PROVINCIAL MEDICAL & SURGICAL JOURNAL.

MEMOIR ON THE DIGESTION AND THE ASSIMILATION OF AMYLACEOUS AND SACCHARINE MATTERS.

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(Continued from page 336.)

APPENDIX.

When I had made known my researches on animal diastase, M. Lassaigne, on the 5th of May, 1845, submitted to the Académie des Sciences a summary of some researches, tending to establish that "in the process of the digestion of crude amylaceous substances, the saliva, at the temperature of the animal body, does not act the part recently attributed to it by M. Mialhe; it contributes, as the greater number of ancient and modern physiologists have recognized, to moisten the alimentary matters, and to dissolve certain of their principles, naturally soluble, in the water which it contains." In reply to M. Lassaigne, on the 19th of May, 1845, I shewed, that, contrary to his assertions, my researches proved that human saliva exercises an action manifestly saccharifying upon crude fecula at the temperature of the animal body; that this action is incomparably more rapid and more complete on starch brought to the state of starch-paste, and even on crude starch simply disintegrated by pounding.

On the 2nd of June, 1845, M. Lassaigne concluded, from his new researches, "that human saliva, which has no action upon crude starch in grains, at the temperature of 38°, acts even at the temperature of from 18° to 20° on disintegrated starch; that it converts the starch in less than twelve hours, partly into *dextrine*, partly into *glucose*; but that in the act of mastication of the grains of the amylaceous cereales, the starch is not disintegrated by the teeth of animals, as some physiologists suppose; and that, consequently, this principle cannot be changed into dextrine in the series of organic actions which precede digestion in the stomach and intestinal canal."

The preceding assertions had in no ways shaken my convictions, and I was disposed to publish some new experiments, intended to establish as before, and contrary to the conclusions of M. Lassaigne, that the *disatacic* salivary fluid possesses the power of partially transforming starch, simply bruised by the teeth of herbivorous animals, and even by the teeth of man, into dextrine and into glucose, at the ordinary temperature of the living body, when a commission of hygiene was named by the *Minister of War*, to make a report upon the same subject. I then thought it right to suspend my publication; and now, that this

commission, through its president, M. Majendie, has sanctioned the facts advanced by me, there is no longer the same occasion for my reply. Since, however, the commission of hygiene has not yet published all the documents on which it has established as a principle, that *the saliva is not, as a great many authors have said, a liquid serving only to moisten the food, and acting as distilled water would in dissolving the soluble matters, but that it has a chemical effect in the first act of digestion*, I proceed to relate some new experiments which confirm my former researches. But in the first place I may be permitted to recal to mind, that in pointing out the difference of the chemical action of the parotidian saliva and of mixed saliva in the horse, the commission of hygiene have made a great step in the chemico-physiological history of the salivary fluid of this animal; for without doubt, it is ignorance of this difference of chemical action in the various salivary fluids which has led M. Lassaigne into this error, that "the saliva of the horse does not act upon starch in the same manner as human saliva,"—an error which I had myself committed for a few days, and from the same reason, that is to say, from having experimented on the parotidian saliva, whilst it is by the examination of the mixed saliva that I have been led to anticipate the conclusion of the commission on the real physiological function of the saliva, as the following passage extracted from my memoir to the Institute, bearing date the 31st of March, 1845, witnesses:—"I establish the principle that animals digest feculent aliments with so much the more facility, as their salivary glands are more developed, and their masticating or grinding apparatus is more perfect, and in proof of what I advance, I refer to the facts collected by Burdach, in his "*Traité de Physiologie Générale*."

Notwithstanding that the saliva secreted by the parotid gland of the horse is without action upon starch, and that the mixed saliva is endowed with a saccharifying power similar to that of human saliva, it must not be inferred that the mixed saliva of the horse acts upon starch by the combined power of all its elements, as before my researches was admitted, after Leuchs and Sebastian, for human saliva. In the horse, as in man, it is solely to the diastase that the energetic action of the salivary fluids can be referred. If Leuchs and Sebastian concluded from their researches that the saliva does not contain any principle *sui generis*, capable of acting in a special manner upon feculent aliments, it is because they experimented only on modified salivary diastase, which had lost all its specific power on fecula.

It is by the assistance of the artificial digestion

of starch, that I have been enabled to unravel one of the mysteries of assimilation. I took some glass tubes, having an internal diameter of two centimetres, by ten or twelve centimetres in length, and I closed one of their extremities with a portion of the small intestine of a sheep, conveniently fixed. I then introduced into one of these tubes some distilled water holding crude fecula suspended in it, and I attached this little apparatus, surrounded by a pierced cork, to a receiver, for the space of one hundred hours. I examined chemically the liquid which passed through the animal membrane and convinced myself that at no period of the experiment did this liquid contain a particle of starch or sugar. The same experiment performed with barley, coarsely pulverized, furnished results absolutely similar.

I repeated these experiments, replacing the distilled water, with an equal quantity of human saliva, and ascertained that after twelve hours' contact a certain proportion of starch had filtered through the organic visceral tissue, but modified, having lost its characteristic properties, tincture of iodine producing no change in it, and potass, with the assistance of heat, causing a marked brown colour, and containing in solution one or more matters, capable of immediately changing the bluish green hydrate of deutoxide of copper into red protoxide. This liquid then behaved with potash and oxide of copper exactly in the same manner as sugar of starch or glucose. At the end of one hundred hours the amylary transformation was very marked, and quite sufficient to explain the absorption of feculent aliments in animals which are habitually fed on them.

These results evidently shew, that without animal diastase, starch is not only incapable of assimilation, but also of absorption, since it is only the starch which has become dextrine and glucose that passes through the membranes, and the starch held in solution, and not decomposed, remains on the surface.

(To be continued.)

CASE OF DISLOCATION OF THE THIGH BACKWARDS INTO THE ISCHIATIC NOTCH.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND SURGICAL JOURNAL.

SIR,

If you think the following case of sufficient interest to merit a place in your Journal, I shall be glad if you will insert it.

I remain, Sir,

Your obedient servant,

WILLIAM EDWARD BODDINGTON.

Chesterfield, July 25, 1846.

J. W.—, a very muscular young man, aged 20, was engaged in removing some bags of wheat from a boat in the canal to a warehouse, eighteen feet above it, when just as one of the bags had arrived at a level with the warehouse the chain broke, and the bag fell upon the lower third of his right thigh, dislocating the thigh backwards into the ischiatic notch. At the time of the accident the man was bending forwards for the purpose of raising another bag.

I was sent for immediately, and with the assistance of my friends Messrs. Walker and Botham, proceeded to reduce the dislocation. We employed the pulleys in the usual manner, and kept up extension for upwards of three quarters of an hour, and repeated it at four different times; the patient was also bled to thirty ounces, and took seven grains of tartar emetic at intervals, without producing nausea or faintness. Having by these means failed in reducing the dislocation, we agreed to try direct extension. The patient was accordingly placed upon his back, with a wetted roller above his knee, to which the hook was attached, and direct extension made for nearly an hour; the pulleys were then let go suddenly, the knee rotated inwards, and the thigh raised from the pelvis, and to our great delight the head of the bone slipped into the acetabulum, but without any perceptible snap.

I gave my patient a dose of opium, and he never had a bad symptom from that time, and in less than three weeks was enabled to return home into Lincolnshire. The accident occurred at a quarter-before three o'clock, and the reduction was completed at nine o'clock.

COMPOUND FRACTURE OF THE SKULL : LOSS OF A PORTION OF THE BRAIN : RECOVERY.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND SURGICAL JOURNAL.

SIR,

I am induced to forward for insertion in your Journal, the following case of compound fracture of the skull, with loss of a portion of the brain, it being a remarkable case of recovery from so serious an accident.

I remain, Sir,

Your obedient servant,

FREDERICK P. SMITH.

Aylsham, Norfolk, July 18, 1846.

October 1st, 1845, I was sent for to visit Thomas Keeler, a high-spirited unmanageable boy, of four years old, who, I was informed, had been seriously injured by a waggon about an hour before. On my arrival at his father's house, a distance of three miles from my residence, I was told he had been playing under a waggon in the field, and on its being driven forwards, he had fallen with his head between the spokes of the hind wheel; he was carried round by the wheel, and his head was forced between one of the spokes and an iron bolt which projected from the side of the waggon, a space measuring not more than three inches and a half.

On examining the head, I found a most frightful lacerated wound of the scalp, extending from the right temple across the forehead, and terminating in the left eyebrow; the frontal bone was laid completely bare, and the right superciliary ridge from its external to its internal angle, including a portion of the orbital plate, was torn up. On removing this, which laid loose in the wound, I found attached to it a portion of brain, of the size of the end of the little finger, and weighing about thirty grains; four other smaller portions of bone were also removed. After cleansing the