

PART III.

REPORTS, RETROSPECTS, AND SCIENTIFIC INTELLIGENCE.

MEDICAL MISCELLANY.

Postscript to MR. MOORE'S Paper on the Coagulability of Human Milk.

SINCE the passage at page 286 of the present Number of this Journal was printed, in which I suggested that the great coagulability of the colostrum might be a provision intended to compensate for the weak coagulating power of the stomach of the newly-born infant, I have met with a paper published by Dr. John Davy, on the colostrum of the cow(*a*), in which he remarks, that "its easy coagulation may suit it to the stomach, in which, probably, the gastric juice at first is in small quantity and feeble." Dr. Davy did not find the colostrum of woman to coagulate when heated, but he states that the trials he made of it were few. As I have already mentioned, I found some specimens to solidify on the application of heat, like white of egg, while others became converted into curds and whey; but as this property often continues but for a very short time, in order to succeed with the experiment the colostrum should be taken as soon as possible after lactation commences. Had Dr. Davy experimented on a greater number of specimens, he would, I am sure, have obtained the same results as I have done, and have included human colostrum in the explanation I have just quoted from him.

Being anxious to ascertain the duration of this coagulable state of the colostrum, I applied to Dr. Edward L. Ormerod, whose residence in the Dublin Lying-in Hospital gave him peculiar opportunities of deciding the question. Dr. Ormerod was good enough, with the kind permission of the Master of the Hospital, Dr. Shekleton, to undertake a series of observations on the subject, with the results of which he has furnished me. In the first case examined, where lactation commenced thirty-eight hours after delivery, in eight and a half hours

(*a*) Medico-Chirurgical Transactions, vol. x., London, 1845, p. 90.

after the commencement of lactation the colostrum continued to solidify on the application of heat, and at the end of thirty-two hours a few coagula were formed when heat was applied. In the second case lactation commenced seventeen hours after delivery, and the milk continued capable of solidification by heat for nineteen and a half hours. In the third case lactation did not commence until ninety-two hours after delivery, and the milk tested twelve hours subsequently was not coagulable by heat. In the fourth, lactation began at the time of delivery, and in thirty-two hours after heat rendered the milk half solid. In the fifth a free secretion of milk took place twenty-three hours after the birth of the child; the milk was solidified by heat at the end of twelve, and still curdled at the end of fifteen hours. In the next case the flow of milk took place at delivery; at the end of twenty-eight hours it solidified; at the end of thirty-one hours it remained fluid when heated. The seventh patient examined had milk three days before delivery; thirty hours after delivery it curdled when heated; at the end of thirty-five hours it remained fluid. In the eighth case the milk, which commenced to flow in six hours after the birth of the child, was scarcely curdled twenty-eight hours subsequently. In the ninth the milk was scarcely coagulated eleven hours after the commencement of lactation, which took place twenty-two hours after the birth of the child. In the tenth case lactation commenced fifty-four hours after delivery, the milk examined half an hour afterwards solidified by heat; three hours after it scarcely curdled.

From the foregoing observations I think it is most probable that the first milk secreted after parturition by the human female is always capable of solidification by heat; in those cases in which this effect was not produced, the milk was not examined until a longer period had elapsed after the flow commenced than that during which this property continued in the tenth case. So far as the present observations go, the duration of the state of coagulability does not appear always to depend either on the amount of the secretion nor on the period at which lactation commences. Dr. Ormerod informs me that in determining the latter the patient's report cannot be generally relied on. Some will say lactation has not commenced, while on examination the breasts will be found full of milk; and others will state the contrary when scarcely a tea-spoonful can be obtained.

This extreme coagulability of the colostrum evidently depends on the presence of albumen. Scherer supposes that the peculiar distinguishing character of casein (that of not being coagulated by heat alone) may be developed by a gradual more intimate and chemical union of the albumen with alkali(*a*). Perhaps the principle which is to form the albumen of the blood in the infant's system exists in the first milk in a state requiring less assimilation than that in which it occurs in the subsequent secretion. Berzelius

(*a*) *Wagner's Handwörterbuch*, vol. ii. p. 472.

describes the casein of the colostrum of the cow, ass, and goat, as consisting of two substances, the one coagulable by heat, the peculiar casein of the colostrum—"colostrum casein"—the other (called by Chevallier and Henry "mucous matter") incoagulable by heat, ordinary casein(a).

With a view to determine the mode in which the coagulation of milk is effected by rennet, Berzelius performed the following experiment. He washed the mucous membrane of a calf's stomach very well in cold water, and dried it. He then placed a portion of the dried membrane in 1800 times its weight of skimmed milk, and gradually raised the temperature to 50° C. (122° F.), and kept it at this point until the coagulation was complete. This took place so perfectly, that only a mere trace of casein could be detected in the filtered whey. The membrane was then taken out, washed, dried, and weighed: it had lost but six per cent. of its weight(b). Berzelius remarks that even if the amount lost had entirely combined with the casein, the coagulation of the latter could not be explained by the addition of so insignificant a quantity, 30,000 times its own weight of milk having been coagulated by the portion dissolved.

In this experiment the coagulation must have been effected by the membrane acting as a ferment, and determining, with the assistance of the temperature employed, the conversion of a portion of sugar of milk into lactic acid, which, neutralizing the alkali of the milk, would cause the precipitation of the casein(c). On this subject Scherer remarks as follows: "That a portion of the sugar of milk is changed in the stomach of the child into lactic acid is very probable; that this change ensues, however, with all the sugar, we cannot admit, since the soda of the bile would in no case be sufficient for the neutralization of so large a quantity of acid: but a neutralization must take place, for an acid chyle cannot exist in the normal condition. The supposition of a complete change is inadmissible also, because it is well known that when once the coagulation of the casein has taken place, or, if we choose, when once a free acid is present, the conversion of sugar of milk into lactic acid will cease"(d).

The last-mentioned fact may be considered as a provision of nature to prevent the sugar being converted into a substance which would not only be less nutritious, but would even be absolutely injurious to the infant economy. The development of sufficient lactic acid to neutralize the free alkali of the milk probably takes place with great rapidity; and if free acetic acid exists in the gastric juice of the infant, as it does in that of the adult, the coagulation of the milk will be quickly accomplished.

Speaking of the effect of menstruation on the milk of nurses, Scherer remarks that it is sometimes injurious to the child, although frequently, as he has himself observed, no such injurious effect is

(a) *Thierchemie*, p. 709.

(b) *Thierchemie*, p. 680.

(c) *Carpenter's Physiology*, third edition, p. 668.

(d) *Op. cit.* p. 475.

produced, nor can any change be discovered in the properties of the milk. L'Heritier, he says, relates two cases in which children, previously quite healthy, were attacked with anasarca in consequence of using such milk, and he believed that this might be attributed to the greater serosity of the milk. Such milk, he continues, is also said frequently to render children pale and debilitated, and often to give rise to violent colic pains. D'Outrepoint, who quotes a similar case, found the milk during menstruation to resemble the colostrum(*a*).

Since the note to page 291 was printed, I have been informed by Mr. Sullivan, whose able Retrospect of the Progress of Chemistry appeared in the February Number of this Journal, that the casein of human milk has lately been subjected to analysis by Rochleder and another German chemist, and that the only difference discovered between it and the casein of cow's milk is some trifling variation in the quantities of the inorganic matters combined with it; the difference, in fact, appears to consist rather in the arrangement of the ultimate component particles than in any change of their relative proportions. This is, perhaps, what might be expected, for it is not likely that one variety of casein should differ more in its composition from another than it does from fibrine or albumen, and the ultimate composition of these three substances is, it is well known, nearly identical.

From insufficient observance of the context, I gave in the note to page 280 an incorrect version of the quotation made by Berzelius, of a statement of Simon's. It should have been rendered thus: "Its compounds with acids" (i. e. the compounds of human casein) "are in much greater number soluble in water" (than those of the casein of cow's milk). This is one of the conclusions I have drawn from my experiments.

It has been stated that skimmed human milk is incapable of spontaneous coagulation; a portion from which I carefully removed the cream in two successive layers, had, however, at the end of six days, formed a considerable coagulum.

Dr. G. O. Rees draws an interesting and instructive comparison between the composition of the milk and that of blood. Dr. Rees looks upon the casein of human milk as being incapable of forming insoluble combinations with the mineral acids(*b*).

In comparing ass's milk, in respect to the small quantity of cream it contains, with the filtered milk recommended by M. Donnè, it must be borne in mind that the former, probably in consequence of the large proportion of sugar of milk and extractive matters present in it, will often prove slightly laxative; and that, if administered to children while labouring under diarrhoea, it will increase the affection. Sir Henry Marsh informs me that this laxative property is

(*a*) *Wagner's Handwörterbuch*, vol. ii. p. 471.

(*b*) *Cyclopedia of Anatomy and Physiology*, vol. iii. *Art.* "Milk." London, 1847.

removed by heating the milk to about 212° . The mode in which he directs this to be done is, to keep the vessel containing the milk standing in boiling water until the desired temperature has been attained. Sir Henry likewise informs me that he has found ass's milk treated in this manner, with the previous addition of a small proportion of lime water, to form a most useful article of diet for children, even when affected with diarrhœa.

While these pages were passing through the press an opportunity was afforded me of examining a specimen of sheep's milk. In twenty hours after being drawn it was slightly acid, specific gravity 1.034; it was thick; had a rich, agreeable taste, similar to that of the cream of cow's milk; on standing it threw up a thick and abundant cream; in coagulability it resembled the milk of the cow and goat, forming a dense, firm coagulum when boiled with a very minute portion of nitric, hydrochloric, or acetic acid; a large excess of the latter redissolved the coagulum. Coagulation was also instantly produced by the addition of these acids when applied without heat.

I have already alluded to the kind assistance I have received from Dr. Sibthorpe. I am happy to have, in conclusion, an opportunity of thanking Dr. Ormerod for contributing his investigation of the coagulability of the colostrum. I regret that I was only able to give an abstract of the table he drew up for me, which contained in addition to what I have quoted, particulars as to the state of the patients, the amount of the secretion of milk, &c. To Mr. Sullivan, also, I am deeply indebted for free access to his valuable library of standard German chemical works.

A Case of complete Paralysis of the Motores Oculorum, caused by a Tumour within one of the Cruca Cerebri. By S. BROWNE, Surgeon to the Belfast Ophthalmic Institution.

ON the 26th April, 1848, James Townley, aged three years, was brought to the Belfast Ophthalmic Institution. He then presented the following objective symptoms: ptosis of the right superior palpebrum; considerable divergence of the right eye, with the pupil dilated permanently to a quarter of an inch in diameter. On the left side there was a very slight paralysis of the eye-lid. No divergence of the globe, and the pupil, though dilated to nearly the same extent as that of the right, was still active under the stimulus of light. The power of vision in both eyes seemed perfect at the distance of eighteen inches or two feet, and beyond, but the right eye could not distinguish minute objects, placed in its axis within ten inches. The child's appearance denoted the complete strumous diathesis, and also the effects of recent sickness; he seemed very delicate, and walked feebly, especially on the *left* leg. I learned from his mother, an intelligent woman, that he had been sickly from his birth; his dentition had been very protracted, not having cut a tooth until he was twelve months old, and that he had suffered very much during the period from convulsive attacks. When

about two years old he suffered very frequently from headaches and colicky pains. In the month of August, 1847, he had an attack of fever, which lasted three weeks; after that time he lost his appetite, and frequently exhibited unnatural drowsiness. However he rallied during the winter, and seemed better in general health than he had been before the attack of fever. Somewhere about the beginning of the year 1848, his parents first observed a peculiarity in his eyes, the right being especially remarkable. "It seemed to be half-hidden," as his mother expressed it, "and was apparently more prominent than the other, and showed more of the white of the eye." Early in the month of March he had another attack of synocha, all the family at that time labouring under the same disease. It was after his convalescence from that attack he was first brought to the Eye Dispensary, when he presented the symptoms I have already enumerated. Of course I at once diagnosed some disease of the brain at or near the origin of the third pair of nerves.

At that time he was ordered two and a half grain doses of calomel three times a day, with successive blisters to the nape of the neck, and occasionally on the temples. After he had taken two drachms of the calomel the system first became affected; it was then given in two-grain doses every night for about a month, when it was omitted, repeated blisters having been applied in the mean time. During the period of the treatment just stated, he evidently improved in appearance and strength; there was not then any paralysis of the left side, though, in lifting that leg; he seemed not to have complete control over it, as he moved it forward with a jerking kind of gait.

Though there was this evident amendment in his general health, the eyes did not improve in appearance, on the contrary the ptosis of the right side was nearly complete, the divergence of the eye so great (exhibited when the lid was elevated by the fingers) as to conceal a portion of the cornea behind the external canthus; the pupil was fixed and fully dilated, the iris presenting merely a narrow ring within the margin of the cornea. There was still, so far as could be ascertained, the same amount of vision in that eye as when he was first seen by me. The left eye had also become more affected, both in the paralysis of the upper lid, dilatation of its pupil, and divergence in its axis; there was also an evident diminution in the power of seeing objects. During the summer I occasionally saw the patient, observing little, if any, change in his appearance or symptoms.

For some months previous to the 16th of January, 1849, I had not seen the child, on that day his mother came to inform me that for the five or six weeks previously he had been gradually becoming worse. She stated that his appetite, which had all along been pretty good, had then failed; he began to totter very much in his gait, and to be quite drowsy and listless; his sight was, to use her expression, "very dim, as he stumbled over anything placed in his way." When I visited him next day I found him seated on

his mother's knee, and evidently insensible to external impressions, though a few days before he had spoken some words when addressed, but inarticulately. I observed that there was a constant motion of the tongue and lips, and chronic spasms of the left leg and arm; the right side was not affected in any way, save by an occasional twitching of the muscles of that side of the face; the breathing was hurried and laborious. The ptosis in both upper lids was complete; the pupils extremely dilated, and the right globe immoveably fixed and divergent; the left eye also diverging greatly, and occasionally agitated by a flickering movement of the muscles, at which time there was also an appreciable contractile action of the pupil. He lived for about ninety-six hours after I saw him, when he died in a slight convulsive struggle.

Autopsy.—Twenty-six hours after death I had an opportunity of making a minute examination of the brain and eyes, of which the following is a summary of my notes taken at the time. The head presented a well-developed cranium, the sutures being fully and firmly ossified; on removing the calvarium the dura mater presented a perfectly normal appearance, but upon opening it both surfaces of the arachnoid were dotted with small granular points as if of organized lymph, but very few adhesions were found to exist over the top of the hemispheres. The brain having been removed very carefully, it was observed that in the posterior and inferior portion of the anterior lobes there was the appearance of recent effusion of blood; that from the fissure of Sylvius around the chiasma of the optic nerves and forward on the base of and between the anterior lobes there was marked evidence of recent inflammatory action, with congestion, thickening and change of structure in the arachnoid and pia mater; the optic nerve seemed quite healthy in structure, as well as the optic tracts; the third pair of nerves were found much diminished in size, and changed into a soft pulpy structure of greyish matter, interspersed with fine streaks of a reddish hue; the right crus cerebri, at its escape from the pons Varolii, was observed to be more prominent than the left, and felt to the touch as if composed of a hardened mass; on removing a thin layer of the medullary matter, a very firm tumour of the size of a walnut was presented, this was found to have completely destroyed the right crus, save a thin medullary covering, while on its inner side it pressed upon the left crus, causing softening of it and of the posterior border of the corpus callosum; the quantity of fluid within the membranes and ventricles of the brain amounted to eight ounces. The tumour when weighed was found to be two drachms and forty-four grains, and was composed of firm tubercular matter, of homogeneous structure, and without any apparent nucleus. Its surface, however, presented a lobulated appearance.

The eyes, which I removed very carefully, were minutely examined. I observed before removing them that the pupils were dilated as fully as they had been during life; after they had been handled a little in the necessary manipulations while preparing them for dis-

section, I noticed that the pupil of the right eye had contracted considerably while the left remained unchanged. The structure of the left eye was quite healthy, the ciliary nerves being beautifully developed; indeed I have never had such a good opportunity of tracing the union of these nerves in the ciliary ligament, and their minute interlacing branches which supply the iris and ciliary body.

In the right eye I found all the coats and tissues perfectly normal, but it is worthy of remark that the ciliary nerves were not nearly so large as those in the left eye; some of the branches divided from the nasal portion of the ophthalmic division of the fifth. Besides being smaller, they were so soft as to render it impossible to trace them beyond the ciliary ligament. I may add that the retina of each eye was quite healthy, and easily divisible into its component layers.

Remarks.—This case is instructive and interesting in several points of view. It is probable that the disease commenced at a very early age, by a deposit within the right crus cerebri of the small point of tubercular matter, which gradually increased by successive deposits until it attained the large size which it exhibited after death. This tumour was evidently the cause of the several symptoms observed during the progress of the disease, and at last excited the inflammatory action with effusion, which closed the scene. Were such demonstration necessary, this case would fully illustrate the physiology of the third pair of nerves; it also, I think, clearly shows that contraction of the pupils is effected through them, and depends upon their being in a normal condition.

Of course it is clear that no treatment could have cured the disease, but it is probable that that which was adopted may have retarded its progress; and, I may presume, had the symptoms observed depended upon inflammatory action within or around the crura cerebri, it is certain that the treatment pursued was the only one likely to be followed by beneficial results.

Case of congenital Tumour on the Eye-ball. By J. I. TRAYER, M. D.,
Castlewood, Queen's County.

PATRICK KILBRIDE, aged 23, applied to me on the 4th of September, 1848, to have a tumour removed from the ball of the right eye.

On examination I found a yellow, granulated tumour seated on the right eye-ball, of a nearly semi-spherical form, and encroaching on the outer side of the cornea to such a degree that it covered about one-fifth of its area, and though not extending so far as to cover the pupillary opening, still by its prominence it obstructed so many of the oblique rays that the field of vision was materially contracted on that side; and when the patient attempted to look to the right, without turning his head, the right eye was nearly useless. This tumour was of such a consistency that, while it was slightly altered in form by the pressure of the lids, it still had sufficient firmness to protrude between them, and prevent their

being ever completely closed. It bore on its summit several hairs, about as strong as the eye-lashes, which became a source of constant irritation, obliging him to cut them short occasionally. The mass was evidently sub-conjunctival, and appeared to be equally firmly attached to the corneal portion of its site as to that of the sclerotic. It was also the point of convergence of several large vessels, especially one large cluster that came from the outer commissure of the lids.

This tumour was congenital, and the man gravely attributed it to the fact of his mother having been struck while carrying him with a "burr," one of those little, round, bristly beards of the burdock; and he dreaded much that the popular opinion might be too true which says, "for what is born with you there is no cure." This would be the more distressing, inasmuch as besides the deformity, which was considerable, and gave an unpleasant air to his whole countenance, this tumour, in virtue of its size, prevented a complete closure of the lids; and the hairs with which it continually irritated the conjunctiva, were every now and then the cause of more or less serious inflammations, which continually interfered with his work, and rendered his sight weaker after each attack. To the combination of the above causes I attributed the existence of a central ulcer of the cornea which existed at that very time, and which I endeavoured first to heal before I should attempt the removal, by operation, of its cause. This being attained by appropriate treatment in about three weeks (a time which will not appear long when it is remembered that the source of irritation still existed, and that the patient's living fourteen miles off prevented a very regular attendance on his part), I proceeded, on the 28th of September, to remove the tumour. This I effected by divaricating the lids by means of the spring speculum contrived for the operation for strabismus; then by fixing a tenaculum in the body of the tumour, and exercising a gentle traction therewith I carefully dissected off the tumour from its attachments to the cornea and the sclerotic, steering, as well as I could, between the two dangers of leaving too much to be removed by the subsequent use of the nitrate of silver (which I proposed to use), and of injuring, by too close cutting, the transparent cornea. The surface exposed by this process bled pretty freely, both from the conjunctival vessels above-mentioned, and from a great number of little vessels whose mouths gaped upon the wounded surface of the sclerotic. After this had completely subsided, I very freely applied the solid nitrate of silver to the whole surface of the wound, taking care not to go beyond this on the corneal side. I ordered a collyrium of borate of soda, and compresses, wet with cold water, to be constantly applied.

I found the tumour to be composed chiefly of fatty matter, but containing bands of a rather dense, fibrous-looking substance, and carrying on its summit about a dozen fine hairs.

On the third day after the operation he returned, beginning already to feel great comfort from the removal of this tumour. A slough had fallen off from the surface of the wound, and diminished

considerably the thickness of the lamina of fatty matter left by the knife. I now again applied the nitrate as before, and ordered similar applications of borax collyrium and cold water dressing.

I twice again, at intervals of a week each time, applied the solid stick of lunar caustic, and had the great gratification of seeing, on the last occasion, an immense improvement in the aspect of the organ. His sight gained daily in strength from the absence of the continual irritation to which he had been subject, and his field of vision had so much increased that he declared his right eye to be now as useful nearly as the other. The distance of this poor boy's abode, and the occupations of a farmer's life, prevented his coming to me again until February, 1849, when he came to show me his eye, and I was pleased to find that there remained scarcely a trace of his former deformity. On looking closely at the eye there is a barely perceptible nebula occupying the position of the ulcer, but so very slight that it does not interfere with his vision, which is now very clear; while on that part of the cornea occupied formerly by a portion of the tumour, it is all completely transparent, with the sole exception of a very delicate crescent-shaped nebula, existing at the extreme margin of the base of the tumour. This is so very slight that I expect it will (with the central nebulous appearance) either in whole or in part yield to a continued use of a collyrium of borate of soda and sulphate of zinc,—one of those unchemical combinations that experience has taught me to value in such cases, notwithstanding the apparent incompatibility of the ingredients.

Case of slow Action of the Heart in Fever. By CHARLES HALPIN, M. D.,
Cavan.

In reply to the query in the Circular relative to the Fever Report, respecting the peculiar phenomena of the circulating system, Dr. Mease and myself, in our joint report on the epidemic fever of 1847, stated that we had met with “nine cases in which the heart's action ranged between forty and fifty beats in the minute, yet all those cases terminated favourably”(a).

Since that report was written I had an opportunity of treating a similar case in the County Fever Hospital: a short history of its course may not be uninteresting.

Ellen G——, aged 18, was admitted to hospital 2nd December, 1848. Pulse 96; skin hot; tongue dry, but clean, with considerable thirst; no headach. The fever ran its course mildly, and terminated, without appreciable crisis, on the eleventh day. On the 14th of December she relapsed; the skin became hot, and the pulse rose to 84. On the 15th it fell to 70, and continued to decline gradually but steadily until the 18th, although stimulants were given very freely. On the 18th the pulse was 42; 19th, 45; 20th, 46.

(a) Dub. Med. Jour., No. xiii., N. S., Feb. 1849, p. 116.

She took seven and a half ounces of whiskey each twenty-four hours. 21st, felt better, but pulse was 44 ; 22nd, 44; 23rd, 40. Ten ounces of spirits were again taken.

Dec. 24th. Pulse 40. Took the same quantity of stimuli; was up and dressed ; and, with the exception of this extremely slow pulse, was apparently well.

Dec. 25th. Pulse 40. On this day she was ordered the acetated tincture of iron, and small doses of tincture of Spanish flies. Continued the spirits; ten ounces daily.

Dec. 26th, pulse 42; 27th, 52. Took six ounces spirits. 28th, 29th, and 30th, 80.

After this date all remedies were laid aside, and she was discharged on the 6th January, the pulse being then 68.