press any positive opinion on the result. He considered that they ought to allow twelve months at least to elapse before they could claim a cure. Dr. Ward Cousins stated that he had operated on ten cases in the adult, and in some of these, also, with excellent and permanent results. They were all severe cases, in which either from the large size of the hernia or the presence of adherent omentum in the sac, mechanical treatment had failed. The operation in young children he considered both simple and safe. Young children bore operation extremely well, partly because of their restorative powers, and partly from the undeveloped and inactive condition of the organs. He operated by passing the ligatures round the neck of the sac, then dividing the sac below the ligatures, and closing the edges with a continuous suture. He never closed the pillars of the ring in young children. He believed that the only way to reduce the number of hernial subjects in the coming generation was by the almost general application of the radical cure during early life. Parents were getting desirous for operative interference, and in a few years they would be as anxious for an operation for hernia as they now were for the cure of hare-lip and club-foot. He exhibited an elastic air-cushion, which he used after operation in children.—Professor KOCHER (Berne) said he had been very much interested in the discussion on radical cure of hernia, having done it in about seventy cases, not counting those where it was done for incarcerated hernia. He quite agreed with Mr. Banks that we must distinguish cases of small and of very large hernia. Those latter, when failing to give a success, were rather a failure of expectant treatment, having been kept up too long, till the patient could no longer bear the great inconveniences, and had to be submitted to a rather late operation. For the cases in which the operation could be done in time, it had a very good effect on the final results, though not being able to give his statistics; but, practising in a small country, he had been able to watch a good many of his patients for years. The one point he thought of great importance to a definite result was not to trust at all to lymph exudation and adhesions, but rather to employ a material which could not give way, as natural tissues always did give a continued pressure—that is to say, never to use catgut, but rather silk or wire. The methods of Mr. Ball and Macewen must give a much greater security against the effects of pressure and the simple suturing together the pillars of the abdominal opening.

KOUMISS AND KOUMISSIED PEPTONES: INDEPENDENT DISCOVERY OF VARIETIES, PHYSIOLOGICAL USES, ETC.¹

By EDWARD C. ANDERSON, M.A., M.D. CANTAB.,
Wolsingham.

My first acquaintance with koumiss was formed in 1869, at the house of a medical friend residing near Windsor. I recollect both him and myself tapping a bottle, drinking some of it, and pronouncing it to be "rum stuff." From this time until March, 1881, my acquaintance was *nil*. I then had a case of chronic dysentery brought under my notice and care, and, as a last resort, I recommended koumiss. I sent for and obtained one dozen champagne quarts, and my patient evidently derived benefit from the taking it. The price was, however, so prohibitive (nearly £3 3s. by the time the first dozen was obtained and carriage paid), that I, with the greatest difficulty, and only after the lapse of a week or two, obtained the consent of my patient's friends to send for a second supply. Unfortunately, this interval was sufficiently great to cause a relapse to the most severe expressions of the disease; so that by the time this additional supply was received, she was too far gone for recovery. This determined me to penetrate, if possible, the secret of koumiss; and I accordingly for the space of a few months puzzled and cudgelled my brains.

I began by subjecting milk to the action of German yeast, adding a large teaspoonful of sugar to it; but this, while producing what was without doubt a homologue of koumiss, resulted in a highly charged and therefore effervescent carbonic acid drink, with much the odour and flavour of bad ginger beer.

I next experimented with the bicarbonates of sodium and potassium, and with calcium carbonate. These simply gave effervescent milk, sour with excess of lactic acid, which, decomposing the salts, gave respectively drinks holding in solution the lactates of sodium or potassium, or of lime. The same varieties, having a definite quantity of sugar superadded, were first effervescent and sweet; then, in accordance with the daily increased acidity from daily increased amount of

lactic acid produced, effervescent and sour. These were artificial koumisses. They could not become true or normal koumiss, because of the complete absence of alcoholic fermentation. I had, however, advanced one step. I had obtained lactic acid fermentation.

During the course of the foregoing experiments, my attention was drawn to a bottle of diabetic urine placed in my laboratory window, the effect of sunlight and heat upon which caused so great an evolution of carbonic acid gas as to forcibly expel the cork, and brisk effervescence to ensue. The whole difficulty was explained at a glance. Here was a fluid possessing many of the constituents and characteristics of milk, but differing, because containing what neither milk nor healthy urine contain, namely, grape sugar, and, as a factor in the alcoholic fermentation present, the sugar fungus, or *saccharomyces cerevisiae*. I therefore made a solution of cane sugar (I had no grape sugar by me), placed it in a warm damp room, for fermentation to set in, and, having succeeded, I placed a small quantity (a drop or two) into a champagne quart of milk, to which had been added about half an ounce of cane sugar. I corked and tied down the bottle, and submitted it for twenty-four hours to a temperature of about 90° F.; and in this way succeeded in obtaining koumiss. This resembled the German yeast experiment, in that it was highly effervescent, but differed from it in that, while possessing the pleasantly acid flavour due to lactic acid and the presence of sugar, it was altogether free from the bad ginger-beeriness.

Having obtained true koumiss, how was I to produce and renew it without the frequently disappointing expedient hitherto resorted to, namely, exposing the milk to the sun's light and heat in order to obtain the ferment? Surely, I reasoned, in no better way than by "infecting" the prepared milk previously to corking and wiring, by placing in it a small quantity of freshly prepared koumiss; and seldom now do I proceed in any other way.

These experiments were completed in May 1882, nearly six months before meeting with Dr. T. L. Carrick's work. My primary motive in getting and reading this work was to ascertain how far Dr. Carrick and myself were in agreement. I found that, respecting the beneficial influence of koumiss in disease, we had much in common; but I was disappointed and surprised to find that, respecting the manufacture of it, he either on the one hand knew so little about it that he had as little to communicate; or, on the other hand, that, knowing all about it, he was determined to hedge it round with so many difficulties and obscurities as to baffle and bewilder the anxious inquirer and investigator. One thing I learned, namely, that whereas the koumiss I had obtained from London in 1881 was thick and lumpy, Russian mare's milk koumiss was thin, and the sedimentary deposit, impalpably fine. But my experiments with the bicarbonates of sodium and potassium had already unravelled this difficulty; and especially when, having succeeded in making true koumiss, I continued my experiments upon it in producing the therapeutical varieties, months before my knowledge of Dr. Carrick's publication. By adding to the prepared and infected milk a small quantity (from 7 to 15 grains) of either of the alkaline carbonates I have mentioned, I produced an exceedingly fine sediment; but by substituting an equal amount of the earthy carbonate, that is of chalk, I caused the deposit to be even more coarse and lumpy than when water alone was added to the milk. I had previously discovered that milk, to which 25 per cent. of water had been added, produced a koumiss having a far finer sedimentary deposit than that which I had obtained from London; and the explanation must be this: the water in the neighbourhood of my home is the softest and purest in the kingdom, or nearly so; whereas the London waters are, most if not all, of considerable hardness, that is, they contain a large percentage of earthy carbonates, etc. But, it may be asked, does not this addition of alkaline carbonate to milk, previous to being made into koumiss, act deleteriously when taken into the system? Certainly not; koumiss is stated to be, and doubtless is, partially digested milk. If this be so, then coarse lumpy koumiss must be, in the degree of its coarseness and lumpiness, more indigestible, because less digested than koumiss, whose deposit is very finely granular. Again, by the decomposition, during the process of koumissification, of the alkaline carbonate, and the substitution for it of a lactate, not only is the koumiss rendered less acid, from the fixation of some of its superabundant hitherto free lactic acid, but a highly important and valuable therapeutic agent is produced; namely, lactate of soda, for example. Moreover, only that quantity of alkaline carbonate is added as is always permissible and requisite when foods have to be peptonised and digested artificially, whether afterwards koumissified or not. Koumiss, as made by myself when using water alone, is finer and thinner than ordinary commercial koumiss, by reason of the softness and purity of the water abounding in the district; and this, the fineness of the sedimentary

¹ Presented to the Therapeutical Section at the Annual Meeting of the British Medical Association, Dublin.

deposit, is still further increased by the addition of a physiological quantity of a carbonate, the decomposition of which, as above indicated, results in the substitution for it of a most valuable therapeutic agent. The koumiss is, thus and therefore, more thoroughly digested and digestible.

I have stated that, in my opinion, Dr. T. L. Carrick either possessed little knowledge respecting the manufacture of koumiss; or, that knowing all about it, he was determined to bewilder the investigator. "Thus (he states) if milk (speaking of mare's milk) be too rich, the excess of fat is apt to make it undergo the butyrous fermentation," p. 54. Again, at p. 67, speaking of the importance of herbage "when the grasses are too rich, that is, contain too much oil, butyrous fermentation is easily set up; when poor in starchy or saccharine material, on the other hand, they render the milk unfit for fermentation, because of the small percentage of lactine it then contains." On p. 286 he says: "Dr. Polubensky's directions for fermenting cow's milk are as follows: An oak churn, such as is used for churning butter, has a bottle of fermented cow's or mare's milk, five days old, poured into it in the morning. A tumbler and a half of warm milk (of a temperature of about 90° Fahr.) in which half an ounce of cane, still better milk, sugar has been dissolved, and a bottle of skimmed cow's milk, are then added." At p. 287, he continues: "The addition of the sugar (preferably, milk sugar) is made for the purpose of remedying the small amount of lactine in cow's milk." Now, with respect to these three statements of Dr. Carrick's, I must most forcibly insist that, firstly, every appreciable particle of cream, oil or fat, whether in mare's milk or in cow's, must be removed, or the butyrous fermentation is certain to be set up; secondly, lactine or milk sugar, can, if pure, produce nothing but the lactic acid fermentation; is unable, therefore, to set up, still less continue to completion, alcoholic fermentation. How then can this be established? I answer, by the addition to the milk of cane or grape sugar in conjunction with the ferment, and in no other way.

In the BRITISH MEDICAL JOURNAL for May 12th, 1883, mention is made of "kefir," or "khiafar," "the new milk ferment." Kefir seed or ferment is there stated, on the authority of Dr. Kern, to retain its vitality after remaining for months in its dry condition. What is kefir? Nothing more nor less than the sedimentary deposit of koumiss (mare's or cow's), coloured and perhaps sweetened, it may be, to escape detection, but nothing else, notwithstanding. I have kept dried and powdered kefir for more than twelve months, and then found it active.

What is the so-called koumiss extract supplied in 3½ oz. *flacons*, and commonly sold at 25s. per dozen? Some of the sedimentary deposit of koumiss (mare's or cow's, but most probably the latter) suspended in a menstruum which probably contains something to feed it and keep it active. What is the probable cost to the vendors? I should say that, with the exceptions of the *flacons*, corks, capsules, advertisements, and wrappings, positively next to nothing. Stay! There are the directions how to make koumiss from it. I very much doubt it. These directions mystify the public.

With respect to the manufacture of artificial ferments when the natural is not at hand, Dr. Carrick says: "The simplest of any is that recommended by Bogoyavlensky and adopted and modified by Tchembulatof. It is thus prepared:—Take a quarter of a pound of millet flour, add water to it, and boil it down to the consistence of thick oatmeal porridge. Then heat separately in another vessel eleven pints of milk to boiling point, and then allow it to cool down. When its temperature has fallen to about 95° F., pour into a wooden bowl or tub, and add the boiled flour to it. The upper and open part of the vessel is then covered with a piece of coarse linen, and left at rest at a temperature of about 99° F. for from twenty-four to forty-eight hours. The appearance of small bubbles which keep bursting on the surface of this liquid, combined with a vinous or acid odour, proves that the ferment is ready." If this be the simplest method, what must be the more complicated? What the most?

My method is this:—Place about a teaspoonful of honey in a quarter of a pint of water, and put it in a warm, damp atmosphere. Within twenty-four or forty-eight hours the liquid will become vinous, and, if corked, the cork will be expelled, showing the presence of carbonic acid gas. Take a small quantity, say a teaspoonful—a drop even would suffice—and add it to the prepared milk; and within twenty-four hours, providing that the mixture be bottled, corked, and wired, enough gas will result from the koumiss or fermented milk to forcibly expel the cork if unwired, or even sometimes to burst the bottle.

Dr. Carrick, moreover, lays great stress upon the presence of the "bacterium lactis" in the process of koumissisation. I question much whether it can, in any sense, initiate the alcoholic fermenta-

tion; certainly not unless cane or grape sugar be present; and even then failure resulted with me unless the *saccharomyces cerevisiae* were added. On the other hand, I question equally whether the bacterium lactis is absolutely essential to even the lactic fermentation. Most milk, previous to being prepared for making into koumiss, is by me steamed for removal of cream, and thereby raised to nearly 212° F. This should destroy all but sporigenous bacteria.

The following are a few varieties of medicinal koumiss: sodium lacto-phosphate, iron lacto-phosphate, calcium lacto-phosphate, potassium lacto-phosphate, calcium lacto-phosphate, calcium and iron lacto-phosphate, lithium lacto-phosphate, lithium and sodium or potassium lacto-phosphate, and many others too numerous to mention.

What is a koumissised peptone? It is milk, or milk and other foods; first, by the action of pepsin, of pancreatine, or of both, almost completely digested, and thereby converted into peptone, or still further split up, and then made into koumiss. In the process of peptonising about 25 per cent. of water is driven off, and none is previously added. Koumissised peptones are therefore of about 50 per cent. greater food value than ordinary koumiss. They are more fluid, have a sediment of far greater impalpability, and are incomparably more digestible and easily assimilable than ordinary koumiss, or even than Russian fermented mare's milk. While the author of this paper claims to be independently a discoverer of ordinary koumiss, he is the acknowledged inventor and institutor of this, the highest expression of a perfect koumiss. It is of especial use in the most irritable and adynamic types of wasting diseases; and can be, and has been taken and retained, when all other foods, ordinary koumiss not excepted, have been rejected. Valuable lives have been saved which would have been lost but for its administration.

Hitherto I have spoken of the use of cane sugar in the making of koumiss, etc. I now come to speak of the substitution of honey. For years past seldom has cane sugar been used by me. In the preparation of ordinary foods, grape sugar, and sometimes sugar of milk, has replaced cane sugar on the ground of the disagreeable eructative and fermentative action the latter exerts when administered. This cannot be so great in the matter of koumiss; yet I have substituted honey for cane sugar, and principally for the following reasons: honey is more wholesome, more nourishing, more digestible, a more physiological food than cane sugar. It produces a koumiss having a finer sedimentary deposit, increases the beauty and delicacy of flavour, and delays or prevents its becoming caseous.

Koumissised peptones are, equally with koumiss, the vehicles for the administration of such of the most important therapeutic agencies as are of use in particularly wasting diseases. But such medicinal agents are not added where the beauty and delicacy of flavour of either the koumiss or koumissised peptone are in any appreciable degree interfered with.

CLINICAL MEMORANDA.

DISCOLORATION OF THE SKIN BY NITRATE OF SILVER.

A WELL MARKED case of argyria was came under my observation, some years ago, in the person of a woman 60 or 70 years old, who, many years previously, had been supplied with a solution of nitrate of silver to apply to her throat.

Reigate.

J. WALTERS, M.B.

TOXICOLOGICAL MEMORANDA.

POISONING BY HORSE CHESTNUTS.

WITH regard to Mr. Solomon's interesting case of poisonous symptoms arising from eating the green horse chestnut, I beg to record an almost similar case which came under my notice about a year ago. I was sent for to see a little girl, about six years of age, who was suffering from severe pain in the abdomen, nausea, and thirst; there was also slight delirium, and the features displayed much anxiety. I remember, too, the eyes looked very brilliant, and the pupils were dilated, as in Mr. Solomon's case. I thought at first it was peritonitis, but, on fuller inquiry, I learned from the mother that the child had been gathering chestnuts that morning in the neighbouring woods; and it at once occurred to me she might have eaten part of the chestnuts. The suspicion was soon verified on giving an emetic; and, with the application of warm stupes and a sedative mixture, the patient was quite well next day. The child said she ate the green chestnuts "because they were like apples." As far as I can now remember, this was