TRAUMATIC RUPTURE OF INTESTINE: ACUTE PERITONITIS: DEATH.

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THE sequence of events leading up to death in the case here related is the usual one in cases of acute peritonitis following rupture of the intestine, but there are one or two points of special interest in this case.

About 11 P.M., on July 30th, 1892, J. G., a labourer, aged 46, was kicked in the lower part of the abdomen. He was for the moment somewhat stunned, but almost immediately was able to get into grips with his assailant, throwing him down and falling above him. He made little complaint for about twenty minutes, when he began to feel pain in the abdomen. He sat down, bending forwards with his hands pressed on the injured part, and said to his wife that he was "done for." About an hour afterwards he became sick and vomited, while the pain became intense, and spread over the whole abdomen. His wife poulticed him during the night, and next day called in Dr. C. S. Young, who saw him sixteen hours after he had been assaulted. He found him lying in bed, with his shoulders raised and his knees drawn up. He had a pinched and anxious look; his pulse was rapid but not thready; the whole of the abdominal cavity was greatly distended and tympanitic, and very tender on palpation; there was no swelling or bruising of the penis or scrotum. About midnight, however, twenty-four hours after the assault, his wife noticed some swelling of his genitals. At 9.30 A.M. next day he insisted on getting out of bed to make water, and, with the assistance of his wife, he managed to walk to the kitchen sink for that purpose. He did not pass any water, but his wife noticed that the swelling of the scrotum and penis had increased enormously. While being assisted back to bed he fell down on the floor and died, thirty-five hours after the injury.

I was asked by the Procurator Fiscal to make a *post-mortem* examination of the body, and did so along with Dr. Young, thirty-four hours after death. We found no marks of bruising on the abdomen or any other part of the body. There were several large bullæ filled with bloody serum on both sides of the abdomen, probably the result of the poulticing, but the abdominal wall showed no discoloration from putrefactive changes. The scrotum and penis were enormously enlarged, being three or four times their normal size, from emphysema of the cellular tissue. The same condition was also present over the upper part of both thighs, the front of the abdomen and chest, the neck and face, the shoulders, and upper part of both arms. There was no bruising of the muscles of the abdominal wall or rupture of the parietal peritoneum. The whole of the peritoneum covering the intestines was much injected, and covered with flakes of soft recent lymph. The edges of the convolutions of the intestine were glued together. The abdominal cavity contained about 12 ounces of a thick grumous fluid, with a slightly fecal odour. Three inches from the ileo-caecal valve on the free border of the ileum was a rupture, half an inch in length, horizontal in direction, with its edges everted and the mucous coat protruding. There was some ecchymosis of the serous coat for about an inch on either side of this. The stomach, duodenum, jejunum, and part of the ileum were distended, and the rest of the intestine was collapsed. There were some solid faeces in the descending colon and rectum; the bowel was otherwise quite normal. The bladder contained 2 or 3 ounces of urine. The left internal abdominal ring was patent; the opening leading into the sac of an inguinal hernia, which admitted the whole of the index finger; the sac was, however, empty. The rest of the body was normal.

The immediate effect of the kick was a slight degree of shock of a very transitory character, no symptoms having appeared for twenty minutes. The extensive subcutaneous emphysema observed at the *post-mortem* examination is a feature of great interest. It was evident that its presence could not be accounted for by putrefactive changes, as the body was quite fresh, and there was no discoloration of the thoracic and abdominal walls such as always precedes the development of gas in the cellular tissue. The emphysema of the scrotum and penis was observed for the first time about midnight of July 31st, and increased enormously between that time and the time of his death (10 A.M., August 1st). It was not present when Dr. Young examined the deceased in the afternoon. Its occurrence in this region is somewhat difficult to explain, seeing that the parietal peritoneum was quite uninjured. The only probable explanation which suggests itself is that when the pressure in the abdominal cavity had reached a certain height the gas had forced its way in the direction of least resistance through the old hernial sac into the cellular tissue of the scrotum and penis, but had been prevented from passing higher by the great tension of the abdominal walls. After death, however, this state of matters would be altered, and on the occurrence of rigor mortis, owing to the relaxed condition of the superficial parts of the abdominal wall, the contraction of the muscles would still further force the gas out of the abdomen through the cellular tissue of the scrotum and penis into that of the

abdominal walls and the other regions in which it was observed.

The assailant in this case was afterwards tried on a charge of culpable homicide, but although the evidence of the assault was unequivocal, the jury were apparently unable to believe in the possibility of a fatal or even serious internal injury being inflicted without some visible external marks of bruising. They consequently returned a verdict of "guilty of a simple assault," and the accused was liberated on paying a fine of 20 shillings.

ON THE ELIMINATION OF LEAD IN CHRONIC LEAD POISONING.

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THEORIES AS TO THE CHANNELS OF ELIMINATION OF LEAD.

THE mode in which lead is eliminated from the human organism in cases of chronic lead poisoning, and the influence of drugs in producing its elimination, are still disputed points. Some state that the kidneys are the chief eliminators, others the bowels. A great deal of confusion has arisen from the fact that many of the chemical researches on this subject have been made on the lower animals and their excretions. In experiments on animals, although the amount of lead introduced into the organism is actually small, it is relatively large when compared with the minute daily doses received by human beings in drinking water, which may not contain more than one milligramme of lead per litre. In man the inception of the poisoning is usually extremely gradual, each dose being infinitely small; it is only by the prolonged and continuous action of the poison that its toxic effects are produced. A further objection to comparative experiments exists in the difference in susceptibility and in the eliminative channels in animals as compared with man. Ellenberger and Hofmeister¹ found that in sheep the elimination of lead mostly takes place by the kidneys. As will be presently shown, this is not the case in man.

Many of the statements as to the action of drugs in promoting elimination are founded on isolated chemical observations, or on observations which, from the manner in which they were conducted, render them valueless. The subject appeared worthy of investigation, and, having two cases of chronic lead poisoning in the Salford Royal Hospital, I determined to make a series of analyses of the excretions, in order to ascertain the conditions under which the metal is eliminated.

OBJECTS AND RESULTS OF THE AUTHOR'S INQUIRY.

The questions sought to be answered are: (1) What is the relative importance of the channels by which lead is eliminated in chronic lead poisoning? (2) What influence have the drugs usually prescribed in such cases on the rate of elimination?

The first case was that of a young woman aged 21, who had been a general servant in a publichouse for about one year. In October, 1890, she felt a soreness and general aching in the arms with progressive loss of power. She had never had colic. She was admitted into hospital, December 8th, 1890. She presented the two prominent symptoms of chronic plumbism—wrist drop with marked atrophy of the extensors of the forearm, and the blue line along the margins of the gums. Any further clinical description would be foreign to the subject under discussion. The lead had been taken in drinking water, which was found to contain 2.4 milligrammes per litre. The other residents in the house were not affected. This, however, is not very unusual. It is well known that some persons are much more susceptible to the influence of small amounts of lead than others. The patient showed no gouty diathesis, but it was ascertained that she had taken alcohol freely. Whether her exceptional condition, as com-

¹ *Centralb. f. Vet.-Wissensch.*, 1885.

pared with the rest of the household, was owing to the drinking of an extra amount of the lead-contaminated water to dilute the alcohol, or to an increased sensitiveness to the influence of lead from the action of the alcohol on the tissues, is an open question. It has been observed that those accustomed to the free use of spirits apparently succumb to much smaller doses of lead than the average of people.² The second case was that of a young man, aged 26, a painter, who had worked much with white lead. He had suffered from colic on several occasions. Five months before coming into hospital he felt his hands becoming weak. He had well-marked wrist-drop and blue line on the gums.

In order to obtain a definite result, analyses were made at stated intervals, both of the faeces and the urine excreted in twenty-four hours. The alleged elimination by the salivary glands and the skin was neglected as having a remote bearing, if any. Two analyses of the faeces and two of the urine were made at intervals of about a week before any treatment was adopted. Different methods of treatment were then put in force, with recurring intervals of expectant treatment, the double analyses—faeces and urine—being regularly made every second or third day over the entire period that the cases were under observation, which in the first case exceeded four months. The results are tabulated and appended. The second case unfortunately absented himself from the hospital after five double analyses of his excretions had been made; but the information obtained corroborated the more extended results yielded by the first case.

METHOD OF ANALYSIS

The chemical procedure was as follows:—The faeces were weighed, and then mixed with as much distilled water as was necessary to reduce them to a semi-fluid consistence. They were then introduced into a large conical flask, and nearly an equal volume of pure hydrochloric acid, and about half an ounce of potassium chlorate in crystals were added. The flask was heated on a water bath, and more chlorate added if necessary until the mixture acquired the colour of oatmeal gruel. When the organic matter was decomposed as far as possible, the liquid was filtered hot, and the filter was well washed with boiling distilled water. The residue on the filter was subsequently examined to ascertain that it contained no lead. The filtrate was then placed in a porcelain basin, and heated over the water bath until excess of chlorine was driven off, and, if necessary, the amount was reduced to about 170 c.c. If the filtrate became dark during evaporation, a few crystals of potassium chlorate were thrown in until it retained a light yellow colour after heating for twenty minutes. Usually a second filtration was not necessary. When cold, the liquid was placed in a glass cell the bottom of which consisted of a sheet of vegetable parchment. The cell was immersed to such a depth in an outer cell containing distilled water acidulated with a few drops of sulphuric acid, that the liquids in the inner and outer cells stood at the same level. A piece of platinum foil, exposing a surface of about 50 cm. square, was submerged in the liquid contained in the inner cell, and connected with the cathode of four Grove's elements, a similar piece of platinum foil being immersed in the outer cell, and connected with the anode. The two pieces of foil were so placed as to be opposite each other, separated by the parchment diaphragm. The circuit was closed for from six to eight hours. In the case of some of the liquids obtained from the organic matter, the hydrogen given off formed a froth on the surface which embarrassed the proceedings. It was found, when this was the case, that a little amyl alcohol poured on the surface of the liquid prevented the formation of froth. At the conclusion of the time mentioned the foil was removed from the inner cell, and was gently washed with water and dried.

The metallic lead deposited on the foil was dissolved off with dilute nitric by the aid of gentle heat, and the foil was well washed into the acid solution. Most of the nitric acid was then driven off, and the solution was decomposed with dilute sulphuric acid, and an equal volume of alcohol added, the whole being set aside for twenty-four hours. The precipitate being so small, it was deemed advisable to avoid filtration, as the subsequent incineration of the filter paper would reduce the sulphate and necessitate its reconversion. The plan adopted was to wash by decantation with successive quantities of water and alcohol (12 per cent.) until all free acid was removed, and then to substitute alcohol for the aqueous mixture, and on subsidence of the precipitate to decant as much as possible of the supernatant fluid without disturbing the precipitate. The remainder of the alcohol was then agitated so as to suspend the precipitate, and was poured into a small porcelain capsule, all particles left behind being washed off into the capsule with more alcohol. The alcohol was evaporated, and the solid matter ignited, cooled, and weighed. The amount of lead was then calculated from the weight of the sulphate, which in all cases was tested and proved to be a lead salt.

The treatment of the urine was precisely the same, except that in the first instance, instead of being mixed with water, it was reduced to about one-eighth of its bulk by evaporation.

As is customary in all experiments of a delicate nature, the apparatus and the reagents were proved by blank experiments to be free from contamination.

The accompanying tables enable the rate of elimination and the effect of the treatment to be directly compared:

TABLE I.

Medicinal Treatment.	Com-menced.	Excre-tions Ob-tained.	Urine.		Faeces.	
			Amount.	Lead.	Amount.	Lead.
None... ..	1890 Dec. 10	1890 Dec. 11	c.c. 1,945	g. 0.0005	g. 162	g. 0.0025
Potassium iodide (15 grains ter in die) ...	" " 18	" " 18	1,760	0.0006	156	0.0027
" " " " " "	Dec. 22	" 24	1,805	0.0006	194	0.0028
" " " " " "	"	" 27	2,070	0.0003	178	0.0020
" " " " " "	"	" 29	1,650	None	202	0.0031
" " " " " "	"	" 31	1,920	0.0002	180	0.0013
" " " " " "	"	1891 Jan. 1	1,740	None	136	0.0021
" " " " " "	"	" 3	1,230	Trace	152	0.0019
" " " " " "	"	" 5	1,490	0.0005	126	0.0014
" " " " " "	"	" 7	1,400	0.0004	102	0.0018
" " " " " "	"	" 10	1,505	Trace	117	0.0020
Liq. ammon. acet. (3ij ter in die) ...	1891 Jan. 10	" 12	2,008	Trace	105	0.0024
" " " " " "	"	" 14	1,990	0.0003	172	0.0017
" " " " " "	"	" 17	1,800	0.0005	97	0.0014
" " " " " "	"	" 19	1,785	0.0003	109	0.0026
" " " " " "	"	" 21	1,240	None	140	0.0019
" " " " " "	"	" 24	1,195	Trace	187	0.0020
" " " " " "	"	" 28	2,050	0.0002	155	0.0011
Potassium iodide (10 grains ter in die) ...	Jan. 30	" 31	2,120	0.0002	150	0.0003
" " " " " "	"	Feb. 2	2,070	0.0001	98	0.0019
" " " " " "	"	" 5	2,100	Trace	163	0.0005
" " " " " "	"	" 7	1,905	None	184	0.0004
" " " " " "	"	" 9	1,740	0.0001	145	0.0004
None... ..	Feb. 10	" 12	1,805	Trace	138	0.0010
Saline purge ...	" 15	" 16	1,794	Trace	142	0.0011
Baths and general mas-sage ...	" 16	" 18	1,950	Trace	159	0.0010
" " " " " "	"	" 21	1,805	0.0003	144	0.0022
" " " " " "	"	" 23	2,170	0.0001	123	0.0016
" " " " " "	"	" 25	2,205	0.0002	178	0.0019
" " " " " "	"	" 28	2,190	0.0001	170	0.0012
" " " " " "	Mar. 2	" 4	1,508	Trace	255	0.0020
" " " " " "	"	" 4	1,605	0.0002	226	0.0002
Potassium iodide (10 grains ter in die) ...	Mar. 5	" 7	1,828	0.0006	232	0.0008
" " " " " "	"	" 11	1,705	Trace	146	0.0002
" " " " " "	"	" 14	1,695	None	102	0.0008
" " " " " "	"	" 18	1,508	"	99	0.0006
" " " " " "	"	" 21	1,300	"	156	0.0010
" " " " " "	"	" 26	1,905	"	242	0.0006
" " " " " "	"	" 30	1,970	"	141	0.0011
" " " " " "	Apr. 6	" 9	1,945	"	147	0.0014
" " " " " "	"	" 9	1,810	"	95	Trace

TABLE II.

Medicinal Treatment.	Com-menced.	Excre-tions Ob-tained.	Urine.		Faeces.	
			Amount.	Lead.	Amount.	Lead.
None... ..	1891 Mar. 4	1891 Mar. 4	c.c. 1,106	g. 0.0009	g. 57	g. 0.0021
" " " " " "	"	" 6	1,014	0.0005	71	0.0022
Potassium iodide (10 grains ter in die) ...	Mar. 7	" 9	1,095	0.0008	142	0.0020
" " " " " "	"	" 12	1,070	0.0004	113	0.0020
" " " " " "	"	" 16	995	0.0002	141	0.0014

A glance at the tables shows that by far the largest amount of lead leaves the system by the bowels. The bile has been regarded as the principle vehicle of elimination. Annuschat,³ in experiments on animals, found that a considerable amount of lead was excreted with the bile, but that when lead was no longer introduced into the system, the bile ceased to contain any, although the liver might contain a considerable amount. It is possible that the intestinal mucus may aid in elimination.

Further reference to the tables shows that the kidneys do eliminate lead, but to a far lesser extent than the bowels. In order to ascertain whether this relation between the bowels and the kidneys, as eliminators, was constant, both for cases

² Porritt, on the Pathological Affinities of Lead and Alcohol, *Lancet*, 1889.

³ *Arch. f. exp. Path.*, Bd. x.

of slow accumulation of lead and also of its comparatively rapid introduction, I selected a case in the hospital in which, on account of hæmoptysis, lead acetate was being given in 2 grain doses twice a day. The drug was administered from February 28th to March 4th, that is, for five days. On March 5th, the day following the last dose, a series of analyses of fæces and urine was commenced. The following table shows the results:—

TABLE III.

Excretions Obtained.	Urine.		Fæces.	
	Amount.	Lead.	Amount.	Lead.
1891	c.c.	g.	c.c.	g.
March 5	1,435	0.0012	186	0.1290
" 9	1,950	0.0005	156	0.0940
" 12	1,810	0.0006	198	0.0055
" 16	1,660	0.0001	184	0.0030
" 19	1,505	Trace	99	0.0011
" 23	1,190	"	70	0.0007
" 27	1,070	None	101	Trace
" 30	1,105	Trace	141	0.0002
April 17	1,200	None	118	None

Another case in which lead acetate was being administered medicinally permitted evidence to be obtained on another point. It has been stated that as lead probably exists in the organism in combination with albumin, the metal is eliminated in the urine in chronic cases more freely if the kidneys allow albumin to be excreted than under normal conditions. The case was that of a woman, aged 35, who at the time was passing about 4 grammes per litre of albumin. Two grains of lead acetate were being taken three times a day from April 1st to April 6th. The first analysis was made on April 4th, whilst the drug was being administered, and the analyses were repeated every two or three days until April 24th. The following table shows the results:—

TABLE IV.

Excretions Obtained.	Urine.		Fæces.	
	Amount.	Lead.	Amount.	Lead.
1891	c.c.	g.	c.c.	g.
April 4	1,000	0.0011	227	0.1762
" 6	940	0.0004	290	0.1411
" 8	960	Trace	65	0.0053
" 10	700	None	95	0.0006
" 13	480	"	152	Trace
" 15	1,300	Trace	210	0.0005
" 19	605	None	235	0.0005
" 24	1,275	"	187	0.0003

It will be seen that the amount of lead obtained in these cases in the one during, and in both immediately after, cessation of the reception of the drug, was very considerable. This was derived from two sources: a small proportion was eliminated, but by far the greatest proportion passed as an insoluble compound directly from the stomach into the bowels, without entering the circulation at all. This explains why the toxic effects of lead are so seldom seen when a soluble salt of the metal is administered medicinally, even for a considerable time. For example, when lead acetate is given to relieve the diarrhœa caused by tuberculous ulceration of the bowels, it is probable that the immediate contact of a practically insoluble lead salt with the ulcerated surface of the bowels exercises a beneficial effect in checking the diarrhœa, in addition to the influence exercised by the lead which is absorbed. In some cases, frequently repeated medicinal doses of lead acetate may produce some of the symptoms of chronic poisoning—colic, for example. I have seen one well marked case of this kind in which lead acetate was freely given to check the profuse hæmorrhage of purpura hæmorrhagica; typical lead-colic was produced.

Both tables (3 and 4) show that after lead acetate had been administered for several days, the urine passed in the same twenty-four hours in which the fæces yielded a considerable amount of lead, contained only 0.0005 gramme and 0.004

gramme of metallic lead respectively. Four days after, when the fæces yielded 0.0055 gramme and 0.0053 gramme respectively, the urine in the one case contained 0.0006 gramme, and in the other a mere trace. At this period, as the bowels had been relieved daily in the interval, it is probable that the whole of the lead in the fæces was eliminated, not simply discharged.

THERAPEUTICS OF CHRONIC LEAD POISONING.

Of all the drugs recommended as aids to elimination, potassium iodide has obtained the most favour; nor are observations wanting which seem to warrant this preference. Some of the earlier writers on the subject relied on the fact that cases of chronic lead poisoning improved whilst taking potassium iodide, as constituting proof that it aided elimination. Subsequently isolated analyses of the urine were made after administration of the drug, and considerable amounts of lead were found. Various theories have been formulated to explain the way in which potassium iodide facilitates the elimination of lead. The primitive idea was that lead iodide was formed; this could be supported by experimental evidence. Potassium iodide will attack lead albuminate and insoluble salts like the sulphate, and partially convert them into lead iodide. It was soon seen however that this availed nothing, as lead iodide is a very insoluble salt, so much so that one eminent chemist accounted for the alleged benefit derived from its use in chronic lead poisoning, by stating that it rendered any lead that might be in the system practically insoluble and consequently inert. Then the theory of the formation of a double iodide of lead and potassium was formulated. It is quite true, as is adduced, that double salts like the one named, are as a rule very soluble in water. The difficulty however presents itself that the double iodide of lead and potassium is formed with some difficulty, under conditions which could scarcely be assumed to take place within the organism, and further that it immediately decomposes in the presence of water. Binz's theory as to the action of potassium iodide on albuminous substances has been utilised to explain the action of the drug in liberating the lead from albuminoid combinations. It is assumed that lead when stored up in the tissues exists as an albuminate; that free iodine is evolved from the potassium iodide, which is taken up by the albuminous substances and causes them to undergo rapid metamorphosis, and thus liberates the combined lead. Allowing this, the original difficulty again presents itself; the lead set free would combine with the iodide present in excess, or with the free iodine.

None of these explanations are satisfactory, and I believe for the reason that they attempt to explain a condition that does not exist.

Reference to the tables shows that, when the patients were taking potassium iodide, the amount of lead present in the fæces and the urine was not increased. The amounts obtained fluctuated throughout the whole periods of observation, whether potassium iodide was being taken or not; the sole constant feature was a progressive diminution in the total amount of lead daily eliminated. These fluctuations might, in isolated experiments, so correspond to the administration of potassium iodide as to encourage the view that the drug was the cause of increased elimination, which in reality was due to accidental disturbances—or, in other words, to some unknown conditions favouring elimination that existed at the time the observations were made. Experimental evidence that potassium iodide favours the elimination of lead is, so far as I have been able to ascertain, solely founded on chemical observations of the urine; the fæces were neglected. During the four months over which, in the first case, my analyses extended, on only one occasion did I fail to obtain a weighable amount of lead sulphate from the fæces. But on many occasions the urine contained but a trace, and on many others no trace at all. This shows the futility of relying on one or two isolated examinations of the urine only.

It is probable that the results obtained by Annuschat* were due to isolated experiments. He took the urine passed by a patient suffering from chronic lead poisoning for two consecutive periods of three and four days respectively, the amounts being for the first three days 1,050 c.c., and for the following four days 2,300 c.c. In neither of these was lead

* Arch. f. exp. Path. Band x.

present. After the patient was put on potassium iodide the urine was similarly collected for two periods of three and four days, amounting respectively to 1,580 c.c. and 2,300 c.c. In the 1,580 c.c. 0.0075 gramme of lead, and in the 2,300 c.c. 0.0143 gramme were obtained. Pouchet⁵ found that potassium iodide eliminates lead, but not continuously; after six to ten days the effect of the drug is exhausted, even when given in increased doses. If again administered, after an interval of two or three weeks, it acts as before. It was to test this that I allowed intervals of from a fortnight to three weeks to elapse between the periods of treatment by potassium iodide. The tables show no increase in lead on resumption of the iodide after an interval of negative treatment.

Baths and massage have long been favourably regarded as promoters of lead elimination, and quite recently a case was recorded in which, after treatment with potassium iodide, without a trace of lead being found in the urine, the iodide was stopped and general massage commenced. The result was extraordinary, inasmuch as 50 milligrammes of lead per week were obtained from the urine.⁶ Trial of this method, in conjunction with hot baths, was made in my first case. The result seemed to be favourable in producing an increase in the daily excretion of the lead by the fæces, but it was insignificant as compared with the enormous increase in the above mentioned case; the urine also showed a slight increase in lead.

CONCLUSIONS.

The conclusions to be drawn from the two cases of chronic poisoning are: That lead is slowly and more or less continuously eliminated by the bowels, and, to a very much lesser extent, by the kidneys. That once deposited in the tissues it exists as a stable compound over which drugs have little if any power. That the best aids to elimination are baths and general massage, together with fresh air, good food, and all other measures by means of which the general health may be improved and healthy metabolism promoted. Whilst denying that potassium iodide promotes elimination of lead, the possibility of its being beneficial in some other way in cases of chronic lead poisoning is not disputed.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

TORTICOLLIS AND CONGENITAL HÆMATOMA OF THE STERNO-MASTOID.

THERE is one subject mentioned incidentally in the recent discussion upon wry-neck and congenital hæmatoma of the sterno-mastoid at the Royal Medical and Chirurgical Society upon which I wish to offer a few comments. With the main contention of the author of the paper—Mr. D'Arcy Power—I am thoroughly in agreement; the point to which I allude is the relationship that exists between torticollis and the impaired growth of the affected side of the face.

Some years since I was called to operate upon a very severe case of this affection in an otherwise well-grown girl, 15 years of age. The mastoid was dragged down to within an inch of the sternum, and lay vertically over the sterno-clavicular articulation. The upper side of the face and neck was well developed; the under was much smaller, and was obliquely twisted in the usual manner; and even the breast on that side was decidedly smaller than its fellow. Tenotomy was performed upon two occasions, every resisting structure that could be sufficiently isolated being divided; and the patient was given a looking glass, and taught a few simple gymnastic exercises, with the view of getting the neck as straight as possible—an object which she thoroughly appreciated. Two years later I saw her again; the cervical spine, of course, was distorted still; the bones had not been able to alter their shape to any material extent; the head was erect; there was no recontraction, and the disproportion between the two sides of the face was even more striking than it was before;

but the breasts, which had grown very considerably in the interval, were almost the same size; and the next year, when I saw her for the third time, there was scarcely any difference to be detected between them. The conclusion I formed was that the symmetry of the body having been restored as far as possible before their period of physiological development, the breasts had grown equally; had the position of the head not been restored, I believe the want of symmetry would have been as well marked in them as it was in those parts of the body that had already attained nearly their full size. A sole when it escapes from the egg is formed symmetrically, and swims, like the majority of fish, in the vertical position, with an eye on each side of its head, and its mouth in the normal situation. As it falls over on to its side, and because of this change, the head is so twisted that the two eyes are brought to the surface that is uppermost, while the mouth is left beneath. So it is with the deformity in severe cases of torticollis; the infant at birth is symmetrical; the head becomes tied down to one side; and the surface that is uppermost, and the organs that are most used, grow faster and larger than their fellows. I regret very much not having tested the eyesight of my patient: I should not have been surprised to find that there was a material difference between the acuteness of vision on the two sides.

There is no analogy between the defective growth of torticollis and the defective development in congenital talipes equino-varus. In the one the various structures implicated are fully developed, but do not grow to their natural size; in the other they grow to their natural size, but do not develop: as in the case of cleft palate and other malformations, they retain the character that is normal at an earlier period of life, although they increase in bulk in proportion to the rest of the body.

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KOUMISS IN OBSTINATE VOMITING.

NUMEROUS cases have been recorded of severe vomiting yielding to koumiss when every other thing has failed, but the beverage is not so much used as it might be.

CASE I.—A married woman, aged 56, suffered from mitral incompetence with temporary failure of compensation and consequent congestion of the venous systems. She had albuminuria, anasarca of the lower limbs, and evidently congestion of the vessels of the stomach, producing extreme retching and vomiting when anything was swallowed. To check this very known remedy was tried without effect. I scarcely exaggerate when I say everything ever suggested was given, from bismuth in its various forms to mineral naphtha, and, in the list of dietaries, from brandy and the light wines to soda water. It appeared as if the patient was going to die, apart from other causes, from mere inability to take nourishment, and from exhaustion due to the severe retching when anything was given. At last two tablespoonfuls of koumiss were given and retained, and this dose was repeated every two hours for two days, at which time milk and soda water was tolerated and the koumiss was left off. The patient ultimately recovered.

CASE II.—A woman, aged 38, in her eighth confinement (under the care of a midwife), on the second day showed distinct signs of that rare disease called by the older writers "proper puerperal fever." The discharge was very fetid; the belly distended, and so tender she would allow nothing to touch it; a rash appeared above the pubes; sores appeared on the lips, tongue, and in the mouth. The temperature was 103.5° F. and the pulse 130. There were signs of pneumonia. There was fitful diarrhoea and severe vomiting. Everything save the opium mixture she was then having was returned. Koumiss was given, as in Case I, and retained, and left off as soon as other food could be taken. After a protracted illness, complicated by abscesses, she got well.

CASE III.—(For notes of this case and permission to publish it I am indebted to Dr. Bisset Smith.) A married lady of 24, suffering from typhoid fever, had hæmorrhage from the bowel on the seventeenth day, but got over this and did well till 4.30 on the morning of the thirty-seventh day, when she again passed blood to the extent of 15 ounces, with oozing going on all day. She became deadly pale, and at 6 p.m. the same day the temperature fell to 97°, and at 10 p.m. when she was seen by a consultant, the pulse could not be counted at the wrist, and the heart was very feeble and beat 150 a minute. Vomiting now became a prominent symptom. Champagne was tried and likewise brandy and soda-water without good results. Black coffee without sugar and bismuth mixture were also given, but unsuccessfully. Ether hypodermically was administered for the collapse, but had no effect on the vomiting. Vomiting continued all night at intervals, and she looked as if sinking. Next morning koumiss was administered in two-tablespoonful doses at frequent intervals, with the happiest results. Every two hours she was also given a mixture of $\frac{1}{4}$ gr. cocaine hydrochlorate and m2½ prussic acid. The vomiting ceased entirely and the koumiss was stopped. Strangely enough the patient had a great aversion to the koumiss, and yet it was the only thing retained. Contrary to the expectation of everyone, she made a rapid recovery.

The happy results which I have had with the beverage in question led me to make a detailed examination of it to see if I could find present any form of alcohol or ether or other

⁵ Arch. de Phys. norm. et natl., 1879.

⁶ Tedeschi, *Giornale internazionale delle scienze mediche*, 1889.