b, "there is a species of commotion of the organ, as if another pulsation was attempted." His face is pale; tongue foul; appetite

^a "Qui, au milieu des fatigues continuelles de la guerre, de la contention d'esprit qu'exigeaient sans cesse les soins politiques et administratifs d'un immense empire, qui, enfin, avec l'aiguillon toujours pressant d'une ambition effrénée, et au milieu d'événemens qui renversèrent la plus haute fortune à laquelle un homme ait pu parvenir, acquit et conserva, malgré la plus grande frugalité et cette prodigieuse activité morale et physique, un embonpoint assez considérable."—*Dictionnaire de Médecine*, Art. "Polysarcie."

^b See Dr. Stokes' Paper, vol. ii. of this Journal, N. S.

bad; stomach flatulent; ankles œdematous; urine scanty, high coloured, acid, and free from albumen.

In consultation with Mr. Adams, it was agreed that our treatment should consist in diuretics, a nourishing diet, with a liberal quantity of wine and Seltzer water; and we ordered him to abstain as much as possible from muscular exertion, and to limit himself to driving.

On the 27th of August, 1850, his pulse had fallen to 32; he became considerably oppressed in his breathing; his appetite was very bad, and he was very weak. His treatment consisted in the administration of tinctures of bark and calumba with Brandish's solution; and he was ordered to have the following draught always at hand, in case the oppression of breathing should return:—Sedative liquor of opium, six drops; Hoffman's anodyne liquor, and aromatic spirit of ammonia, of each, half-a-drachm; and camphor mixture, an ounce.

September 9th. The urine became more copious; his pulse was 32 in the horizontal, and 36 in the sitting posture; the *bruit* was the same. He was ordered to take blue pill and squill in addition to his other medicines.

10th. His pulse fell to 28, and he had some irritability of bladder.

24th. He became greatly oppressed in his breathing, and his pulse fell to 24. A couple of glasses of wine relieved the breathing, and raised the pulse to 31.

October 11th. He was seized with an unpleasant sensation in his head, and a tendency to syncope, which was warded off by wine.

25th. Pulse 38. When at dinner on this day, he was seized with involuntary action of the muscles of his left fore-arm (in which part there is also slight numbness), so that he could not guide his fork to his mouth. The penis and scrotum are now œdematous; he complains of great oppression on the slightest exertion.

May 1, 1851. Became affected with pains in the extremities of some of his toes, in addition to his other symptoms.

11th. It was agreed in consultation with Dr. Stokes and Mr. Adams to try two ounces of the following mixture, three times daily :—Infusion of quassia, a pint; and tincture of the acetate of iron, an ounce : mix.

27th. Mr. W—— became very unmanageable and uncontrollable to-day, and is affected with the most ridiculous delusions. He remained in this state until July 8th, when he became composed, and his maniacal symptoms ceased.

September 11th. Has had no return of the mental disturbance; he gets up every day, and eats with a good appetite; pulse 32 to 40; no alteration in the cardiac murmur; the anasarca is but very trifling. He went on very well, his pulse ranging from 36 to 40, until May 15, 1852, when he again manifested symptoms of declining intellect, not knowing his wife nor some of his most intimate friends. Between this date and the 29th, he took but little food, and his pulse averaged 31.

June 2nd. He still labours under delusions, and he was disposed to be violent.

6th. He did not know Mr. Adams to-day, and would not let him feel his pulse. The delusions continue; he takes but little nourishment, and is chiefly supported by wine; pulse 30 to 36; complained of pain in the region of the heart.

17th. Intellect much impaired; is very weak; pulse 30; supported by wine.

25th. He is very low; pulse ranges from 36 to 40, but it is weaker than at any time since his illness began; his hands are of a dark, mottled, livid colour, and cold; tongue dry and brown. His intellect brightened up a little, so that he recognised his wife, and took leave of an old friend; passes urine involuntarily.

28th. Pulse 38.

29th. Pulse 41, very weak; he seems very low to-day.

30th. Greatly prostrated; pulse has risen to 52, but is excessively weak. He lingered till 9 o'clock, A.M., 1st July.

My friend Dr. Mayne made the post-mortem examina-

tion thirty hours after death. On opening the thorax, the lungs were seen to be remarkably healthy. The heart was very large and flabby, and all its cavities were dilated, and full of blood. The walls of the left ventricle were about half-an-inch thick, and so softened that they were very friable, and easily torn. In the anterior wall of the right ventricle there was a deficiency of muscular fibres, and their place was occupied by fat in different parts, so as to give the interior of this wall a yellow, mottled appearance^a; and a

^a Dr. Quain reduces the forms under which fat presents itself as a disease of the heart to two. "In one of these forms the fat, composed of large cells containing oil, identical with the fat found in other parts of the body, grows upon and extends over the surface of the heart; it then encroaches on and insinuates itself between the muscular fibres, in some cases to such an extent as to completely conceal them when the examination is made with the unassisted eye. In the other form of disease a fatty matter, composed of granules and small oil globules, occupies and fills the sheath of what was previously muscular fibre. In the one form of disease fatty tissue grows on and outside the fibre, in the other the muscular fibre itself degenerates into molecular fatty matter." The first Dr. Quain calls fatty growth, the second fatty degeneration.—*Op. cit.* p. 123.

"The fat may so completely envelope the heart that none of the muscular tissue can be seen on its external surface; fat rarely occurs on the surface of the organ without insinuating itself between and encroaching on the heart's fibres. The muscular fibres become thinner and thinner, until the *carneæ columnæ* appear to arise from a mass of fat. This is nothing more in many cases than an hypertrophy of fat."—*Op. cit.* p. 124.

"In all cases the course and direction of the fibres are more or less modified and distended; the fibres, though they are overwhelmed with fat, may still retain their organization. In these cases there is neither a degeneration nor metamorphosis of muscle, but a growth or hypertrophy of fat upon it, though in many cases some of the fibres will be found degenerated. The fibres still existing, though concealed, explain the persistence of the heart's action in those cases in which the muscular walls appear to a greater or less extent replaced by fat."—*Op. cit.* p. 125.

"When a portion of the heart in a state of fatty degeneration is examined, the first thing which meets the eye is a want of the transverse striæ which mark the fibres of all the voluntary, and less distinctly those of the heart amongst the involuntary, muscles. When a portion of the object in which the disease has but commenced is examined, it will be observed that, in addition to the faintness with which the cross markings are seen, a number of dark small dots stud the fibres in many points, evidently situated within the fibre. A few such dottings do not appear inconsistent

couple of the *carneæ columnæ* in this situation seemed to be converted into this substance. The microscope detected fatty growth in great abundance here. Some of the fibres of the parietes of the left ventricle have a very granular appearance, with absence of the transverse striæ. Scarcely a trace of muscular fibre in some parts of the walls of the right auricle, large oil globules occupying their place. The parietes of the left auricle much occupied by fatty growth, and some of the fibres in a true state of fatty degeneration. Atheromatous deposits in the coronary arteries, but they are not ossified; the same substance exists in the parietes of the arch of the aorta in a slight degree. The aortic valves healthy, with the exception of a small warty excrescence attached near the free edge and under surface of one of them; these valves do not permit regurgitation of water into the ventricle. Atheromatous deposits to a slight extent in the mitral valve. The lining membrane of the left auricle very much thickened and opaque. A light-coloured coagulum, probably of some days' standing, was entangled by means of slender processes amongst the mus-

with a tolerably healthy state of fibre, and they are frequently found in hearts which have well performed their functions. As the observer, however, approaches the seat of more decided disease he finds that the cross markings have in many points disappeared, and that the black dots have increased in size and number; some of the dots are now found to be transparent in the centre, and to assume some order in their arrangement; sometimes the centre of a fibre is occupied by a long row of opaque points, forming a continuous line in the centre of the filament, sometimes two or three lines lie side by side, the dark lines being broken by transparent apertures or circles; less frequently the lines lie transversely to the fibre. Thus may be traced, as Mr. Paget has described, the change from the particle of molecular fat, the black dot in the fibre, to the large oil globule with its transparent centre. This fat, be it remembered, is not in the ordinary fat cells, such as are found on the surface of the heart or amongst the fibres; the fat globules placed within the fibre are much smaller, appear to have a mere albuminous envelope, and are extremely like the oil globules of milk." —*Op. cit.* pp. 125, 126.

See also Rokitsansky, *Pathological Anatomy*, vol. iii. p. 312; and vol. iv. p. 203, Sydenham Society's edition; and Dr. Ormerod's *Observations on the Clinical History and Pathology of Fatty Degeneration of the Heart*. London, 1849.

culi pectinati of the right auricle. Permission to examine the head was not obtained.

I am indebted to the kindness of Dr. Mayne for the permission to take notes of the following case.

James Duff, aged 73, a very short-necked, stout-made man, states that about twelve months since, whilst wheeling a hand-cart, he became faint, and fell down, but recovered in a few minutes. Three months afterwards, whilst at the same occupation, he had a second fit, and recovered as quickly as on the first occasion. In about another space of three months, while sitting before the fire, he felt dizzy, and would have fallen into it, but for the assistance of a person sitting near him; he recovered immediately. None of these attacks were followed by paralysis. During the last eight months he has been much annoyed by frequent calls to pass water. He never suffered from palpitation, or any uneasiness about the heart. Early this month (September, 1851) his feet and ankles began to swell.

September 15, 1851. Present symptoms:—Visible pulsation of the temporal, carotid, brachial, and radial arteries; pulse 44, when he is in the horizontal, and 48 when in the sitting, posture, but it has been so low as 32. Thorax is very prominent anteriorly; slight dulness in the cardiac region; the rest of the chest has the morbid resonance indicative of emphysematous lungs. Heart's sounds distinct, but there is a soft murmur with the first sound, audible at the apex and over the aortic valves; impulse of heart not stronger than usual. Both jugular veins are very much distended, particularly when he is in the horizontal position. Urine coagulates with heat and nitric acid; specific gravity, 1014. Prostate gland very much enlarged, which causes great flattening of the stools. The arcus senilis is very well marked in both eyes, being semilunar, and situated in the upper part of each cornea. Dyspnœa is brought on by walking or by going up stairs, and he is frequently obliged to stop to recover himself. Bowels generally consti-

pated; tongue furred. None of his family ever, to his knowledge, had heart disease, but one of his sisters died of phthisis. He was ordered diuretics; wine and gin punch, with good diet, and an occasional purgative.

October 1st. The anasarca has increased very much during the last few days. Pulse 38 when lying down, and 40 when he is sitting up; it is irregular to-day. Urine scanty, of a dark colour; coagulates with heat and nitric acid. He was ordered to take two ounces of the following mixture, three times in the day:—Infusion of calumba, a pint; tartarized iron, two drachms; mix: and to continue his wine and gin.

3rd. Urine much increased in quantity; anasarca lessened; cardiac symptoms the same.

22nd. Three days ago the anasarca began to increase; effusion was manifest in both pleuræ. He became greatly oppressed and drowsy; yesterday he lapsed into coma, which continued until his death at nine o'clock last night.

The autopsy was made sixteen hours after death. There was a thick layer of fat under the integuments, particularly of the abdomen. The arteries at the base of the brain were brittle, and studded with bony deposits. The arachnoid membrane was slightly opaque in some places; three ounces of sub-arachnoid effusion; pia mater very slightly congested; brain not so firm as usual, and about an ounce of serum in the lateral ventricles. Serous effusion in both pleuræ. The anterior surface of the pericardium was covered by a thick deposit of fat. On opening this sac it was found to contain a small quantity of serum. Heart hypertrophied, and its whole surface covered by a layer of fat, which only allowed the auricular appendices to be seen; this fat was thickest at the grooves for the coronary arteries; it extended for about an inch up the pulmonary artery. Coronary arteries ossified, the right the most so. The walls of the left ventricle, when cut into, were found to be at least three-quarters of an inch thick, and the muscular substance was paler than natural. Both this ventricle and its

auricle were occupied by recently coagulated blood. The right side of the heart was large, and its cavities were dilated, the muscular fibres pale, and the ventricular walls very thin. The mitral valve was very much ossified, and evidently allowed regurgitation into the auricle. The aortic semilunar valves were studded with sharp bony spiculæ near their insertions, but they did not allow water to pass into the ventricle. There were ossific deposits in the aorta at the origins of the innominate, carotid, and subclavian arteries; these vessels were also extensively ossified, and the thoracic aorta was in some situations almost converted into a bony tube. The liver had the nutmeg appearance, and the kidneys were in an advanced stage of fatty degeneration.

Dr. Frazer kindly assisted me in examining the heart microscopically. We found fibres of the organ in a state of fatty degeneration in the following parts:—the septum of the ventricles corresponding to the fissure for the left coronary artery; portions of the right auricle and of the right ventricle near the apex. We also found fatty growth between the fibres in different situations.

Mr. W.'s case is of considerable interest; for in addition to the slow pulse and cardiac degeneration, he was affected with temporary mental alienation, which it is more than probable depended upon the state of the heart, and that they stood, with regard to each other, in the relation of cause and effect. Whether undecarbonized blood circulating through the brain disturbed its functions*, or whether the head symptoms were produced by disturbance of the balance of the circulation, it is difficult to say. The following observations of Dr. Burrows are of interest here. He tells us: "That Dr. Clendining has

* "L'Altération des fonctions du cerveau a lieu par trois causes: 1°. Son engorgement sanguin; 2°. L'infiltration séreuse et l'épanchement aqueux; 3°. L'Altération du sang artériel devenu noir, et ne pouvant plus par conséquent produire la même excitation."—*Corvisart, Maladies du Cœur*, p. 391. Paris, 1811.

known many cases of inflammatory disease, and several of mania and delirium tremens, which, although of no extraordinary severity in themselves, proved fatal, notwithstanding all the usual remedial means; and such event was wholly owing, as Dr. Clendining thought, to affections of the heart." Dr. Burrows also mentions:—"That these observations perfectly coincide with his own experience; and so assured did he feel as to the influence of diseases of the heart upon the functions of the brain, that he has little doubt but that if auscultation were generally employed among the insane patients in the large lunatic asylums, that numbers would be found suffering from cardiac lesions, which, by disturbing the cerebral circulation, tend to keep up the disordered functions of the brain. He also believes it will be found that diseases of the heart play their part as an eccentric cause of irritation, exciting or increasing disorders of the intellect to an extent which is not at present suspected"^a.

After I had written so far, I obtained, through the kindness of Drs. Mollan and Tuohill, Physicians to the Richmond Lunatic Asylum in this city, permission to examine a considerable number of the patients in that Institution, but I did not find cardiac disease so frequent among the inmates as I had expected. At the period I made the examination there were about 400 patients in the establishment, and the following is the result of the inquiry:—I examined altogether 269 patients, the remainder being so refractory that a satisfactory examination could not be made. Of the 269 patients so examined, 144 were males, and amongst these I found 5 patients in whom there existed confirmed cardiac disease. The number of females examined was 125, and out of these there were only 3 who exhibited unequivocal evidence of disease of the heart.

I have impartially stated the results of this inquiry, as the facts may be useful to others; but I cannot take upon myself

^a *Op. cit.* pp. 179, 180.

to say, whether the proportion of lunatics thus affected with cardiac disease is large or small, as I have not at present before me any data that enable me to judge of the relative frequency of heart disease in the community at large. I am, however, inclined to the opinion that, although in some cases heart disease and insanity evidently bear the relation to each other of cause and effect, yet that such is not of so frequent occurrence as some authors would lead us to suppose.

Mr. Canton first promulgated the opinion that the *arcus senilis* is a fatty degeneration of the cornea; he also has observed the degenerated state of the heart in cases in which it was well marked^a. As I mentioned in the recital of Duff's case, this alteration of the cornea was very apparent, being semilunar, and situated in its upper part. It was not so, however, with Mr. W., for his corneæ were remarkably clear; indeed it was observed by Mr. Adams that he rarely observed this part of the eye so clear in a person so advanced in years as Mr. W. It must be evident, therefore, that there is no necessary connexion between this state of the cornea and fatty degeneration of the heart. Dr. Quain, in speaking of this subject, reminds us, "that fatty degeneration of the heart may occur under circumstances and at an age when we would not expect to find this lesion of the cornea; so likewise, but in a much less degree, we may expect to find the change in the cornea independently of the change in the heart"^b.

Dr. Todd alludes to some cases in which the general law,—that in the erect, or standing posture, the pulse is most frequent; that in the sitting posture it is less frequent; and that it numbers still less when the person is horizontal or recumbent,—was reversed, the pulse in them being more frequent in the horizontal than in the upright position. He has frequently observed this peculiarity in connexion with feebleness of the heart"^c.

^a Lancet, vol. i. p. 461, 1850.

^b *Op. cit.* pp. 161, 162.

^c London Medical Gazette, N. S., No. 306, vol. xlvii. 1851.

On referring to the preceding cases it will be seen that this reversal of the law did not take place, for Mr. W.'s pulse was always increased in frequency on assuming the erect position, thus following the usual law; and in Duff the same also was observed until a few days before death, when I remarked that the pulse was uninfluenced by change of posture. There was another very interesting point about Mr. W.'s pulse, namely, its remarkable rise in frequency before death, an increase, however, that was accompanied by a great diminution in its strength.

Dr. Ormerod suggests that the slowness of the pulse which is so often noticed in fatty degeneration of the heart is characteristic of the second form of degeneration described by him in which the fat is deposited at the expense of the muscular tissue, in fact substituted for it and not merely laid upon it. I can draw no conclusion on this point from my two cases, for in both fatty growth and fatty degeneration existed together.

A diuretic plan of treatment was pursued in these cases, and at the same time we endeavoured to improve the quality of the blood by chalybeates, and by supporting the nervous system. This treatment was very useful with Mr. W., for his cardiac oppression was always relieved when the diuretics were acting well; but an increase of the anasarca was always accompanied by an aggravation of the dyspnœa. It was much less successful with Duff, and this is not to be wondered at when we recollect that he had fatty degeneration of the kidneys in addition to that of the heart.

The bad effects of muscular exertion on both patients was remarkable. I was one day driving with Mr. W., when he required to get off the car, and the exertion of walking a few yards brought on such great oppression that I feared for the result. On another occasion, contrary to advice, but being tempted by feeling well, he walked to the end of the street (a short one) in which he resided, when he became so faint and weak it was with difficulty he made his way home. He now became fully alive to the danger of walking, and restricted

himself ever afterwards to driving. Two of Duff's attacks of syncope were brought on whilst he was wheeling his hand-cart, and on different occasions when merely walking he had to stop to recover breath.

The great probabilities are, that patients with this disease will not be able to use muscular exertion; but if they can it should, as recommended by Dr. Quain, be always short of producing fatigue.

It is very difficult, however, to say when the disease commenced in any given case, and the first warning the patient may get of it is an attack of syncope, and it is probable, when this occurs, that the disease is somewhat advanced, and now muscular exertion may increase the tendency to these attacks. Exercise has been most warmly recommended in *fatty growth* of the heart; but we should recollect that this and true *fatty degeneration* may exist in the same organ^a. "Fatty growth may occur alone, so may fatty degeneration, but as both are the result of a degraded and bad nutrition both may be often found in combination"^b. Moreover, we are in this difficulty, we have not yet arrived at the knowledge of the diagnostic symptoms between the two forms during life; and, as Dr. Quain tells us, "there is no evidence to show that we can restore muscular fibres which have been destroyed," we must see the uselessness and danger of overtaxing the weakened organ.

The following numerical abstract, which I have compiled from the cases collected by Dr. Quain, in his admirable memoir so often alluded to in this paper, will show the liability to sudden death, and the consequent danger of muscular exertion in this disease. The number of cases given by Dr. Quain are eighty-four, and are divided into three series:—in his first series there are thirty-three cases, and of these twenty-two died suddenly, *twelve* of them being by syncope, and *six* from rup-

^a Chambers on Corpulence, p. 121, 1850.

^b Quain, *Op. cit.* p. 151.

ture of the heart. In the second series there are thirty-six cases, of which twenty-six died suddenly, *four* being by syncope, and *sixteen* from rupture of the heart. And in the third series there are fifteen cases, of which twelve died suddenly, *one* being by syncope, and *three* from rupture of the heart.

These cases speak for themselves, and should make us pause before we recommend muscular exertion in this disease. Should syncope be produced the imperfect and enfeebled organ may not be capable of resuming its functions. "If," to use the words of Mr. Adams, "the three important organs, the heart, the brain, and the lungs, the 'tripod of life,' as they have been aptly denominated, be not all equally strong at a time when animation has been accidentally suspended, the weak one cannot be roused to resume its functions. Thus under such circumstances what might have been supposed a simple faint has terminated in death"^a.

That apoplectic coma may occur in the course of this disease, there can be no doubt; and it seems to me to result, as Mr. Adams explains, from the "state of the ventricle incapacitating it from emptying itself with sufficient quickness to relieve the brain," and thus "indirectly producing a state of congestion of its vascular system"^b.

This congestion, however, is not of an active character; indeed, Dr. Stokes mentions, in his paper on Slow Pulse, that his experience coincides with that of Professor Law, in that "the pseudo-apoplectic attacks in cases of slow pulse and weakened left ventricle are more frequently attributable to a diminished or feeble circulation than to one of active congestion;" and in the same communication it will be seen that he ordered one of his patients, on leaving the Meath Hospital, "never to allow himself to be bled, when threatened with one of his fits." A great deal, therefore, depends upon the discrimination and forbearance of the practitioner who may chance to be called to

^a Dublin Hospital Reports, vol. iv. p. 359.

^b *Op. cit.* p. 400.

a person who has become suddenly insensible, and apparently comatose, for he may have very opposite states of the brain to treat. When I say forbearance, I allude to the strong prejudice in favour of the lancet which generally exists in the minds of the bystanders who may happen to be present.

Some short time since, I was called up early in the morning to see a gentleman who had been found insensible in a water-closet. I was with him in ten minutes after having been sent for, but although he was still quite warm, life was extinct, and he was pale and blanched. The people present all urged me to open a vein, but this I resolutely refused, and the consequence was, they formed a very low estimate of my professional skill. I was not sent for to make the post-mortem examination, but I subsequently learned from Dr. Corrigan that this gentleman died in a state of syncope, caused by the rupture of a small aneurism which was situated over one of the aortic semilunar valves, and which burst by a small pin-hole opening into the pericardium.

The words of Mr. Liston are here very apposite: "A practitioner," he remarks, "ought to think twice on the probable and possible effects in every case of disease or injury, before he determines upon and proceeds to open a vein for the purpose of drawing off the vital fluid"^a. We should never, therefore, lose sight of the fact, that in a great number of cases of fatty degeneration of the heart the attacks are purely syncopal, and depend upon the weakened state of the organ. If we consider the history of the generality of these seizures, they would appear to be evidently of this character. A person with this disease uses some ordinary or unusual exertion; the heart being weakened, fails in its action, and the brain being deprived of the necessary degree of pressure, the person becomes insensible, and falls to the ground. Now this fall, if the patient be not seriously injured thereby, brings with it the cure of the fit; the

^a Practical Surgery, p. 228, Fourth Edition.

body being thereby most advantageously placed for restoring to the brain its normal supply of blood, so that the individual, if he is to recover, regains his consciousness, and speedily rises up, without any impairment of intelligence or muscular power.

The following case so well illustrates these remarks that I cannot refrain from introducing it here.

Dr. Quain was suddenly called to a patient, "and found him, as he believed, dead. He had been in his usual state, and taking his dinner a few moments previously. Though neither pulse nor respiration could be perceived, nor in a hurried examination could the sounds of the heart be heard, I felt," observes Dr. Quain, "from something about his appearance, that he was not dead. An electro-magnetic apparatus was set to work from the spine to the region of the heart ; other stimuli were made use of, and after several minutes he slowly recovered. He lived for two years afterwards ! The heart was in a state of fatty degeneration." If, instead of having recourse to the stimulus of galvanism, an opposite mode of treatment had been pursued in this case, and blood had been abstracted, how very different would have been the result !

ART. XIV.—*Observations on Lithotrity, illustrated by Cases.*

By SAMUEL G. WILMOT, M. D., Surgeon to Steevens' Hospital, &c. &c.

THE number of cases of calculus in the bladder, in which, of late years, the operation of lithotrity has been successfully performed, and particularly the marked success which has crowned the practice of M. Civiale, of Paris, ought to be sufficient to remove those objections which were formerly with justice urged against the operation, and fully justify the observation of Sir Benjamin Brodie, "that with the exception of those which occur in children, there are few cases of calculus of the bladder in which it is not to be preferred to lithotomy." According to a report furnished by M. Civiale of cases of stone litho-