aromatic gums for disinfectant purposes has an origin at least equally remote.

An attempt will be made, in the course of the observations which follow, to bring the operation of the large majority of the latter class under a general law which shall furnish us with an explanation of their true character. This is especially desirable, since it is to be feared that, for want of such an explanation, many good and valuable disinfectants have been condemned by chemists, on theoretical grounds, as mere deodorisers—not assailing the virus of infected substances, but rather masking their poisonous character by precipitating their offensive gases. An objection to this view at once meets us, in the utter disproportion between the volume of the gases to be fixed and the quantity of salt practically found sufficient for the object required, while it breaks down altogether when applied to such disinfectants as the new “chloralum” or chloride of aluminium of Mr. John Gamgee, or the well known carbolic acid. Before endeavouring to supply a more probable theory, it may be well to remind you that the researches already mentioned have established the fact that contagion and putrefaction, if not actually identical, are processes so closely allied that they require exactly similar conditions; the latter appearing to consist of a kind of disease propagated from particle to particle of a decomposing substance, and ending in its entire destruction. Hence it may be inferred with perfect safety, that any agent which arrests putrefaction is capable also of abolishing the properties of contagion and infection.

This conclusion at once puts into our hands a valuable instrument of research; for while it is difficult, and often impossible, to investigate directly the disinfectant action of a substance, the inquiry being surrounded by innumerable sources of error, the properties of an antiseptic are perfectly well defined, and open to the clearest demonstration. Thus, in the case of the two bodies mentioned above, carbolic acid and chloride of aluminium, the antiseptic action of the first is well known, and has long been usefully applied; while that of the latter is maintained in the most positive manner by its introducer, Mr. John Gamgee, who certainly brings forward overwhelming proof of it in his recorded experiments upon meat and fish; and hence, on the grounds given, we are justified in regarding these substances as good and useful disinfectants. It may be stated, in passing, that the deodorising power which these and other similar bodies possess is probably due to their antiseptic action; the offensive gases of decomposition being sooner lost by diffusion, and their fresh production being entirely suspended.

Let us now proceed to a consideration of the origin of the remarkable properties which we have described. This appears to have been traced with some degree of probability, in the case of carbolic acid, by Dr. Joseph Hirsch, the writer of an article which appeared in the *Chemical News* about the end of February 1869. He advances the bold and ingenious speculation, that the disinfecting action of that substance depends upon its power of coagulating albumen. He supposes that the acid finds its way into the minute organisms, which propagate disease by diffusion through their investing membrane; that it coagulates the albumen which they, in common with all germinal matter, contain as a necessary constituent; and thus practically destroys their vitality as perfectly as immersion in boiling water terminates that of an egg.

In order to test the accuracy of the view thus enunciated, I selected a substance of which the albumen-coagulating power was well known, and examined it with regard to its antiseptic, and therefore disinfectant, properties. The substance chosen was nitro-muriatic acid, which has long been in use as a test for albumen in urine. The experiments were conducted as follows.

a. Two samples of fresh healthy urine, passed at the same time, each measuring about one ounce, were placed side by side. To one of them six drops of strong nitro-muriatic acid were added. In a few days, the unacidified specimen was covered with a thick crust of mould; while that to which the acid had been added was unaltered, except by a slight darkening of colour and deposition of crystals of uric acid.

b. Some fresh meat was pounded into an emulsion with water—the whole divided into two equal portions of about six drachms each. To one of them six drops of strong nitro-muriatic acid were added, as in the former case. In a day or two, the unacidified sample was quite putrid and offensive; while that to which the acid had been added retained the smell of fresh meat, and continues to do so still, after the lapse of nearly a month.

I now proceeded to test some of the salts commonly used as disinfectants, with respect to their possession of this power of coagulating albumen. The examination was conducted thus. One part of the salt to be tested was dissolved in one thousand parts of distilled water, and the solution was mixed thoroughly with the fresh white of egg. The salts examined were iron-alum, sesquichloride of iron, common alum, chloride of zinc, and nitrate of lead. Coagulation fol-

lowed immediately in every instance. In one or two cases, the dilution was carried much further—one part of the salt to three or four thousand of water. Here, too, coagulation followed in one or two seconds.

It may be remarked, in passing, that the hæmostatic action of the iron-salts is probably to be attributed in great measure to this faculty of coagulating albumen, exercised upon the serum of the blood.

The attempt to obtain similar results from the sulphites entirely failed. They appeared, indeed, to retard coagulation by other reagents. The coagulating power of sulphurous acid was faint and ill defined.

If we review the evidence now before us, we shall find that it stands thus.

We start with two assumptions—the first justified by recent research, the second borne out by analogy; viz., that infection results from the transference and development of minute germs; and that these germs contain albuminous matter as a necessary constituent, the coagulation of which terminates their existence. Upon these assumptions we frame our major premiss—that “all coagulators of albumen are disinfectants”; and, having arrived at this result by a process of pure reasoning, we proceed to prove its truth by experiments upon the antiseptic, and so upon the disinfectant, properties of a well known albumen-coagulator. Having thus established our fundamental proposition, we produce experimental proof of our minor premiss—that “nearly all the substances to which popular experience has assigned the property of arresting the spread of infectious diseases, where that power is at present unexplained, are coagulators of albumen.” The conclusion then necessarily follows, that these substances are disinfectants; and thus a vindication of their efficiency is furnished in those cases where it has been called in question by chemists on the ground that no sufficient explanation of their action had been offered.

The above conclusion does not apply to sulphurous acid and the sulphites. In their case, we must probably look for some more remote physiological effect upon germinal existence.

Note on the Use of Hydrochloric Acid as an Antiseptic.

It is probable that hydrochloric acid, which shares the properties attributed to nitrohydrochloric acid in the foregoing remarks, will be found to be a valuable preservative of animal food. A piece of meat, immersed for fifteen minutes in a mixture of one part of the acid to three of water, remained entirely free from putrefactive change after nearly a fortnight, though the action of the acid was not sufficiently powerful to prevent the appearance of a small quantity of mould. The meat was then immersed in a dilute solution of carbonate of soda, and the superficially absorbed acid was thus converted into common salt. This reaction obviously gives hydrochloric acid a great advantage over other antiseptics, which introduce into the food a foreign substance, inimical by its very nature, in most cases, to the process of digestion.

GYNÆCOLOGICAL NOTES.

By ROBERT BARNES, M.D.,

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IV.—SUDDEN DEATH IN PATIENTS SUFFERING FROM CANCER.

PATIENTS suffering from cancer of the uterus or ovaries not unfrequently die suddenly. The causes of this event have not attracted much attention. The late Dr. Todd (*Clinical Lectures*, Beale's edition) remarked that death may occur suddenly from malignant disease in the abdomen, as of the peritoneum. He was of opinion that cancerous matter passes suddenly into the circulation, causing prostration by poisoning, as in pyæmia.

There can be little doubt that, in some cases, where cancerous growth invades the walls of blood-vessels, portions may be detached and then swept into the circulation. I have, however, searched for these cancer-emboli without success in cases where the final symptoms seemed to point to pulmonary embolism; but in a woman suffering from encephaloid disease of the ovary and uterus, who recently died suddenly in St. Thomas's Hospital, my attention was fixed upon a condition which, I think, accounts for the catastrophe by a mechanism altogether different from embolism.

A woman aged 60 was admitted with the usual symptoms of cancerous cachexia of some duration. I found the pelvis filled with the morbid growth, involving uterus, vagina, rectum, and bladder, in one mass. Rest and good diet seemed to improve her condition; but one day after being about she complained of difficulty of breathing, quickly became collapsed, and, without losing consciousness, died in a few minutes.

The mode of death, as it was reported to me, made me surmise cardiac or pulmonary embolism; and at the autopsy, careful examination was made to verify this conjecture. Nothing in the nature of embolism or thrombosis was found; there were, however, extensive secondary cancerous deposits or growths in the abdomen and chest. The pelvic peritoneum was studded with small cancerous nodules; others were scattered over the liver and spleen; the left psoas muscle was involved. The glands and subperitoneal tissue in the lumbar region and the vicinity of the left kidney were involved in dense masses of cancerous tissue. A condition which struck me was that the diseased glands, lymphatics, and connective tissue around the aorta and vena cava, made one compact solid mass from the pelvis to the diaphragm, in which the aorta and vena cava ran like tunnels bored through unyielding substance. In many places the coats of the aorta were bent inwards, forming nodular projections into its channel. The result was that the aorta was no longer an elastic tube, expanding under the heart's systole and then contracting, but a rigid tunnel, utterly wanting in resiliency, and with its interior no longer smooth, but distorted by irregular projections.

Such an aorta, accompanied by a vena cava similarly affected, is mechanically unfitted to do its work. Under very moderately increased exertion or emotion, causing unusual action in the heart, this rigid tube would throw back upon the heart a portion of the column of blood which the aorta ought to receive and propel. This retrograde dynamic disturbance would overwhelm the feeble heart, and thus death would follow.

In another case, where the ovaries were involved in malignant disease, and where secondary growths were found in the intestinal peritoneum, the patient, coming from the country during cold weather, died next day, almost suddenly, overpowered by dyspnoea. The pericardium and both pleuræ were found distended with recent effusion of blood-stained serum.

These cases show that to prolong life the strictest care should be taken to avoid excitement, exposure, or exertion.

CASE OF PERITYPHLITIS.

By MARSH JACKSON, M.R.C.S., SMETHWICK.

E. P., aged 24, a spare, active, steady man, of a nervous disposition, had always had good health till within the nine or ten months before I saw him; during which time he had suffered from "indigestion", irregularity of the bowels, flatulence, and occasional hiccough. I first saw him on March 9th, 1871. He then complained of great pain in the right inguinal region, about the umbilicus, and down the right thigh; the testicle was retracted. On examination, the pain, which was exquisite on both the slightest and on continued pressure, was especially referred to a line about an inch and a half above, and parallel to the crest of the ilium, extending almost from the edge of the quadratus lumborum to within two inches of the pubes. There was no swelling, but a distinct hardness could be felt, and there was dulness on percussion along that line. He was in bed, and lay on the right side, with that thigh flexed upon the abdomen; the slightest movement increased the pain. The bowels had not been moved within the last twenty-four hours. The tongue was furred and moist; the breath had a fecal odour. There had been some vomiting. The heart and lungs were healthy. The urine was abundant, and, on being tested, gave no special indications. He had had no rigors. Pulse 92; temperature 100.2 deg. Fahr.; respiration 24. The treatment consisted of hot linseed poultices to the side; a pillow to support the right knee; one grain of opium every four hours; an injection of castor oil. The diet was milk, beef-tea, eggs, etc.

I saw him at 8 A.M., and between 7 and 9 P.M. each succeeding day, till the 13th, during which time the above symptoms remained pretty constant. On the morning of the 13th, the pain was most acute, and had extended more round to the back, up to between the scapulae, to the buttock, and down the side of the thigh. There was a marked line of swelling along the line described above, and here the pain was most acute. I ordered six leeches to be applied over the swelling, and increased the frequency of the doses of opium. In the afternoon, I saw him with Dr. Heslop, who concurred as to the diagnosis and treatment. In consequence of the pain having abated somewhat, the leeches had not been applied; and Dr. Heslop advised their immediate application, thinking they would relieve the local congestion, though suppuration was a consequence to be feared. Notwithstanding daily injections of castor oil, the opium had confined the bowels too much, and Dr. Heslop recommended in addition to them a daily small dose of castor oil by the mouth. The next day he was much easier; the leeches had drawn a fair quantity of blood. He had passed two pale lumpy motions,

though with great pain, and was very feeble. Temperature 38.3 deg. On the 15th, he had had a most restless night, and had been delirious. The pain was much worse, and the swelling more marked than it was the previous day. He had had no rigors. Pulse 100; temperature 102.9 deg. Fahr.; respirations 28. Six fresh leeches were ordered to be applied. At 8 P.M., the pulse was 96; temperature 101.5 deg. Fahr.; respirations 28. The leeches had drawn well. The pain had almost gone; considerable pressure could be borne. The swelling had subsided very much. The opium was ordered to be discontinued altogether, and a dose of castor oil to be taken in the morning.

On the 16th, at 8 A.M., the pulse was 100; temperature 103.3 deg. Fahr. Respirations 28. He had passed a restless night. The intestines were distended with flatus; the bowels had not yet been moved. At 7.30 P.M., the pulse 80; temperature 101.1 deg. Fahr.; respirations 28. The bowels were moved during the morning; after a free motion, he broke out into a profuse perspiration, and had several hours' sound sleep. He was in no pain, and for the first time could straighten the leg.

Next day, the temperature was 100 deg. Fahr. From this date he progressed towards complete recovery; the induration disappeared; and the bowels acted spontaneously. He sat up dressed on the 20th, and I ceased to visit him on the 23rd. He was taking quinine, and ate with a good appetite.

On May 1st, he called on me, quite well. Till within the last fortnight, he has felt a slight soreness on receiving any jar, as coming down stairs, or stepping off the curb-stone. Now he has lost this feeling, and looks robust and strong.

The specially interesting features of the case are the steady persistence of so high a degree of temperature, the marked benefit resulting from the use of leeches and castor oil, and the speedy and complete recovery.

CLINICAL MEMORANDA.

CHLORAL IN DELIRIUM TREMENS.

AMONG the many communications respecting the use of chloral in delirium tremens, I do not remember any mention of an antagonism to the action of this drug such as that manifested in the following case. On the afternoon of the 1st instant, I was called to see a man, aged 25, who was fast lapsing into delirium tremens. He had not then any delusions, but he had been sleepless for two nights, was excessively restless, and for twenty-four hours had vomited everything taken; a mixture containing chloral in small doses being always rejected the moment it was swallowed. In place of this, I ordered him a mixture containing hydrocyanic acid and morphia, which he took, with much relief to the gastric irritability; that night he had two hours' sleep, and three more in the afternoon of the following day. On the evening of the 2nd, he seemed much better, and presented a fair chance of escaping the worst features of the disease. He had, however, a very restless night; and the next morning, being without proper control, he got up and wandered about the house and neighbourhood; in the evening, all the phenomena of the disease in an aggravated form were present. Chloral having been at an earlier stage so intolerable to the stomach, I was unwilling to return to it, and ordered him bromide of potassium in thirty-grain doses every hour, in the hope of allaying his great violence and excitement. Three doses were taken without any mitigation of his symptoms; and at midnight I ordered a draught containing eighty grains of chloral, one half to be given at once, and the remainder in an hour and a half, if sleep did not come on. Both doses were taken and retained without producing any effect; and he spent the night in a state of great excitement, requiring the continuous exertions of two men to keep him in bed. At 8 A.M., a draught containing sixty grains of chloral was given; sleep came on in a quarter of an hour, and lasted for two hours. He then awoke, certainly much less violent, but the delusions and restlessness were as bad as ever. Pulse 120, small and feeble. This state of things continuing until 2 P.M., he took an additional sixty grains of chloral, and, between 4 and 5 P.M., being still restless and sleepless, another sixty grains. He fell asleep about 5 P.M. He woke up two or three times during the night and took nourishment, but went quietly off to sleep again. The next forenoon he was quite rational, and free from his complaint; pulse 88, comparatively full and strong. In rather less than seventeen hours, then, this patient took two hundred and sixty grains of chloral before curative sleep was induced. He had no vomiting for the last twenty-four hours of his illness, and during that time he partook freely of a solution of Liebig's extract of meat, to which whipped white of egg had been added.

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