saccharine is sufficient to cover the taste of 10 gr. of calcium chloride. This mixture may be given either in water or in milk, and it does not interfere with the use of any other remedies.

I have also used it in cardiac disease, where the ventricular wall appeared to be losing power, and here also the results have been encouraging. In cases of pneumonia, where one wishes to get rapid action, I think the chloride is the best salt of calcium, but in cardiac disease other salts may be employed, such as the lactophosphate or the glycerophosphate. It is quite possible that the great benefit one frequently observes from a milk diet in cases of heart disease, may be due, in part at least, to the large quantity of calcium salts which the milk contains.

At the present moment, when there is a good deal of antivivisection agitation, it may be interesting to note that the plan of treatment by oxygen and strychnine recommended by Dr. Prickett and myself fifteen years ago, and the one which I now recommend, both owe their origin to laboratory experiments, and any benefits which may result to patients from either plan must be regarded as the fruits of experiments upon animals.

DELAYED CHLOROFORM POISONING.

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The following are notes of 2 cases in which symptoms of delayed chloroform poisoning were observed in adults.

CASE I.

A. B., aged 26, was sent to the Western Infirmary by Dr. Thomson on March 2nd, 1906, suffering from acute appendicitis. She was operated on an hour and a half after her arrival and a large diseased appendix removed. The temperature fell to normal the next day, but persistent vomiting continued for two days in spite of washing out the stomach and rectal feeding. On the fourth day after operation she complained of pain in the cardiac region, which was not relieved by strychnine or digitalin, and she died on the fifth day after operation.

I am indebted to Professor Muir for notes of the *post-mortem* examinations in this and the following case.

Post-mortem Examination.—There was no trace of peritonitis, and the site of operation showed normal healing over the point where the appendix had been removed. The stomach contained a considerable quantity of altered blood, but there was no ulceration, and no source of the haemorrhage could be detected. The liver was in a condition of extreme fatty degeneration, the colour being almost a uniform yellow. The organ was not enlarged. The kidneys showed a diffuse fatty degeneration, though rather less marked than was in the liver. The cardiac muscle also showed considerable fatty change, this being pretty generally distributed. The coronary arteries were healthy. The lungs had a distinct acetone-like odour. The spleen was healthy. Microscopic examination gave confirmative results. In the kidneys the convoluted tubules, Henle's tubules, and also many of the straight tubules showed profound fatty degeneration, the cells being practically filled with small fatty globules. The fatty change in the liver was also very advanced and almost uniform in its distribution. In the heart the fatty degeneration was very diffuse, practically all the fibres containing fatty globules, but was not of extreme degree. The changes noted correspond with those in late chloroform poisoning, and point to the action of some toxic substance on the organs mentioned. There was no evidence of septicaemia or of any other condition which might explain the fatal result.

CASE II.

B. C., aged 28, was sent to the Western Infirmary by Dr. Ingram of Helensburgh. She was suffering from pyloric stenosis, and for this a gastro-enterostomy was performed on November 11th. After the operation she was much troubled with sickness and faintness, and died on November 15th. She had as anaesthetic 5 c.cm. ethyl chloride and 3½ oz. of A.C.E. mixture. The anaesthesia lasted for fifty minutes.

Post-mortem Examination.—A posterior gastro-enterostomy had been performed, and the peritoneum was in a healthy condition. The stomach showed signs of chronic catarrh, and its mucous membrane was somewhat rugose. There was no haemorrhage. The liver showed extreme fatty degeneration as in the previous case, and microscopic examination showed the condition to be of similar nature and degree. In the kidneys fatty change was present, but it was much less marked than in the previous case; and it was found on microscopic examination that the fatty globules were only present in the basal portions of the cells. The spleen was normal, and cultures made from it gave only a few colonies of the *Bacillus coli*. The heart muscle was somewhat atrophied, but was not fatty. In the right lung there was an area of chronic grey

tubules with evidence of caseation at places, but this was of small extent.

In the second case the changes in the liver and kidneys were somewhat similar to those in the first, but were of less degree. The case is possibly of the same nature, but considerable emaciation was present, and death may have resulted simply from inanition.

I record these cases owing to the importance of cases of delayed chloroform poisoning and the interest that has recently been taken, more especially regarding deaths among children. In the first case the patient had chloroform alone, in the second case ethyl chloride and A.C.E. mixture was given. This latter combination may have accounted for the symptoms in the second case not being quite so pronounced. So many feeble patients have operations done of even a more serious nature than the above and get perfectly well, that it is to a certain extent satisfactory to be able to give a definite cause as to the fatal termination in two such comparatively young patients as the above. The practical question naturally arises, What is to be done in order to prevent the possibility of acetone poisoning taking place?

CHRONIC PERITONITIS CAUSING ELEPHANTIASIS.

BY

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A WOMAN of 43 years of age was admitted to Westminster Hospital under the care of Dr. de Havilland Hall, to whom we are much indebted for permission to publish the case, on September 15th, 1905. She complained of shortness of breath and swelling of the legs and abdomen.

She had been an in-patient at several other London hospitals, and we are much indebted to Dr. Jex-Blake for kindly allowing us to make abstracts of his notes taken during the patient's stay in St. George's Hospital.

HISTORY.

Patient has had five miscarriages and ten children; the menses ceased fifteen months ago. She denies alcoholic excess. In March, 1904, she began to suffer from dyspnoea on exertion, loss of strength and flesh, and languor; in April from vomiting; in June and July from protrusion of the eyeballs; in July, swelling of the thyroid gland; about the same time she complained of nervousness, and the colour of the skin became darker; in August the abdomen became enlarged; in October she suffered from bronchitis and palpitation. A diagnosis of Graves's disease was made. In January, 1905, the following was noted: Abdomen enlarged, walls thick and brawny; no evidences of ascites; lower extremities large, brown stained, and in a condition of hard oedema; no albumen in urine. In February patient suffered from diarrhoea, which continued for two months. On April 9th condition was as follows: Orthopnoea; pulse irregular, small, of low tension; apex beat fourth and fifth spaces, 4 in. to 4½ in. from middle line; mitral systolic bruit conducted toward axilla; jugular veins distended and fill from below; signs of fluid at both bases, and scattered rhonchi; tongue small, red, and raw; abdominal wall hard and irregularly pitted; legs much swollen, very tense; skin of body regularly pigmented; moderate exophthalmos; moderate, non-pulsating, bilateral goitre. In June there was oedema up to the level of axilla, evidences of ascites, the legs were of brick-red colour, brawny, and barely pitted.

On admission to Westminster Hospital the patient presented the following condition: Orthopnoea; moderate exophthalmos; movements of eyeballs very quick; thyroid gland moderately enlarged, soft, and elastic, with slight pulsation and thrill; severe palpitation on excitement; pulse 100 per minute, irregular, rather full, low tension; apex beat in fifth interspace, diffuse and feeble; loud, blowing, mitral systolic bruit propagated to axilla; fainter bruit in pulmonary area; carotids pulsating vigorously; jugular veins distended and refill from below; much thirst, tongue dry; abdomen extremely distended, walls in lower part hard and brawny; signs of free fluid in cavity; liver not palpable, upper border at level of fourth rib; external haemorrhoids; lower limbs enormously enlarged and condition well represented by photograph; calf measures 20 in.; skin obviously much thickened, does not pit, hard and brawny, sulci deep, general surface shows closely aggregated minute prominences, colour bronzed, with reddish tint; skin of body bronzed; no pigmentation of mucous membranes; scattered rhonchi over lungs; patient highly nervous and flushes; fine tremors of upper limbs; urine normal.

After-History.—September 25th. Twenty-three pints fluid withdrawn from abdominal cavity and 3ij adrenalin solution introduced. Microscopical examination of fluid showed red blood corpuscles, large number of lymphocytes, very few polymorpholeucocytes. October 10th. Soft oedema of right upper arm and forearm, to less extent of left arm; volume of left pulse smaller than right; some stridor, mainly expiratory; over right base, vocal fremitus and percussion resonance diminished. October 12th. Eighteen pints of fluid withdrawn from abdominal cavity and adrenalin solution introduced; fluid, specific gravity 1014; no evidence of chylous fluid; liver palpable just below xiphisternum. October 25th. Bronchial breathing over both bases. October 26th. Patient gave a peculiar cough and fell back dead.

There could, of course, be no doubt that the patient was suffering from Graves's disease. The enlargement of the thyroid gland, the exophthalmos, the palpitation, and the fine tremors clearly pointed to this. This diagnosis was also sufficient to explain the presence of uniform pigmentation over the body. The question was whether the patient was also suffering from cirrhosis of the liver, perihepatitis or chronic peritonitis, and the diagnosis arrived at was that the condition was in all probability hepatic cirrhosis, possibly associated with some chronic peritonitis. The condition of the legs was thought to be due to some pressure on the thoracic duct. Several possible causes of this were considered, but no definite conclusion was come to. Having regard to the nature of the physical signs and to the fact that degeneration of the myocardium

Fig. 1.—Photograph taken in life.*

PATHOLOGICAL REPORT.

Autopsy Performed Sixteen Hours after Death.—The upper parts of the body and the arms slightly emaciated; the lower extremities and abdominal wall below the umbilicus the seat of extreme brawny oedema, the legs and suprapubic skin being particularly indurated; circumference of calf 19 in., thigh 28 in., abdomen 46 in. The skin over these parts thickened and corrugated; the abdominal wall immediately above the pubes measured 3 in. in thickness, gradually thinning down to 1 in. just above the umbilicus, where it became fairly normal. The thickened tissue on section showed extreme oedema, with a gelatinous appearance. Face cyanosed; thyroid enlarged; cervical veins distended; eyes prominent (proptosis). Dorsal hypostasis, and over the buttocks several prominent dilated lymphatic vessels. Abdominal cavity distended with yellowish serous fluid, a similar fluid occupying the right side of the thorax and compressing the lung. Peritoneum markedly thickened, and posteriorly especially so, with adhesions around the liver, between the transverse colon and duodenum, and around the pancreas. The receptaculum chyli and the origin of the thoracic duct were involved in an extensive prevertebral fibrosis, whilst from the first lumbar vertebra upwards the duct was dilated to the size of a quill pen, until its entrance into the subclavian vein. The inferior vena cava and aorta did not, however, appear to be constricted by this fibrosis, nor did the larger vessels in the groins. Marked perihepatitis; suprarenals involved in the fibrotic tissue which also surrounded the ureters without causing any dilatation. Spleen 10 oz. in weight, surface mottled by white patches of peri-splenitis; section normal. Liver 50 oz., surface finely granular, on section yellowish, finely granular and somewhat firm. Gall

Fig. 2.—Prevertebral lymph gland showing dilated lymphatics amongst lymphoid tissue (microphotograph $\times 20$.)

is by no means infrequent in cirrhosis of the liver, the mitral systolic bruit was thought to be due to cardiac degeneration rather than to any organic disease of the mitral valve.

*These photographs were taken by F. R. Chopping and A. Parsons, of the hospital laboratories. They are best discerned with the aid of a hand lens.

Fig. 3.—Dermis in condition of advanced oedema resulting in separation of fibrils by fluid; slightly dilated lymphatics, some of which are surrounded by round cells, and best seen in lower segment; portion of sweat gland seen in upper part (microphotograph $\times 30$.)

bladder distended with clear mucous fluid and contained several soft calculi. Bile and pancreatic ducts patent, opening normally into the duodenum. Portal vein and its tributaries and intestines normal. Kidneys together weighed 18 oz., cardiac. Inguinal and neighbouring glands large and

soft, but mesenteric glands small and pink. Heart 16 oz., dilated, hypertrophy of left ventricle, no endocarditis, muscle soft and friable. Lungs oedematous, collapse of right. Thyroid enlarged and no typical colloid appearance on cutting. Cause of death cardiac failure.

Microscopical Examination.—The fibrosis in the neighbourhood of the receptaculum chyli (see Fig. 2) contained some lymph glands with markedly dilated varicose spaces lined by endothelium and evidently lymph channels, similar spaces appearing in the adipose and fibrous tissue around the glands. The enlarged soft inguinal glands showed similar dilatation of the channels, together with some thickening of the fibrous trabeculae, but the mesenteric glands were normal. The lymphoid tissue of the affected glands was also more diffuse, and the follicles less distinct. The skin showed typical advanced oedema, marked dilatation of the lymphatics, which often were surrounded by and sometimes filled with small round cells, hyperplasia of the connective tissue elements and thickening of the arterioles (see Fig. 3). Liver capsule thickened, capillaries engorged and dilated, some chronic hepatitis evinced by round-cell infiltration of Glisson's capsule, and especially beneath the capsule in the depressions between the fine granulations mentioned, but no definite cirrhosis, the condition suggesting a spread of inflammation from the perihepatitis. The hepatic cells adjoining the dilated capillaries were atrophied where the engorgement was most marked.

Kidneys: Intense hyperaemia, granular epithelium, wedge-shaped areas of cell infiltration in the cortex such as seen in early interstitial nephritis. Suprarenals fairly normal, though embedded in fibrous tissue, and showing early struma lipomatosa; the enveloping fibrous tissue showed dilatation of the lymphatics. The intestinal mucosa was fairly normal, and no dilatation of the lacteals was evident, though there appeared to be an unusual amount of round-cell infiltration in and around the bases of the glands. Unfortunately the large intestine was not examined histologically, so nothing can be said as to the condition of its lymphatics.

Sections of the mesentery showed thickening of subendothelial fibrous tissue on both sides with evidences of chronic inflammation in the shape of accumulation of round cells around the vessels. No noticeable dilatation of lymphatics.

In the thyroid, coarse structure present in sections with acini of varying size and irregular outline, but the colloid material was practically *nil*, only a very small remnant being found. Acini only in a few instances showed remains of a cuboidal epithelial lining, yet their lumina were filled with spheroidal cells which appeared to have arisen in a proliferation of the epithelium.

The morbid appearances found may be summarized as follows:

Chronic peritonitis, with especially prominent perihepatitis, perisplenitis, and prevertebral fibrosis surrounding the lymphatics at about the level of the receptaculum chyli. Below this a varicose condition of all the lymphatics and an oedematous and hyperplastic condition of the parts drained by these affected vessels, but not of the mesenteric lymphatics or lacteals. Some chronic hepatitis, especially subcapsular, and a slight interstitial nephritis. Thyroid enlargement with diminution of colloid and proliferation of epithelium (comparable with exophthalmic goitre). Cardiac dilatation.

Anatomically the condition is explainable on the view that the fibrosis had interfered with the lymphatic course at about the level of the receptaculum chyli, above the point of entry of the lymphatics draining the lower part of the body, which includes the abdominal wall as far as the umbilicus (and here note the decreasing oedema of the parietes from the pubes up to the umbilicus, where it ceased), but below the junction with the lacteals and vessels from the coeliac glands. These latter are said to enter the first part of the thoracic duct. The rectal lymphatics generally open into the sacral glands, but, as mentioned above, an examination of the rectal mucosa was unfortunately neglected. Oedema and hyperplasia from excess of lymph in the parts would follow a chronic obstruction, and is a well recognized phenomenon. The ascites might be due in part to this cause and to some extent also to the cardiac failure. It must be remembered also that ascites is commonly associated with chronic peritonitis. The presence of a large number of lymphocytes in the fluid obtained by paracentesis points to some lymphatic obstruction.

Apparently, then, the condition is one of chronic peritonitis of peculiar distribution. Cases of prevertebral fibrosis are occasionally met with on the *post-mortem* table, but the complications here described consequent on implication of the lymphatic system appear to be very rare. The etiology can, however, be merely speculative. Proliferative peritonitis, according to Osler, is found frequently in subjects of chronic alcoholism. Rolleston says, "Cirrhosis of the liver is often associated with a

certain degree of chronic peritonitis, but a high degree is comparatively rare in association with well-marked cirrhosis."

It may be that the toxin which causes both conditions has in this case exerted its influence more on the peritoneum than on the liver, which showed merely a cellular interstitial hepatitis of no marked degree.

And, finally, into the realm of unconfirmable speculations may be brought the mechanical factor of the oft-repeated prognancies with a consequent chronic inflammation—the hepatic and renal conditions being lesions apart and associated with alcoholism. Whether the exophthalmic goitre was merely an accidental complication—which seems probable—or not, is impossible to say.

THE RELATION OF DIET TO THYROID ACTIVITY.

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As the result of a series of experiments conducted with a view to determine the effect of heat upon the nutritive value of milk, I have been led to a particular study of the thyroid glands of the animals experimented upon.

The prevailing custom at the present time of the pasteurization of milk for infant feeding and the very divergent views held regarding the advantages and disadvantages attendant on the custom, were in the first place the reasons which induced me to undertake these experiments. The results obtained as regards the respective value of plain milk, pasteurized milk and sterilized milk, as a food, have proved inconclusive both positively and negatively.

Certain facts, however, concerning the structure of the thyroid gland in these animals would appear to be worthy of being placed on record, the variations in structure obtained being constant within narrow limits and corresponding to the diet employed.

My experiments were conducted in the Physiological Laboratory of the University of Edinburgh, and to Professor Schäfer my warmest thanks are due. In all, the thyroid gland was examined in the case of 94 rats—5 of these being wild rats. The remaining 89 animals of 14 litters were dieted from the date of weaning (usually the twenty-first day) for periods varying up to sixty-seven days. Seventy-three of these rats from 11 litters were fed, thanks to the kindness of Dr. Robertson, Medical Officer of Health for Leith, upon modified milk obtained from the Leith Milk Dépôt, while the remaining 16 rats of 3 litters were fed on ordinary dairy milk.

In the case of those rats reared in the laboratory, animals from the same litter were placed at the time of weaning on (1) bread and milk diet¹; (2) fresh milk; (3) the same milk pasteurized; (4) the same milk boiled for thirty minutes.

In all cases an unlimited supply was given, no marked difference being noticed in the amount taken by rats on the three milk diets.

Rats of the various litters, when weaned, were weighed and divided as evenly as possible between the four diets, and thereafter were weighed every third day.

As regards increase in weight, practically no difference was noticeable between the various milk-fed animals, but in all milk-fed animals the increase was less than in corresponding bread-and-milk-fed rats. Clinically all rats at the period of death appeared perfectly healthy, milk-fed rats being, however, in the majority of cases, somewhat softer and plumper than those fed on bread and milk.

The rats in all cases were killed with chloroform, and the tissues examined *post mortem*. In all cases of milk-fed rats there was considerable deposition of general body fat. This increase of fat was most marked in the abdominal cavity, and was in some cases very excessive. In all milk-fed rats the thyroid glands were of a markedly paler colour than those of animals fed on bread and milk.

The organs and tissues were fixed in 5 per cent. formalin and stained with haematoxylin and eosin after, in the case of the bones, decalcification with Perenyi's fluid. The bones, spleen, liver, pancreas, kidney, suprarenal, thymus, and thyroid, in each case, were examined microscopically, and, apart from the thyroid gland, no constant