

**On the transfusion of milk : as practised in cholera, at the cholera sheds,
Toronto, July, 1854 / by James Bovell.**

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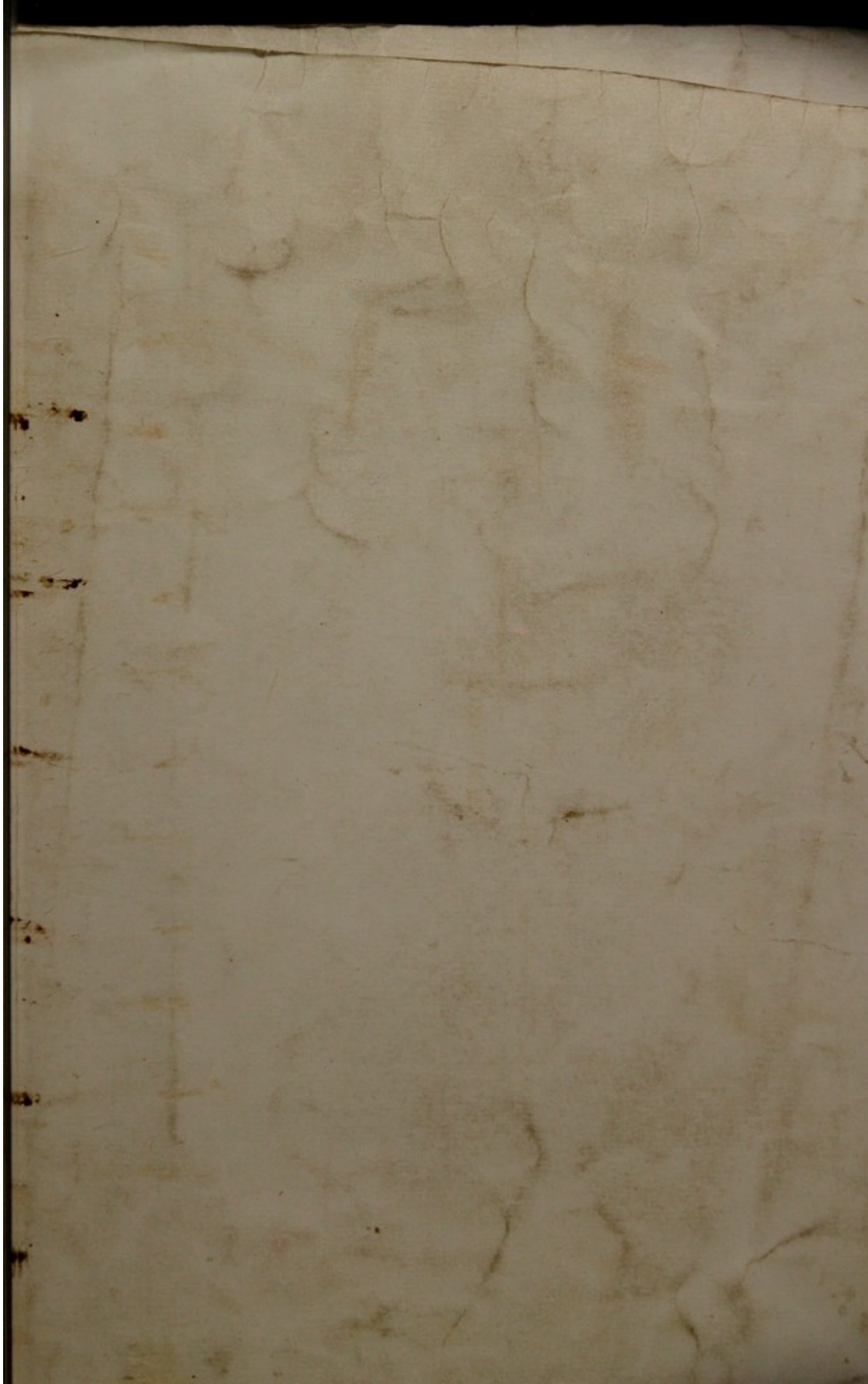
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PRESENTED

BY THE
AUTHOR.

ON THE

TRANSFUSION OF MILK,

AS PRACTISED IN CHOLERA, AT THE CHOLERA

SHEDS, TORONTO, JULY, 1854.

BY JAMES BOVELL, M.D., TRIN. COLL., TORONTO.

(Read before the Canadian Institute, January 27th, 1855.)

Mr. PRESIDENT.

As I am quite aware that the Council of the Institute, as well as many of its members, wish to confine within proper limits the introduction of purely professional matters at the usual evening meetings, I have endeavoured to divest the subject which I purpose to bring before you this evening, as much as possible, of what you might consider its technical features; and instead of presenting to the Society a Report on the Cholera of 1854, I now venture to claim your attention to a single fact connected with that visitation,—one which I believe will be received by the members of the Institute with interest.

The possibility of saving human life by the transfusion of new blood into the system is not of very ancient date, and I believe that the records of antiquity furnish us with no instance of the introduction of blood into the system by operation. It was however practised, says Dr. Rhamsbotham, “by some in the last century; and some physiologists contend that the operation of transfusing medicated fluids, and blood itself, into the system of man, is of very remote origin; and they ground their supposition on some passages in the ancient

poets." Thus Ovid represents Medea as renewing the youth Æson by injecting the juice of herbs into his veins.

"Quod simul ac vidit, stricto Medea recludit
 Ense senis jugulum : veteremque exire cruorem
 Passa replet succis. Quos postquam combibit Æson
 Aut ore acceptos, aut vulnere, barba, comœque
 Canitiæ posita, nigrum rapuere calorem."

This is no warrant for such a belief; and the probability is, that the fancy originated, not in any practice then pursued, but merely in an adventurous flight of poetry. It has been even supposed that in these early times blood was actually transmitted from one person to another, and a second passage in the same author, where he describes Medea's fiend-like deception practised upon the unsuspecting daughters of Pelias, has been quoted in proof.

..... Quid nunc dubitatis inertes?
 Stringite, ait, gladios, veteremque haurite cruorem
 Ut repleam vacuas juvenili sanguine venas.

LIB. vii.—5.

That these lines will not bear any such interpretation, the whole context, and the pretended sanitary preparations she makes, abundantly testify.

My relative, Dr. Leacock, in his Inaugural Thesis, published at Edinburgh, in, I think, 1816, again directed the attention of physicians to the real benefits which might be expected from the employment of such means for the restoration of life; and his opinions meeting with a warm advocacy from the justly celebrated Dr. Blundell, the operation of transfusion received an impress which it has never entirely lost. Various physiologists have, since the re-introduction of transfusion by Dr. Leacock, performed on the lower animals experiments, with the view to ascertain how far the blood of one animal may be substituted for that of another. As might have been expected, it was soon discovered that it was impossible to so far pervert the laws of physiology as to build up tissues from blood formed for the support of structures typically distinct: accordingly the law has been established, that an animal can only be restored to health by the introduction into its veins of blood taken from one of its own species. But intelligible as this law is, it is, nevertheless, found, that many conditions contribute to its successful

working. Constituted as blood is, possessing a highly complex organisation, consisting of many parts—organized solids and fluids, and inorganic salts, wonderfully and inseparably joined together, living very quickly and dying as instantly, in obedience to laws which govern its origin and death—blood cannot be for any appreciable time removed from the circulatory condition without undergoing change. It is a completed organism when withdrawn from the body of the animal; already has it lived out more than half its time, and all its tendencies are not to live on, but to die out: hence experiment has shewn that even with the blood of the same animal the effects of its transfusion have not been invariably satisfactory, and various propositions have been made to modify the introduction of the blood, in order to render it better fitted for the end in view. Thus the French philosophers have endeavoured to show that the de-fibrination of the blood was more likely to secure the benefits sought to be obtained, than when the whole organized compound was employed. Be this as it may, it is quite certain, that in case of epidemic visitations, which cut down, not an individual here and there, but which decimate a population, be transfusion never so successful, yet it would be an impossibility to employ it on a general scale, since the physician would not be justified in depriving the as yet unattacked man, of blood, every drop of which he may require shortly himself, even if it were possible to induce the disaffected to part with what is really under such a condition to them “their life’s blood.”

The appreciation of this truth evidently led our authorities to introduce other menstrua, and as Animal Chemistry pointed out in the destroying discharges the presence of the saline constituents, it was thought advisable to inject into the system a supply of similar material to fill up the place of that drained away. That this plan has been occasionally successful experiment fully attests; but it is nevertheless admitted, that it has not fulfilled the expectations of its originators. In the first place, this doctrine fails to take cognizance of that portion of the blood which remains in the vessels; it fails to recognise the prime fact that the serum and salts of the blood are drained away, not so much in consequence of changes which have ensued in the vascular canals, as from a tendency in the blood itself to separate into

its constituent parts—in short, to die. The introduction, therefore, of the saline ingredients into the body is not a restoring to the blood that which it had lost, but it is a restoring to the system of a part only of its usual circulating pabulum, the thick, black decaying blood-corpuscles being altogether unfit to carry on the vital processes requisite for the maintenance of the animal fabric. Thus reasoning, the thought suggested itself that nature herself provided us with the means of accomplishing the renovation of the blood, and that we had prepared ready for our use a liquid possessing the requisite qualities of a blood forming fluid, and, above all, that which no art or power of man could bestow, viz., vitality—a compound mixed in the great laboratory of life.

The experiments performed by M. Magendie were, however, not very encouraging, and tended rather to throw a shade of doubt over the utility of milk as an agent in transfusion. This distinguished physiologist injected various substances into the arterial system of dogs, and amongst them milk, the results of which was by no means satisfactory.

In Mr. Hassall's very excellent work on the Microscopic Anatomy of the Human Body, in the chapter on the blood, the following remarkable observations, cited from M. Donne's Papers, occurs:—

“Now, with regard to actual experiments with milk, we have the testimony of M. Donne, that about two hours after its injection, rabbits, birds and dogs have been opened, ‘I have collected,’ he says, ‘the blood in the different organs, in the lungs, the liver, the spleen, and everywhere I have found the blood containing a certain number of white globules in all stages of formation, and of red globules more or less perfect: invariably the spleen has presented to me special circumstances, so established and constant that it behoves me to mention them.’ M. Donne further adds, ‘that he believes that he has also traced, by direct observation and experiment the transformation of the minute oily and fatty particles found in the milk into white globules.’ He injected numerous animals, birds, reptiles and mammals with various proportions of milk; and, strange to say,” observes Mr. Hassall, “the creatures thus experimented upon experienced no injurious effect beyond a momentary

shock, with, however, the single exception of the horse, to which the experiment proved fatal in seven different cases. If almost immediately after the injection of milk, a drop of blood be withdrawn from the system at a distance from the point where the milk was introduced, a number of the globules of the milk may be detected quite unaltered, and which may be recognised by their general appearance, their smaller size, and, lastly, by the action of acetic acid, which dissolves the red globules, renders apparent the granular texture of the white, but leaves untouched the molecules of the milk. If the blood be again examined, at about the expiration of two hours, the smallest milk globules will be seen to have united themselves with each other by threes and fours, and to have become enveloped, by circulating in the blood, in an albuminous layer, which forms around them a vesicle analogous to that which surrounds the white globules; the largest remain single, but are equally enveloped in a like covering. These soon break up into granules, in which state the milk globules of the blood bear a close resemblance to the white globules of the blood, from which finally they are not to be distinguished. The blood, Donne then remarks, 'shows itself very rich in white globules, but little by little these undergo changes more profound; their internal molecules become effaced and dissolved in the interior of the vesicle, the globule is depressed, and soon it presents a faint yellow colouration: they yet resist better the action of water and acetic acid than the fully formed blood globules, and it is by this that they are still to be distinguished. At length, after twenty-four hours, or at latest after forty-eight hours, matters have returned to their normal state; no more milk globules are to be seen, the proportion between the white and red globules has returned to what it ordinarily was.' In only one instance have I had the opportunity of noticing the changes spoken of by Donne, and that in the case of the man J. Pickles. He died about fourteen hours after transfusion, and I procured some blood from veins in the feet, and from the opposite arm; on submitting this blood to the microscope it was found to be loaded with white globules, presenting one of the best marked cases of Leucoeythemia I ever saw. I failed, however, to notice a single milk globule; the red-corpuscles were very jagged."

Now, by reference to the Tables of Analysis of Milk and Blood by Simon and Mulder, we note the very close relationship which exists between them, and couple with this the facts as observed by Donne, viz., the evident convertibility of milk into blood, and the conclusion is almost irresistible that it must be a valuable agent for transfusion. Yet we had no precedent to direct us; and although I searched all the medical records within my reach I could not find a single case to guide us.

It will be noted by the Institute, that it was on the 10th of July, 1854, that the first case of transfusion with milk was effected in Toronto. In the *Association Medical Journal*, edited by Dr. Rose or Mack, under date Sept. 1st, 1854, the following letter, from William Bird Herapath, M.D., F.R.S., is published:—

On the Employment of Injections of Milk, or Milk and Water, into the Peritoneal Cavity, Cellular Tissue, or Venous System, in the Collapse of Cholera.

SIR.—In a paper read to the East Surrey Cholera Society, and published in the last number of the *Association Journal*, by Dr. Richardson, a proposal is made to inject the peritoneum and cellular tissue of cholera patients in the stage of collapse, with large quantities of water, for the purpose of rapidly supplying the loss of serum experienced by the excessive discharges from the intestinal mucous membrane. This extremely philosophical and ingenious suggestion is certainly highly deserving of a mature consideration, and a careful digest of properly conducted experiments. But it has occurred to me, whilst reading these remarks, that the injection of a fluid more closely approaching the character of serum in its chemical constitution would be more likely to give permanent benefit, and avoid the chances of destruction of the blood-corpuscles, occasioned by the difference existing between the specific gravity of their contents and of the rapidly imbibed water.

The most readily obtained liquid, having all the qualities we can desire is most assuredly cow's milk; it is always at hand in any quantity, whilst its tendency to coagulate may be obviated by adding a little solution of carbonate of soda or potassa, perhaps about one scruple of the salt to a pint of milk would be sufficient.

The only difficulties about the matter, would be the adulterations to which it may be subjected by fraudulent dealers, and the accidental presence of foreign bodies. Investigations at home and abroad have however shown that nothing enters more largely into the adulteration of milk than water. This is of no importance; but were the world-renowned "chalk and water" compound employed, fatal consequences would assuredly follow.

The entrance of foreign bodies into the circulation, or into the cavity of the peritoneum, or the muscles of the cellular tissue, may be easily prevented by attaching a fine muslin or gauze filter, or seive, to the mouth of the injecting syringe. It remains to be proved whether this fluid would be absorbed by the peritoneal vessels as readily as water, or with sufficient facility to be of service.

The specific gravity of good pure milk varies from 1.041 to 1.033 or 1.020; serum varies from 1.026 to 1.037, and even 1.050, according to the presence of health or disease. Now to produce the difference in specific gravity required by the laws of endosmosis to act in a state of health, water may be added to the milk. But the *visciduity of cholera blood* would assuredly indicate an increase in the specific gravity, and no dilution would be *necessary* in this disease; but if it were adulterated with water only, it would be a matter of no great importance.

It seems highly probable that milk, or milk and water, would be a much more successful fluid for this purpose than water only, and would certainly offer many great advantages, especially if the injection were to be made directly into the venous system, as the corpuscles of the blood do not suffer any material alteration in form, when examined microscopically, after dilution with milk; *they suffer nothing from the admixture*, especially if the milk is obtained from an animal of the same kind as the blood experimented on, *and if the milk used be pure and unmixed with water.*

I apprehend also that the introduction of an albuminous constituent is essentially necessary, to supply the waste of this vital pabulum experienced during the exhaustive discharges of this disease.

It is quite a question whether the subsequent symptoms and fever, exhibited during the recovery from collapse, do not depend as much upon the loss of the albumen and salts of the serum, as upon the great difference subsequently existing in the relation between the quantity of the *solids and watery fluid* of the blood.

The chemical constitution of milk does not differ very materially from that of the chyle obtained by healthy digestion, which would of course be the only means *nature* would employ to regenerate slowly the lost liquor sanguinis.

Art physiologically directed comes to aid of nature, and, by employing her own Divine laws, assists her early efforts and wonderfully aids the cure—*gains time*, an element of vital importance in this marvellously rapid and fatal disease.

Nature would then merely have to regenerate the lost epithelial cells, which would of course be a work of time; and no efforts of art could remedy this defect; if the amount of the epithelial exfoliation had been very excessive, the exhaustive discharges of the choleraic diarrhoea would go in spite of all our injections; for the intestinal mucous membrane would then be in the condition of the dermis denuded

of its epidermis by artificial vesication; exosmosis must occur by serous transudation until the protective covering had been reformed, when endosmosis would again recommence from the re-establishment of the physiological action of these wonderful cells.

Hoping that some members of the Association may have the opportunity to put these suggestions in practice, and be able to communicate the results through the *Journal* to the profession.

I am, etc.,

W. B. HERAPATH.

Bristol, August 1854.

This letter, coming from so distinguished a chemist, gratified me very much; and from it I gather that the use of milk in transfusion, and as a substitute for blood, is novel, and whatever little credit, therefore, is due to so humble a suggestion, must be awarded to Toronto, where its use was not only suggested, but actually put into practice.

The fact that milk (provided it has not parted with life) may be injected into the human system by the veins is now established; and it remains to be seen how far it may be useful as a remedial agent, not only in cholera, but as a restorative in cases of Uterine Hæmorrhage, or Hæmorrhage from loss by wounds. In the cases in which it has yet been tried, all other means were exhausted before the attempt was made to inject the milk; and I am informed, both by Dr. Daniels and Mr. McKenzie, that after my attendance on the cholera patients ceased, in no case was transfusion attempted, until every one present concluded that the patient was actually dying. I regret exceedingly that my own serious illness should have prevented my continuing to visit the patients, as I was thus prevented carrying out the observations; enough, however, was witnessed to show, that, while we may expect much good from transfusion, it cannot be expected to restore to health the body in which serious local disorganisation has taken place: the earlier the collapse, and the sooner the milk be used, the better.

Dr. Owen Rees, in a very late publication, thus expresses himself:—"With regard to the chemical constitution of the fluid, it would appear that we can scarcely venture to interfere with the organic constituents of the blood, nor imitate the animal extractions and protein compounds of the circulating fluid, in order to supply them if deficient. There is, however,

no occasion for this in Asiatic cholera, for the evacuations from the intestinal surface which destroys the healthy character of the blood in that disease, appear to contain but little organic matter, being chiefly made up of water, holding the salts of the blood in solution. Thus Vogel and Wittstock agree in describing cholera evacuations as containing intestinal mucous, traces of albumen, and the ordinary salts of the blood with carbonate of soda somewhat in excess. The analysis of cholera blood again points clearly to the necessity of supplying more especially salt and water, if we desire to restore it to the healthy standard." Now, if we take a review of the composition and properties of milk, it will be found to possess all the qualities above desired by Dr. Rees. Thus the distinguished chemist Simon remarks, "that perfectly fresh milk has always a decidedly alkaline re-action, and it retains this property for a longer or shorter time: the milk of woman retains its alkaline re-action longer than that of cows, and the milk of healthy women longer than that of invalids."

On examining the milk under the microscope, we perceive a great number of fat vesicles of very different sizes swimming in a clear fluid, and occasionally epithelium cells. From repeated comparisons I have found that the fat vesicles in the milk of women are generally larger than those in the milk of cows. In addition to these, we observe, under certain circumstances, other microscopic objects. The fat vesicles have, as Raspail declared, a solid envelope, a point which has been confirmed beyond dispute by Henle. Raspail considers that it is composed of coagulated albumen; it is, however, more than probable that it consists of caseine. Henle has shown that this capsule may be dissolved by acetic acid, and that butter then issues from it. It is probable, however, that this fluid fat becomes enclosed in a new envelope, for Ascherson has observed that a membrane immediately forms around every drop of fat that is brought in contact with a solution of albumen; and have found, says M. Simon, that fat shaken with a caseous substance (crystalline) in a state of solution, causes a partial coagulation by the formation of such membranes or capsules.

"When milk is left to itself," continues Simon, "for a considerable time, it coagulates, in consequence of the con-

version of a portion of its sugar into lactic acid. This change often takes place *very rapidly in cow's milk*, and generally more quickly than in woman's milk." By reference to the analysis, it will be seen that in every particular cow's milk alive, and therefore fresh, possesses every necessary quality, as already observed; there is fuel for the sustentation of animal heat, and salts to supply the place of those drained away, mixed not by any cunningly contrived art of man, but in vital combination with a living fluid; for I think that we ought not to lose sight of the fact that, when we speak even of the water of blood, that we speak of water in a particular state, for it certainly must possess properties differing from the ordinary properties of water, and so on with every other constituent of the blood.

COW'S MILK.

Water	857.0	861.0	823.0	} F. Simon.	
Solid constituents.....	148.0	139.0	177.0		
Butter.....	40.0	38.0	55.0		
Cassia.....	72.0	68.0	67.0		
Sugar and Extractine.....	} 28.0	29.0	51.0		
Matter.....					
Fixed Salts.....	6.2	6.1	13.0		
Earthy Salts					
Phosphate of Lime.....	2.31	47.1	3.44		50.7
Phosphate of Magnesia.....	0.42	8.6	0.64		9.5
Phosphate Peroxide Iron	0.07	1.4	0.07	1.0	
Chloride of Potassium.....	1.44	29.4	1.83	27.1	
Chloride of Sodium.....	0.24	4.9	0.34	5.0	
Soda	0.42	8.6	0.45	6.7	

PROXIMATE CONSTITUENTS OF THE BLOOD.

Protein Compounds :—Fibrin, Albumen, Globulin,

Colouring Matters :—Hæmatin, Hæmaphein.

Extractive Matters :—Alcohol extract, Spirit extract, Water extract.

Fats :—Cholesterin, Serolin, red and white solid fat, containing Phosphorus, Margaric acid, Oleic acid.

Salts :—Iron. Albuminate of Soda. Phosphates of Lime, Magnesia and Soda. Sulphate of Potash. Carbonate of Lime, Magnesia and Soda. Chlorides of Sodium and Potassium. Lactate of Soda. Oleate and Manganate of Soda.

Gases :—Oxygen. Nitrogen. Carbonic. Sulphur, &c. Phosphorus.

DR. REES' ANALYSIS OF CHYLE.

Water	902.37
Solid constituents	97.63
Fibrin	3.70
Fat	36.01
Albumen	35.16
Extractive matters soluble in alcohol and water	3.32
Do. do. in water only	12.33
Salts as in lymph	7.11
Salts—chloride sodium.	
Lime—sulphate and phosphate.	
Other soluble salts—peroxide of iron.	
Earthy salts.	

CASE 1ST.

Thomas Harrison, aged 40, a native of Ireland, a farmer, resident near Brockville, admitted into the Cholera Sheds, General Hospital, July 10th, 1854, states that he was quite well when he left his home, and for some time after leaving the steamer; indeed, until the evening of July 9th, when he was seized, about 10 o'clock, with nausea, accompanied almost immediately with tendency to fainting and diarrhœa. He continued ill throughout the night, and received no benefit from the medicines which were then administered. Finding that he was seriously ill, he was brought to the Hospital. On his arrival, 10 o'clock a.m., he was placed in bed, covered with warm blankets, and was given hydrg. submur. gr. x. dry on the tongue, merely washing it down with a little iced water. His countenance was pale and cadaverous, sunken and cold, particularly the alæ of nose, the tongue was contracted, pointed, and cold as ice; fingers shrivelled, cold, and pointed; vomiting of liquid, having all the characters of similar fluid passed constantly and freely from bowels; cramps in bowels very severe, less so in legs; pulse small, contracted, 120; breath cold: gave calomel every 20 minutes; at 11 o'clock, vomiting continuing, he got—

R. Argenti: nitr: gr. j.

Aq. distill. oz. j, ft. haust.

To be taken every half hour.

At 1 o'clock p.m.—Finding that there was no improvement, but, on the contrary, that the symptoms had not yielded, I proposed to my friend and colleague, Dr. Hodder, to follow out a plan of treatment which had already been discussed between us, namely, that we should transfuse warm fresh milk into the veins. Dr. Hodder coinciding in my opinion, and satisfied with the physiological data on which that opinion was based, readily assented to the operation. Previous, however, to undertaking one of so serious a nature, as we then deemed it to be, I sought the advice of some other medical friends, among the number, Dr. Widmer, who, by message, as I could not see him, re-

quested us to be very cautious as to what we did, least, in case of immediate death, the public mind should become excited. One of my colleagues, also, could not bring his mind to approve of the step. We determined, therefore, to delay the operation until there could scarcely be a doubt that death was imminent. At about 3 o'clock the prostration had greatly increased; the man lay on his back, with his eyes sunken, countenance of ashy hue, hands cold, tongue equally so, breath drawn, in gasping sighs, and the pulse gone from the wrist. We now, therefore, commenced the operation. Dr. Hodder kindly undertook to introduce the tube and to inject, whilst I superintended the procurement of the milk. An ordinary glazed earthenware bowl was placed in warm water at the temperature of the blood. A cow, which was grazing close at hand, was brought up to the shed, and the nurse, with great care, keeping the teat close against the side of the vessel, to prevent frothing, drew off the milk in sufficient quantity; the syringe—a brass, anatomical injecting 4 oz. syringe, made by Neeves of London—having been warmed, was now filled with the fresh living milk. Dr. Hodder with considerable care introduced it into the tube previously inserted, and tied in the median vein; by a slow, steady motion the fluid was pressed on, while a gentleman present kept his finger on the pulse; in a few seconds the pulse was distinctly felt, first weakly, then more perceptibly, until at last he exclaimed, “How the pulse rises!” almost simultaneously the eyes responded, the half-closed lids being raised, the lustreless orbs giving utterance to the relief which was being given, while deep and well-drawn inspirations told how readily the lungs responded to the vital tide which now flowed towards them. Three syringes full having been passed into the system, the following effects were noticed—repeated sighing the breath being drawn deeply and fully, with evident sensations of relief; the pulse quite perceptible and steady, 100 in the minute; the voice, which was unearthly before, was clear, though not strong; and whereas, before the operation he was perfectly careless and, indeed, reckless as to his personal safety and the care of his family, almost his earliest thoughts were directed to the welfare of his children and wife. The arm being bound up, Harrison, with much strength, turned himself on his side, and desired to sleep. Knowing that, under the condition to which he had been reduced, it was not at all probable that he would be enabled to keep up the animal heat of his body, care was taken, by artificial means, to attain this desirable end; while, therefore, hot bottles were placed against his feet, his chest, body, arms, and spine were ordered to be rubbed with hot turpentine, and hot flannels were to be kept constantly over his body; and as nutriment he was supplied with small quantities of strong beef tea whenever he would take it, with white of egg and brandy and water, an oz. of brandy, to white of two eggs.

At 8 o'clock p.m.—Had some good natural sleep; no vomiting, bowels not moved once, no cramps; surface requires to be kept artificially warm; if the applications are discontinued becomes cold; ex-

presses himself greatly relieved, but still feels very weak, has by no means so great thirst as before, kidneys have acted. Treatment continued.

July 11th.—Has had a tolerable night, bowels moved twice, discharges coloured with bilious matter, passed water, has vomited this morning a free quantity of bile; pulse quite perceptible, 100, and easily compressed; no cramps or pain in limbs. My friend, Dr. Clarke, whose valuable services at the General Hospital are too well known to require any commendation from myself, suggested the desirableness of administering a gentle laxative, with a view of procuring a freer discharge of matter from the bowels. Accordingly, it was determined to administer at even-time a couple of grains of pil. hydrg., and a tea spoonful of ol. ricini, and continue warm applications.

July 12th.—Medicine has acted freely, but not too much so; he has vomited a large quantity of bile; pulse very much improved; is now painfully sensitive to the application of turpentine, which at first only produced an agreeable glow of heat; enjoys his beef-tea, and takes his brandy and egg. He had after this a troublesome bilious diarrhoea, but progressed towards convalescence, and left Hospital convalescent. I learned on Wednesday last, January 23d, that he was yet alive, and in good health. It was noticed that many patients bore white of egg and brandy with cod-liver oil, when the stomach rejected other nutriment.

CASE 2D.

Mary Hall, an Irish woman, married, and the mother of four children, the youngest being an infant at the breast. This patient had come into Toronto with her husband to attend the demonstration made by the Orange Society. She was quite well on leaving home, and remained during the day at a small tavern on Queen Street; in the afternoon she was seized with distinct symptoms of cholera. At 10 o'clock p.m., I saw her for the first time. In order to procure for her efficient attendance, she was with some difficulty persuaded to enter the Hospital Sheds. On her arrival she was placed in a comfortable warm bed, and was ordered

Argent. nitrat. gr. j.

Aq. distill. oz. j, ft. haust.

Every half hour. To have beef-tea, and brandy and egg.

July 13th.—She has passed a restless night, and although the vomiting was considerably lessened, yet the discharge of rice-water evacuations from the bowels continued; her pulse was extremely feeble and quick; countenance pinched and of ghastly hue; tongue cold and pointed; tossing about her arms, and sighing; careless about her fate, and is not roused by any reference to her children or husband. Dr. Hodder, equally interested with myself in the history of the disease, and anxious to do all in his power to mitigate its horrors, came to the sheds, and witnessing the condition of the poor woman, at once agreed

to perform transfusion. The same precautions were adopted in this case, as were found necessary in that of Harrison, and with like results. At the time the tube was put into the vein she was pulseless, and although she could be roused, yet was incapable of answering questions, and altogether she presented a hopeless appearance. Two syringes full, equal to 8 oz., of the fresh warm milk from the same cow which afforded the supply to Harrison, were injected into the vein. As soon as the operation was completed, she expressed the greatest relief, and seemed irresistibly impelled to draw deep and frequent inspirations. The arm being bound up, as with Harrison, so with this patient—a desire to sleep was manifested, and turning over on her side, she composed herself to slumber. Hot bottles were kept not only to her feet but about her body, and she was rubbed with hot turpentine, and then swathed in warmed flannels. At evening visit she was evidently improved, had some sleep, the renal secretion was restored; her pulse was steady and quite perceptible; countenance relieved, and not so pale and ashy; no vomiting, nor discharge from bowels.

Ordered to have beef-tea, and brandy and egg.

July 14th.—Improving, although very weak; has had occasional vomiting of bile, and has had several bilious evacuations. She was carefully watched, allowed to have nothing but beef-tea and brandy and egg occasionally, and was finally discharged convalescing on the 17th July.

Two other cases were transfused by myself, both immediately after being brought into hospital, and when *in articulo mortis*; the one a man named James Pickles, and the other a female. In the last case it was quite evident that life was ebbing fast; and to complicate her difficulties, the veins were so empty and small, that I was for some time foiled in my endeavours to find one; after some difficulty, I succeeded in getting a pipe into the vein of the arm, and injected two syringes full, equal to 8 oz; the effect was to recall the pulse at the wrist, to enliven the countenance, and restore strength and fulness to the voice. From the lateness of the period at which the operation was performed, and from the disease having nearly done its work ere she was brought into Hospital, her rally was only temporary; for four or five hours she gave promise of amendment, and seemed greatly relieved; but afterwards she again began to sink, without, however, any renewal of the diarrhæa or vomiting, and finally died on the following morning. In reference to this case, I think it right to state that I intended to transfuse a second time, but, being seized with alarming illness, neither in it nor in any case was the operation repeated.

The next cases are kindly furnished me by one of our most industrious medical pupils, Mr. John Mackenzie, whose devotion to the sick during the whole of the cholera visitation was truly praiseworthy, and deserved to be honourably rewarded by the Board of Health. When

others refused to lay hands on the dead, this gentleman removed them without any hesitation, to make room for the living.

TRANSFUSED.

1.—*Wm. Fraser*, admitted July 16th, was a very athletic young man, in the employ of Mr. Tuminey, was a carpenter by trade, formerly lived in country, had had Diarrhœa for several days, on Saturday, 15th inst., eat a great many cherries; on Sunday morning early, or on Saturday night, he was taken with violent vomiting and purging; on admission he had violent vomiting of Rice water, together with cramps. Nitrate of silver was tried, together with calomel, brandy and water, beef tea, &c.

On Monday, 17th, pulse scarcely to be felt, cramps less frequent, but vomiting continues; evidently sinking fast; at 10 A.M., median basilic opened, and tube introduced without difficulty; about 10 oz. of milk thrown up. Pulse in 10 minutes could be felt, and voice, which before was scarcely audible, could now be heard; the patient expressed himself far stronger; and though he was greatly revived by transfusion, yet vomiting continued in spite of everything, and he died at about 2 P.M.

2.—*James Conway*, admitted July 12th, an able-bodied labourer, brought to hospital in state of collapse; pulse scarcely perceptible, eyes sunken; mouth open, with that peculiar dropping of jaw; tongue cold as ice. Saw him a few minutes after he was laid on bed. I then thought the man would die before the tube could be introduced, and as his wife was piteously imploring something to be done, I determined to attempt it alone. Introduced the tube, and transfused about 8 oz. milk. Went and got brandy, and made his wife give it to him, and though he remained insensible during the time I was introducing tube, yet he so far recovered as to be able to speak to his wife, but died about 1 P.M.

This man had no vomiting latterly, though his wife stated he had vomited during night. Was taken during previous night.

3.—Dutch woman, admitted July 18th, unable to speak English, came in state of collapse; pulse absent, tongue cold; eyes sunken, the fingers wrinkled, and nails blue, having the appearance as if wrinkled by cold,—evidently dying. Brandy and water was given. Transfused about 11 P. M., rallied a little, but died in afternoon, about 2 P. M.

Such is the brief account of the cholera cases which I have the honor to submit to the Institute. In conclusion, I would venture to express a hope that the Corporation of the city will not again permit themselves to be taken by surprise, as we unquestionably were last summer. The pestilence came on us suddenly, and cases poured into the sheds ere the fitting ac-

accommodation could be provided. In this way, wards became overcrowded; the sick had neither utensils nor proper bedding, nor food for their accommodation; and much distress arose. By enlarging the Board of Health, and placing it on a better footing, much good would result. Why not empower the Members of the Corporation for each ward to associate with themselves a medical man, resident in their own or in the nearest ward, to act as a health committee. In May let these committees commence their work, visiting first the worst streets, and ordering the removal of all nuisances and filth; and, in case of disease, looking after the sick in their districts. There are many old decaying wooden houses in our lanes and bye-streets, which are not even good enough for kennels; surely the owners of such places ought to be compelled to remove them, or, at all events, to cleanse and drain their premises. It is well known that cholera delights in filth and moisture. No allusion is made to the important question of water supply, as the proper authorities have taken up the matter; it may, therefore, be hoped that the detestable liquid quaffed last year, and even at this time, will not be much longer supplied to us. Money ought not to be the sole object when the health of a whole city is concerned, and the guardians of the public health ought to be entrusted with full powers to act for the good of those placed under their care.

I trust that these few remarks, uttered in no captious spirit, but from an earnest desire to prevent a recurrence of perhaps scenes then unavoidable, will not be misconstrued.

