May 16th. He was ordered at first when admitted a full dose of tincture of opium to reduce irritability, and cause sleep; simple milk diet (D.L.); beef-tea, and the acetate of ammonia mixture, and to be kept very quiet; the parts are very tense, as if from effusion.

May 26th. Under this date he seems going on well.

June 2nd. He was ordered porter, and a mixture with excess of ammonia. The effusion is reduced; but as he shows signs of sinking and constitutional debility, and the ends of the fingers are dark coloured, considerable apprehension is felt as to the nature of the case.

June 16th. The gangrene has been more marked, and Mr. Lloyd ordered the oil of turpentine, as an external application, to stimulate the parts.

June 22nd. The fingers and part of the thumb of the left hand are now exactly like those of an Egyptian mummy, corrugated, cold, and quite black; it seems to be the same disease as one sees under the term senile gangrene; the cause in one disease, of course, being more of a constitutional, or vital, than traumatic character as regards the artery, though it must not be forgotten that Dupuytren, Carswell, and others, deny that arteries are diseased in senile gangrene. Here, at least, there can be little doubt that both arteries and nerves were torn. K.

Original Communications.

ON FÆCAL FERMENTATION AS A SOURCE OF DISEASE.

By C. H. F. ROUTH, M.D., Physician to the St. Pancras Royal General Dispensary; Assistant-Physician to the Samaritan Hospital for Women and Children; Vice-President of the Medical Society of London; etc.

[Read before the Medical Society of London, February 23rd, 1856.]

PART I (concluded).

INFECTION THROUGH FÆCAL MATTERS.

THERE are three conceivable ways in which disease may be generated by the absorption or ingestion of faecal matters:—I. When in their natural, concentrated, undiluted state; II. When taken after dilution or suspension in water; III. When the emanations arising therefrom are inspired or otherwise absorbed in the system. Under these three heads I propose considering the subject. In doing so, however, it is right to premise, by the following considerations, which must be admitted *in primis*, otherwise the conclusions may prove unintelligible.

Infection, to be propagated, requires three concurrent conditions:—1. The infecting source; 2. A transmitting medium; 3. A fit recipient.

1. *The source of infection* may be the person affected, fomites, his excretions, or, in fact, any personal part of him so contaminated. Such source is always more concentrated and potent at the *outset* of an epidemic, and the reverse towards the termination of it.

2. *The transmitting medium* may be (a) liquid, or (b) gaseous. (a) In the former case, as in the example of inoculation, it may be the blood; it may be water holding any poison in suspension or solution; and, in fact, any other fluid which does not destroy the poison, applied externally or taken internally with food or drink. (b) In the latter case, it may be a gaseous or volatile substance mixed or suspended in the atmosphere. Now, of these two varieties of transmitting agents, the *gaseous* and the *liquid*, the *barometrical changes which influence the development of the one may be the very reverse of those which influence the spread of the other*. Thus, the gaseous will be more energetic in hot and moist weather, and the liquid in moderately cold or temperate and dry weather; because, in hot and moist weather, the air is lighter, and the ammonia more volatile, which gas, with Robiquet, I believe to be a great adjuvant in the suspension of poisonous emanations in the air, especially when

damp. Hence it is that in hot and moist weather many contagious diseases are rapidly conveyed and extended, whereas cold and dry weather will prove beneficial in its effect, the air being heavier, and the ammonia not only less volatile, but also less in quantity, because animal matters decompose less rapidly in cold weather. We are all aware how excessively fœtid our London drains smell just before rain sets in, so much so as to be the ordinary and popular prognostic of rain in this town. According to Robiquet, as I have said, the odour of gaseous (which may also be contagious) matter is due to the volatility of the ammonia, which, as it were, raises it to the nose. Ammonia is, moreover, always evolved in the putrefaction of organic matters. It is also very generally produced in cases of disease, and is always emitted in contagious diseases. (See Liebig's *Agricultural Chemistry*, by Playfair, fourth edition.) In cold and dry weather, since the air is heavier, and the ammonia therefore not so volatile, all poisonous matter will be more likely retained in solution or suspension in the flowing or stagnant waters; unless, indeed, the cold be so extreme as to destroy all fermentation. In this case, the poison may, therefore, be more readily taken in the water, or other liquid ingesta.

3. *A fit recipient* is necessary: and here, even more than in the preceding conditions, there has been much error admitted. In judging of the effects of poisons, we have not fully considered the effects of *race* in man, *species* in animals, *concentration* of the poison if taken at the commencement or at the end of an epidemic, and the effect of *acclimatisation*, besides *previous diseases, occupation, and state of health* of the recipient. These are a few amongst many causes, the neglect of which has led to the most heterogeneous confusion and contradictory statements. Thus, a *negro* is less susceptible to fever than a *white man*. All *animals* may not be susceptible of taking certain diseases, or at least of catching them in the same way, as men do. Thus Beclard inoculated dogs with plague matter, and made them eat the matter from plague buboes and pathological specimens of plague; and they did not catch the plague. Similar experiments performed on criminals (*British and Foreign Review*, v, 561) communicated the disorder. Syphilis is another disease which cannot be in any way transferred to the lower animals. The symptoms may vary: thus, the dread of water in hydrophobia is a symptom invariably present in man, but not in rabid dogs. Again, small-pox may become cow-pox in a cow. The same man, *ceteris paribus*, as regards health, may, after exposure, get cholera at the commencement of an epidemic from its virulence, when, at the end of the same or a similar epidemic, from the milder character of the disease, he may get only diarrhoea. Then, in regard to the experiments on animals at the beginning of an epidemic, from the same cause, cholera may be induced by making them swallow the diseased egesta; and yet, at a later period of the epidemic, only diarrhoea will result. A person who has lived in an infected district for some time is less likely to suffer from an epidemic than a new comer; and so on. All these circumstances are most important to notice during contagious epidemics, and yet, I fear, are too often neglected even by our best authorities; and therefore I have thought it necessary to review them briefly, because they bear so manifestly on my subject.

I. EFFECTS OF ABSORPTION OF FÆCAL MATTERS IN THEIR CONCENTRATED AND UNDILUTED STATE.

Effect of Diseased Faeces on the Body. Healthy faeces, I believe, are not poisonous; and to some animals, owing to retained nutritive matters in them, they may prove nutritious, as in the case of those of the horse, partaken of by birds. I have seen the experiment voluntarily performed by dogs. The pointers and other *chiens de chasse* are notoriously voracious, and I have frequently seen them devour, apparently with great avidity, the faecal matters in their way, and have never observed any peculiar effects produced therefrom; and other additional examples from barbarous nations, and hysterical and demented persons,

might be adduced to prove the same fact. And, more than this, the annals of ancient medicine record their exhibition in the treatment of diseases. Fonseca (*De Excrementis Humanis*), quoting from Dioscorides (lib. ii, ch. 72) and Galen, enumerates a series of diseases, such as anginas, dysenteries, sore throats, phlegmonous inflammations, colic, many skin-diseases, etc., in which the fæces of man or animals were found curative in their effects. He has the modesty, however, to add that these remedies are better borne by unlettered rustics than by polished town-folk. The record of such a practice, though eminently disgusting in the present day, is historically curious, and confirmatory of the non-poisonous properties of fæces in health if accidentally partaken of. This must be my excuse for alluding to the fact. On the other hand, many persons retain fæcal matters in their bowels for long periods with apparent impunity. The fæces in these cases are unchanged; no poisonous fermentation has occurred. But it is not always so.

Those who are acquainted with the works of Hamilton on purgatives and Burn on constipation are aware how far, in the opinion of these writers, the retention of fæcal matters in the bowels is capable of producing disease. In the hands of the former writer, typhus, scarlatina, marasmus, many nervous and chronic diseases, seemed sometimes to be produced, at least much aggravated, by accumulations in the bowels, and were greatly relieved or cured by aperients. According to Burn, it seems that the general health may be completely undermined by habitual constipation. There is scarcely a variety of indigestion, an uterine affection, a dysentery, or diarrhoea, not capable of being originated by this cause. Without, however, asserting the universality or even generality of this cause, as productive of these diseases, it may be admitted that all these diseases may occasionally be so generated and kept up. In many such cases, the effects produced are analogous to those usually observed to follow the absorption in the system of putrid animal matters, such as flesh, and pus in a putrefactive state. When these are placed on wounds, vomiting, low continued fever, rigors, and death, often result. The danger of dissection wounds is proverbial. "The poison of bad sausages", says Graham, "belongs to this class of noxious substances. Several hundred cases are known in which death has occurred from the use of this kind of food. In Würtemberg especially these cases are very frequent, for there the sausages are prepared from very various materials. Blood, liver, bacon, brains, milk, meal, and bread, are mixed together with salt and spices; the mixture is then put into bladders or intestines, and, after being boiled, is smoked. When these sausages are well prepared, they may be preserved for months, and furnish a nourishing savoury food; but when the spices and salt are deficient, and particularly when they are smoked too late, or not sufficiently, they undergo a peculiar kind of putrefaction, which begins at the centre of the sausage. Without any appreciable escape of gas taking place, they become paler in colour, and more soft and greasy in those parts which have undergone putrefaction; and they are found to contain free lactic acid or lactate of ammonia—products which are universally formed during the putrefaction of animal and vegetable matters." This change of colour I have before remarked as existing in fæcal matter kept in a moist state and exposed to the air, and I presume it is indicative of an analogous change in it. Very lingering and remarkable symptoms precede death when this is the result of poisoning by putrefied sausages. There is a gradual wasting of muscular fibre, and of all the constituents of the body similarly composed. Other substances employed as aliments, as cheese, pork, bacon, mussels, salmon, in a state of partial putrefaction, occasionally produce poisonous effects. These vary, it is true, in degree and kind; but the effects are not the less certain. It is, therefore, in strict accordance with analogy to conclude that putrefying fæces may generate disease in the same manner, the poison being absorbed by the same intestinal membrane.

Moreover, that feces are capable of inducing a putre-

factive fermentation in surrounding tissues, is evidenced by the character of the pus in abscesses about the large intestines. We all know how excessively offensive the pus in abscesses about the rectum and colon generally is—in fact, wherever fæcal matters are to be found in its vicinity; and this without necessarily, I believe, a direct communication. Here we have the ferment acting at a distance, perhaps through endosmosis, upon the pus, and exciting its decomposition, which is often acid in reaction, instead of alkaline as in healthy pus. Patients under these affections frequently suffer from typhoid symptoms and low fever. Their very expression denotes serious blood-disease. These symptoms, it is true, may be referred, secondarily, to the absorption of putrid pus; but they were no doubt due primarily to the changes effected in the pus. The habitual foul breath and tongue, the generally offensive, almost fæcal odour of some persons (particularly uncleanly females), who are as habitually addicted to constipation, are evidences of absorption of fæcal matter under ordinary circumstances, which, like a contaminating drain odour (only originating in the patient himself), must prove injurious to the organism. The anomalous nervous symptoms originating in hysterical females and boys may often be referred to fæcal impregnation, so speedily are they relieved or entirely removed by a brisk purge. In these cases, we may suppose that the poisonous substance in the colon sets up a partial fermentation in the blood, which may in adverse circumstances excite fever, and even death.

Synocha or ephemeral fever is, I think, very frequently the result of such a change in grown up persons as remittent fever is in infants, yielding frequently to good purging, the motions having the abominable putrid odour before referred to, very different from that of healthy fæcal matter. These and many other allied diseases may be referred to this cause. The effect on the system is certainly, however, less violent than that produced by fæcal fermentation in water or in the atmosphere. If I might venture to call it so, I would say this is poisoning only in the first degree.

Cholera. The experiments made with cholera excreta on man are necessarily few, and are almost exclusively confined to a few instances where love of science has overcome the natural disgust to such a course. Five such cases are recorded by Dr. Richardson, in his Review on the Water Supply in London (*Journal of Public Health*, vol. i, p. 130). A sixth case was the result of accident. On Sept. 5th, 1853, four physicians tasted the intestinal fluid of a cholera patient. One of these (who, however, had been labouring under diarrhoea previously) took cholera on the 8th, and died in the evening; another was taken ill with choleraic symptoms on the 9th, but these symptoms passed into typhoid fever. An assistant in the Cholera Hospital at Berlin tasted choleraic fluid. Diarrhoea soon supervened, which passed into a smart attack of cholera. The accidental case is one related by Messrs. Pearce and Marston, in which a dispenser drank a quantity of rice-water evacuation by mistake, without any result. Dr. Richardson gives also the case of M. Scipion Pinel, who inoculated himself with cholera evacuation, and two hours afterwards suffered from sickness and vertigo, which disappeared after free perspiration; and that of M. Foy, who tasted vomited matters and breathed the air expired by a choleraic patient, but who, although unwell for four days, did not get cholera. In neither of these latter cases, however, were the fæcal matters tasted; and thus they do not bear upon this part of my subject. The other cases afford only negative and inconclusive evidence.

The lower animals have also been experimented upon with the dejections of patients affected with Asiatic cholera, but so far as I know, those of Thiersch of Munich are the only experiments made with putrid choleraic stools. I quote from Dr. Snow's excellent work on cholera. "Dr. Thiersch is of opinion that the choleraic evacuations are not capable at first of generating the disease, but that a decomposition takes place in them, and that in from six to nine days they become in a state to induce cho-

lera. He founds this opinion on experiments which he performed by giving small quantities of the cholera evacuations to white mice." (*On Cholera*, p. 112.) From some experiments detailed at length by Mr. John Marshall, of London, in the *British and Foreign Medico-Chirurgical Review* for April 1853, we may, I think, conclude that choleraic disease, yet unaccompanied with the algid symptoms of Asiatic cholera, may be communicated to animals, by the ingestion of the cholera stools of man. In a paper by Dr. Lauder Lindsay (*Edinb. Med. and Surg. Journal*, lxxxi, 1854, page 275), it appears the specific disease cholera was not generated by feeding dogs on choleraic vomit and evacuations, nor even on the blood drawn during life or taken from cholera cases after death. The effect was the production of a non-specific diarrhoea. Their general health did not appear to deteriorate or to act otherwise than as a predisposing cause to their suffering from cholera, after exposure to its exhalations. The diarrhoea generated appeared to be very violent, with griping, vomiting and cramps, and great exhaustion, but the expelled matters were always feculent. In two dogs the disease proved fatal. The *résumé* from the experiments detailed, both by Dr. Lindsay and Mr. Marshall, thus appears to be that in all these cases diarrhoea more or less severe, and vomiting were produced. This was the general rule. In some cases the symptoms were so severe that death resulted, but faecal matter was continued to the last. The *post mortem* examinations of these cases were, however, defective. Moreover, in the few instances recorded where actual cholera is said to have been produced and to have been in the end fatal, I do not find it stated whether the urine was suppressed or not; such circumstance, had it been present, would have gone far in my mind to prove that this diarrhoea was, after all, cholera, modified in different animals. The experiments, so far as they go, are then inconclusive; besides, they certainly present no relation which is constant, to the quantity of faecal matters swallowed; although, as a rule, a large quantity is more certain in its products.

I am not aware of any experiments that tend directly to prove that the evacuations of typhus and other malignant fevers have ever been experimented with in the same way. We may, however, reason by analogy that in some cases yellow fever is propagated by the evacuations. The black stools passed in many instances of this disease differ in nothing from black vomit; and black vomit has been known, even when rubbed externally over the body, to generate the disease.

The evidence from retention of diseased fæces is, however, more conclusive. I have already alluded to those bad cases of typhus and yellow fever which are preceded by obstinate constipation. Among ourselves, the most familiar example of disease which, *per se*, proves the poisonous influence of diseased or putrid fæces, is afforded in that variety of *puerperal mania* which is so often induced by accumulations in the intestines. It should be remembered that the female after parturition is placed in those conditions most favourable to absorption, as there has been loss of blood to a greater or lesser extent, and invariably as a concomitant more or less nervous shock. Absorption of any offensive matters under these circumstances is greatly facilitated. Now these cases are generally accompanied by more or less head symptoms—the head may or may not be warmer, but a slight incoherent delirium at first, often passing into mania, presents itself. The face is sallow, and the conjunctiva is tinged with bile; the tongue is remarkably foul, the breath offensive, often faecal. The abdomen is very tumid and swollen, and in one or other of the iliac fossæ there is uneasiness, not to say tenderness, and on deep pressure frequently a large mass of fæces may be detected. The motions are peculiarly offensive, and in most cases emit that cadaveric odour which to my mind is so indicative of putrefaction in faecal matters. The pulse is frequent, easily excited, from 100 to 120, and a shivering fit often occurs, thus denoting that the entire system is impregnated with the poison. The *locale* of the disease is often strongly manifested in the progress of the case. Rapid purga-

tion may come on; the head symptoms will be ameliorated, if not actually removed; but the pulse will fall in frequency and increase in strength as the offensive matters are removed, an effect which, being generally the reverse of that observed after violent purgation, I look upon as almost diagnostic of this form of faecal impregnation. It is clear in such cases that something more than faecal accumulation is present here. The symptoms are those of a narcotic poison in its first effect with fever, and cannot but be partially explained if looked upon as due only to mechanical irritation. There are besides similar examples of disease occurring in non-puerperal cases, as in many instances of mania.

I have mentioned an extreme case, but the variety of minor affections of the same kind, differing only in degree, is legion. In these cases the poison is in the *primæ viæ* primarily; and so long as it remains, so long will the disease be kept up.

ON THE CHARACTER AND MODE OF INFLICTION OF WOUNDS OF THE FEMALE PUDENDA, CONSIDERED IN REFERENCE TO CRIMINAL CHARGES.

By JOHN BARRETT, Esq., F.R.C.S., Senior Surgeon to the Bath Western Dispensary.

[Read at the Meeting of the Bath and Bristol Branch, April 21th, 1856.]

[Concluded from page 540.]

THE last of the three cases is one which caused a deep sensation of horror at the time of its occurrence, from the supposed manner in which the death was effected—by a pointed stick thrust up the vagina. It is the case of *Regina v. Joseph Clarke*, for the murder of his wife, Maria Christiana Clarke, at Bath, in February 1851. It was tried at the Taunton Assizes before Chief Baron Pollock.

Clarke was a carpenter, working near Bristol, his wife and children living at Bath. He had the character of being an industrious, sober man; his master had so high an opinion of him that he went to the expense of defending him; but his wife, who, before her marriage, had been in a somewhat superior position to him, and had married him against the wishes of her friends, was a woman of the most drunken, dirty habits; the consequence was, that his children were grossly neglected, and his room was kept in a state of discomfort and filth. He was in the habit of returning to Bath every Saturday, and providing her with sufficient means for her own and their children's support. These, however, she soon spent in liquor; and, of course, the children were constantly in a state of half-starvation and wretchedness. On the evening, however, of her death, he returned, out of his usual habit—for it was only Monday—as he stated himself from anxiety respecting his children, but as presumed, on the side of the prosecution, with the intention of murdering her by means of a stick, with which he came provided, and which he himself stated he had picked up on his way home. Her conduct had recently been very gross, and this was supposed to have been the immediate provocation to the act; it was also stated by one of the witnesses, though very properly not accepted as evidence, that the witness had heard the wife say shortly before that her husband had read from a newspaper an account of an atrocious act of this description, committed by a pensioner (unless my memory fails me, he had destroyed his wife by piercing the womb or the bowels, *per vaginam*, with a sharpened stick); it was also supposed that if murder was designed at all, such a kind of murder was not unlikely to have suggested itself to a thoughtful mind like his. I mention these circumstances, because, as I shall presently have to take exception to the medical evidence, it is but fair to state what I think at the time may have influenced the judgment of those who gave it, as it undoubtedly did that of a large portion of the public against the prisoner. Clarke reached home about half-past six in the evening,