AN ACCOUNT OF THE CHARACTERS OF EPIDEMIC PLAGUE IN MESOPOTAMIA IN 1876-1877.*

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THE sudden and alarming announcement of an outbreak of plague in Asiatic Russia; the possibility of this scourge extending into Europe; the conflicting opinions that seem to be entertained concerning the nature of the malady and the precautions necessary to ward it off, have prompted the following brief sketch, derived almost entirely from notes taken, and kindly given me, by Dr. Giovanni Cabiadis, as the result of his observations at Hillah and Bagdad, during the outbreaks of plague in 1876-77.

History.—Two or three months previously to the manifestation of plague in Mesopotamia, *glandular swellings free from fever* prevailed in that country. They showed themselves in the groin, armpit, or neck, and were not accompanied by other symptoms. They began to appear amongst the inhabitants about the end of autumn, and continued through the winter; but towards the end of it, plague broke out, and reached its acme of intensity in the spring, and died out suddenly during the summer season when the *great heat* declared itself, and the thermometer rose to 45 or 50 degrees of centigrade scale (113 or 122 deg. Fahr.). During the prevalence of the plague, the thermometer ranged between 5 and 30 deg.; and when it rose to 30 deg. (86 deg. Fahr.), the disease had reached its maximum of intensity. As the temperature increased from 30 to 45 deg. (86 to 113 deg. Fahr.), the epidemic began to diminish; and as soon as the thermometer rose to 45 deg. (113 deg. Fahr.), it ceased abruptly. On the cessation of plague, *aptyretic glandular swellings* reappeared again, precisely similar to those which had preceded the outbreak; and they continued to manifest themselves for about two months longer. These glandular swellings were frequently observed, and were distinct from the chronic adenitic swellings met with in subjects of a scrofulous tendency, and evidently unconnected with any special diathesis.

Symptoms.—The symptoms that characterise plague are of two orders, local and general. In severe cases, the general symptoms precede the local manifestations. The patient is suddenly seized with high fever, which, in some instances, is ushered in by a prolonged shivering fit; the pulse beats 130, or even more, and the temperature of the body rises to above 42 deg. centigrade (107.6 deg. Fahr.). In some cases, however, this febrile condition is hardly appreciable; while, on the other hand, alarming complications indicate the severity of the attack by perturbations connected with the nervous centres, such as convulsive tremor, drowsiness, coma, delirium; or with the circulating system, such as epistaxis, hæmatemesis, hæmoptysis, sanguineous diarrhoea, menorrhagia; or with the assimilative organs, such as painful tumefaction of the liver, bilious vomiting, bilious diarrhoea, jaundice, etc. These phenomena appeared to be dependent on some *periodic impulse*, because at times the bilio-gastric manifestations prevailed; at others, the hæmorrhagic; and at others, the nervous. The nervous agitation which sometimes ushers in an attack of plague is a very remarkable symptom, and one that Dr. Cabiadis had never met with before. He describes it as a *prolonged regular shake*, lasting from six hours to three days. While the patient is suffering from it, he does not complain of cold, nor does the thermometer indicate a lowered temperature. The pulse is small, short, and quick, and the temperature of the body remains in nearly its normal state. This tremor is always followed by profound coma, during which the patient rapidly sinks.

In some instances of plague, Dr. Cabiadis has seen death supervene within a few hours of the attack, and before any of the characteristic indications of the disease, such as buboes and carbuncles, had shown themselves. These severe cases were mostly met with at the *commencement* and at the *termination* of an epidemic outbreak.† They were observed in the plague of 1876 at Hillah, as well as in that of 1877 at Bagdad; and, in these instances, the glandular swellings either did not appear at all, or were very small, and never suppurated; the patient, moreover, seldom lived more than three days. The cutaneous

surface, in some cases, was so filled with *petechiæ* that, when death supervened, the skin assumed a dark livid hue, giving the corpse a blackened appearance, and so characteristic of the malady that it might even to this day be called the *black death*.

In the usual course of plague, however, the local manifestations precede the general symptoms. The patient first complains of pain in the groin, the armpit, or the neck, and on examining the part a swelling is found there, which rapidly increases and usually suppurates by the seventh or eighth day; at the same time, carbuncles may show themselves, and in bad cases petechiæ. In these instances, the fever runs high and in accordance with the gravity of the case. When death supervenes, it mostly occurs on the fourth or fifth day of the illness; but three-fourths of such patients are reckoned by Dr. Cabiadis to recover.

In slight attacks of plague, the local manifestations are seldom accompanied with fever, and you often meet such patients walking about the streets, with two or three suppurating buboes upon them. These cases are hardly ever fatal.

I have expressly omitted, in the foregoing description, to mention several symptoms which are usually met with in all febrile complaints, in order to draw attention to those which may be considered as pathognomonic of the plague. Headache, thirst, constipated bowels, lassitude, and aches in the limbs exist, more or less, in all fevers. The appearance of the tongue in cases of plague is not in general much altered; usually, it is red at the tip and edges, and sometimes dry. A comatose state is much more frequently met with than a delirious one. The diarrhoea is always either sanguineous or bilious, but never serous. As a rule, an attack of plague lasts from a few hours to four weeks, and Dr. Cabiadis considers that one-third of the attacks end fatally. From the accompanying table, however, of 1,826 cases of plague seen and registered by him at Hillah, in 1876, the proportion of deaths to that of the attacks is 52.6 per cent. But a great many cases of plague, he observes, are never made known, and would thus diminish very considerably this percentage of its mortality; whilst the deaths, on the other hand, must all be reported, in order to obtain the permit of interment.*

Analytical Statement of 1,826 Cases of Plague noted by Dr. Cabiadis, at Hillah, during the Epidemic of 1876.

From 2 months to 9 years	277
" 10 years " 19 "	617
" 20 " " 29 "	432
" 30 " " 39 "	202
" 40 " " 49 "	123
" 50 " " 59 "	52
" 60 " " 69 "	18
" 70 " " 79 "	11
" 80 " " 89 "	3
An old man of 113	1

Total 1,826

Sex: Male, 889; Female, 937; total, 1,826.

Result: Recovered, 865; died, 961; total, 1,826.

Manifestations:—

Glandular swellings—in the groin	710
" " axilla	466
" " neck	98
" " several places	122
Carbuncles	1,396
Dependent on the nervous centres { Coma	28
{ Convulsive shake	9
{ Petechiæ	120
{ Epistaxis	2
" " circulating system { Hæmoptysis	6
{ Hæmatemesis	27
{ Sanguineous diarrhoea	14
{ Menorrhagia	2
" " assimilative organs { Bilious vomiting	32
{ Bilious diarrhoea	16
{ Jaundice	2

Diagnosis.—The diagnosis of plague is not difficult, for no other malady presents an assemblage of symptoms so well marked and so significant of its true nature. In fact, no other idiopathic fever, attacking a multitude of persons at the same time, is characterised by glandular swellings, by carbuncles, and by those severe manifestations of the nervous, sanguineous, and bilious systems which declare themselves in an attack of the plague.

Dr. Beck and a few other physicians, basing their views on the intermittent phenomena manifested in some cases of plague, imagined that the disease might be merely a variety of the *pernicious fevers* engendered by the *malaria poison*; but Dr. Cabiadis cites three facts which conclusively subvert this hypothesis.

* Read before the Epidemiological Society.

† I have noted a similar circumstance in severe epidemic outbreaks of *cholera*. The first and the last attacks are mostly fatal.

* The same remark applies to the death-rate shown by the official register kept at Bagdad in 1876, which gives 55.7 as the percentage of deaths to that of the attacks.

1. No *intermission* has ever been observed in the symptoms of plague, not even in those intercurrent phenomena which arise from complications of the nervous, circulating, and assimilative organs.

2. There is no instance on record of an attack of plague having been cut short by the administration of sulphate of quinine.

3. A striking difference marks the expression of the countenance and the general aspect presented by a person suffering from an attack of *pernicious fever*, and those of one suffering from the *plague*. On coming up to a patient suffering from an attack of pernicious fever, you are struck with the gravity of the case and the danger threatening his life. The very reverse of this meets your eye when you see for the first time a case of plague. Even the worst instances of this malady are apt to deceive an inexperienced physician, and make him fancy that the case is free from danger, when in reality the patient has only a few hours to live. The first instance of plague seen by Dr. Cabiadis did not seem to him to be one of an alarming nature. The patient looked stupefied, or rather as if intoxicated, and did not answer readily the questions put to him. He had vomited blood, and had a very small bubo in the right axilla; but the pulse and temperature were normal. This patient died a few hours after Dr. Cabiadis's visit.

Progress.—Rapid suppuration of the buboes, even when accompanied with high fever, indicates a favourable termination. All cases complicated with nervous, hæmorrhagic, or bilious manifestations end fatally.

Contagion.—With regard to the debated question of contagion, I beg to draw attention to the conclusions arrived at by Dr. Cabiadis, and which are derived from a careful study of the facts that came under his observation during the two last outbreaks of plague in Mesopotamia.

Dr. Cabiadis neither attempts to deny the contagious properties of plague, nor does he accept unconditionally the assertion of those who pretend that you must keep at a distance, say of six *mètres*, from the patient, in order to avoid contracting the disease. The experience acquired by him during the epidemic outbreaks at Hillah and Bagdad has convinced him that no great risk is incurred in touching a person affected with the plague, provided you avoid exposing yourself for any lengthened period to the atmosphere of the apartment occupied by him. As a proof of this doctrine, he says that those persons who lived in the same house with a plague-smitten patient, but who avoided touching him or his clothes, through fear of catching the infection, generally did get the plague; whilst those who lived in houses exempt from the malady, but who visited plague-patients and handled them freely, without remaining long in the same room with them, hardly ever caught the disease. When plague entered a house, it seldom spared its inmates, and often carried them all off within a week's time. In noting these facts, Dr. Cabiadis was careful to take into account the various tenets of the different religious sects of the people of Bagdad; for, while the Mohammedans, discarding all sanitary precautions, lived with and handled plague-patients, the Jews and Christians, on the contrary, firmly believing in its contagious properties, very seldom touched them; yet all of them equally caught the disease if they lived in the same house with the plague-patient, but were safe if they quitted the house the moment a case of plague occurred in it. Dr. Cabiadis quotes another remarkable fact in support of his theory. With one exception, none of the physicians, surgeons, or assistants who daily attended on plague-patients caught that malady, and he himself handled nearly two thousand plague-smitten persons without suffering any inconvenience from it. To this it might be objected that the immunity enjoyed by them was owing to their contact with the sick being a momentary one. But Dr. Cabiadis remarks that, if this be true with respect to the physician, it cannot be so with regard to the surgeon and assistant, whose duties obliged them to prolong their stay near the patients for the purpose of opening abscesses, washing and dressing sores, etc. The exception alluded to above was that of an assistant who actually died of the plague. But, in an epidemic outbreak affecting a whole population, one death among an entire corporation would rather indicate the law that governed the general mortality at the time, than the exceptional liability of that body from coming into contact with the disease.

Dr. Cabiadis does not think that the *infectious matter* of the plague is contained in the pus secreted from the buboes and sores. Plague, he observes, is transmitted even in its incipient stage, and before any of the swellings or boils have suppured. The problem, therefore, remains to be solved whether the specific *materies morbi* of plague is exhaled from the patient's respiratory organs, from his cutaneous surface, or from some other emunctory.

These considerations lead me to the important practical question of *fomites*. I was very anxious to obtain from Dr. Cabiadis the fullest information on this point, so as to clear up, if possible, this intricate subject. Dr. Cabiadis says that he considers the *atmosphere* which surrounds a person affected with plague as the true medium of transmission. Apart from this, he has also met numerous instances in which,

he believes, the *clothes and bedding* of plague-patients communicated the malady to sound persons living beyond the sphere of the epidemic outbreak. Such articles were made of wool, cotton, flax, or hemp. He ignores whether these materials in a *raw state* would have given the disease as well, since he has not met with any fact to enlighten him upon the subject.

Etiology.—The origin of plague and the causes that bring it into activity are utterly unknown. Some persons have conceived the idea that a *marsh-miasm* might be the exciting cause of this pestilence, but Dr. Cabiadis refutes this idea by quoting the immunity from plague enjoyed by Bussorah and Kerbela, two of the dampest cities in Mesopotamia, and both of them surrounded by marshes. Kerbela, in fact, stands on an island in the midst of a marsh, the waters of which reach up to its very walls. Midhat Pasha, when Governor-General of Bagdad, built a fine new quarter at its south-west end; the whole of it, however, has now fallen down in consequence of the foundations being embedded in a slushy soil. Kerbela, therefore, according to the malaria hypothesis, ought to be a spot favourable to the development of plague, and yet it has not been visited by that epidemic, notwithstanding that all the surrounding villages have been more or less attacked by it, and that persons suffering from the plague have gone to Kerbela and died there.

Some persons have fancied that eating diseased camel's meat might have caused the outbreak in Mesopotamia. In order to find out whether there were any truth in this assertion, Dr. Cabiadis made a careful inquiry, but failed to discover any evidence in corroboration of it. He, therefore, infers that diseased camel's meat, like that of any other diseased animal, might predispose to an attack of plague, but not engender the malady.

Proximate Cause.—The most palpable and evident of all the causes which predispose an individual to an attack of plague during an epidemic outbreak is *poverty*. No other malady shows the influence of this factor in so striking a degree; so much so, indeed, that Dr. Cabiadis styles the plague *miseria morbus*. In his experience, he found that the poor were seldom spared; the wealthy hardly ever attacked. Cholera also has a preference for the poor, but at the same time it spares not the rich, whereas plague attacks exclusively the poor. Here, again, Kerbela presents a striking proof of this fact. Its inhabitants are the most prosperous section of the whole population of Irak-arabi (Turkish Arabia), and even its poorer classes can at all times live on a meat diet. Its streets are narrow and crooked, but the houses are spacious and well aired. Hillah is the very reverse of this: its houses are low, confined, and very imperfectly ventilated. They are, moreover, generally encumbered with a horse, with poultry, and with two or three buffaloes. These animals constitute the resources whence the lower classes of Hillah derive a livelihood by selling milk and eggs to the wealthier inhabitants, while they themselves limit their own nourishment to barley-bread, dates, and onions, with sometimes fish in a putrescent state. It is needless to add that Hillah suffered severely from the plague.

Prophylactic Measures.—The most effectual means for the protection of a community against the propagation of plague are the isolation of the sick, the destruction by fire of their clothes, and the whitewashing with lime and free ventilating of the domiciles in which cases of plague occur. The plague reappeared in only one out of 350 houses which had been whitewashed after an outbreak of plague in them, whilst its reappearance in houses which had merely been abandoned for a time, after an attack of that disease, but which had not been whitewashed, was of frequent occurrence.

The other disinfectants tried, such as sulphur fumigations, lighting fires, and throwing a solution of sulphate of iron into the drains, gave no decided results, except when associated with the whitewashing and airing of the infected houses.

Cordons Sanitaires.—Dr. Cabiadis believes that *cordons sanitaires*, properly enforced, are extremely useful in checking the extension of an outbreak of plague. The greatest vigilance, however, is required to render them efficient, because the persons put to guard these cordons often allow passengers to evade them, either through neglect of their duties, or through the persuasive influence of bribes. He strongly condemns, however, the practice adopted at one time in Bagdad of shutting up persons smitten with the plague in their houses, and placing guards around them to prevent communication with the rest of the population. The fear of this harsh and unreasonable measure, caused the inhabitants to conceal the existence of the malady, and even to bury inside the house those who succumbed from it; thus deceiving the authorities, and helping to intensify and propagate the evil it was intended to mitigate.

Treatment.—Dr. Cabiadis can offer no suggestions worthy of trust, as to the best mode of treating plague. The remedies chiefly tried at Bagdad and at Hillah, were leeches, and mercurial frictions to the

swellings, combined with the internal administration of carbolic acid, or sulphate of quinine. In some cases, these remedies were thought to do good, while in others they proved useless, if not detrimental, and Dr. Cabiadis is convinced that we know as little about the cure of this disease as we do about its essence.

He concludes his interesting notes on this subject by expressing astonishment and regret that no public hospital exists in Bagdad, an extensive city of 150,000 inhabitants.* A large *military* hospital was built there by Midhat Pasha, on a fine and healthy site, but no use has been made of it. He therefore suggests that the Government should turn it into a civil hospital for the benefit of the people of Bagdad.

NOTE ON A PECULIAR CONDITION OF THE SKIN IN PARAPLEGIA.

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IN a case of tumour of the neck complicated with paralysis of the cervical sympathetic on the left side, and complete paraplegia from the mid-thoracic region downwards, under the care of Mr. Wood in the Albert Ward of King's College Hospital, Mr. Wood, while examining the patient, was incidentally struck with the remarkable facility with which a clean silver probe made dark pencil-marks on the paralysed parts, while it produced only a red mark of vascular dilatation on those parts of the same patient which were not paralysed. When I was told of the circumstance by the house-surgeon, I was at first somewhat incredulous, and inclined to attribute it to some silver compound on the probe; or at any rate that any other metal, such as a key or hard substance, would probably produce a similar effect. I was told, however, this was not the case; and, on examining for myself, I found that most undoubtedly a silver probe or the bright edge of a shilling produced a dark pencil-mark on the abdomen and legs, while a key and a piece of ivory were absolutely negative. But I also found that the edge of a bright sovereign would produce a similar mark, though less readily and not so distinct, and the same with a bronze coin.

Thinking these facts rather remarkable, I determined to pursue the subject: and, with Mr. Wood's permission, I instituted a further series of experiments. The various hypotheses which suggested themselves at first to myself and those who witnessed the facts will appear somewhat ludicrous when viewed in the light of what turned out to be the real explanation; but, as they served to eliminate the truth, they may as well be detailed.

From the fact that silver in particular marked the skin, it was supposed that it might be due to the formation of a sulphide on the skin. To test this, I provided myself with acetate of lead papers, and also with metals which do not form dark sulphides, as zinc, magnesium, and metallic arsenic. The reaction of the skin was neutral to litmus. The acetate of lead test-papers did not become blackened when applied to the skin—at once excluding sulphurous exhalations; and, as zinc and magnesium also caused dark pencil-marks, the theory of sulphides could not be entertained. The metals which were found to give distinct marks were silver, gold, copper (pure and in alloy), lead, zinc, and magnesium; while iron, platinum, and a crystal of metallic arsenic produced only a red line of vascular dilatation. The pencil-marks, though all dark, had different shades, and some were produced with greater facility than the others. With silver, the skin could be drawn on with as great readiness as with a pencil on paper, and it was easy to write or sketch on the thighs, hips, and abdomen. With a wet sponge, the marks were easily effaced, leaving mere lines of vascular dilatation. On examining with a lens the dark lines drawn with a piece of pure magnesium, it was possible to detect a fine dark powder; and, on rubbing him with a clean linen handkerchief, a distinct dark stain was communicated to it. To insure absolute brightness of the magnesium, I cut and scraped it; and, on proceeding to burnish it with a piece of wash-leather, I was struck by the fact that the leather became blacker the more I rubbed. Here was the key to the puzzle. Placing the wash-leather on my leg, I tried in succession the various metals which had produced pencil-marks on the skin, and found that all those which had been effectual also produced marks of exactly the same character on the leather, while iron and platinum produced none. The explanation was thus simple, that the skin possessed the same property as the wash-leather in rubbing down the metal in the form of a fine dark powder. That this property of the skin was not peculiar in the case under investigation, was proved by Mr. Wood writing with a silver probe on the

legs of another patient paraplegic from fractured spine lying in the next bed, while on the arms and chest of the same patient only red marks could be produced.

On testing the healthy parts in these cases, as well as the skin of healthy persons and patients free from paralysis, it was found that, though with considerable pressure some indications of pencil-marks might be made on most, yet the readiness with which the paralysed limbs could be written upon was very striking. I could detect no difference between the two sides in a case of hemiplegia, nor was there any difference between the two sides of the face in a case of peripheral facial paralysis of some standing. Thinking that the physical condition of the skin which caused it, like wash-leather, to take on metallic pencil-marks so readily was probably due to a state of oedema, I tried the various metals on the legs of a patient suffering from cardiac dropsy, and with marked success. With silver, copper, gold, zinc, magnesium, aluminium, etc., sketches could be drawn on the legs in bold dark lines. As before, iron and platinum were entirely negative—a fact easily explicable by the hardness of the metal. I found also that on the lumbar region and buttocks of a patient confined to bed in the recumbent posture, similar metallic lines could readily be traced. Here also oedematous softness of the skin, caused by the long maintenance of the recumbent posture, would readily account for the phenomena. But neither here nor in the paraplegic patients was there any evidence of oedema by pitting on pressure when tested in the usual way.

Hence it would appear that, though the property of taking on metallic markings belongs to the skin to a greater or less extent in the healthy state, yet in certain conditions, especially of oedema, which may not be otherwise evident, this property is greatly intensified, and may be of some diagnostic value.

THE ETIOLOGY OF ENTERIC FEVER, WITH AN ACCOUNT OF NINETEEN CASES WHICH OCCURRED IN THE HOMERTON FEVER HOSPITAL.

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THE object of the present paper is to show that enteric fever is contagious, and by this we mean communicable by direct personal intercourse. It is of secondary importance, for the purpose of the paper, to determine what, if any, particular excretion may contain the fever-producing material; but we think it has been asserted without sufficient evidence that this "material" resides in the stools alone. On the assumption that enteric fever is a specific enteritis, and nothing more, there would be reason for this opinion. It is, however, something more. The severity of the general symptoms is not only not always, or even in the majority of fatal cases, in proportion to the severity of the internal lesions, but they are sometimes entirely *unlike* the symptoms produced by acute local inflammations. We not infrequently see cases of enteric fever in which the symptoms during life point only to acute poisoning, and in which it would be impossible to say to what the acute poisoning was due: cases in which *post mortem* examination shows lesions in no degree proportionate to the severity of the general symptoms. If, then, we regard the fever as the result of a poison affecting the body generally, and the small intestine incidentally, we see no reason why the poison should be limited to the intestinal excreta, and why that of the kidneys, the lungs, and the skin should be held innocuous. That there is no such limitation derives support from the fact that the anatomical changes occurring in the early period of the fever are not limited to the small intestine. The early enlargement of the liver and of the spleen indicates early changes in those organs; and the early bleedings of the nose, mouth, and bowel point to early blood-change. Add to all this that enteric fever, apart from diarrhoea and soiled linen, has its "stink", as typhus and small-pox: a stink which, to persons with good noses, is an aid to diagnosis in doubtful cases; and who will dare say that this stinking matter may not produce the disease? As we have already said, it is of secondary importance for our purpose to establish what particular excretion produces enteric fever. This is a question to be determined by future observation, on the hypothesis that one or all of them may produce it. We believe that the cases which arose at Homerton, and the record of which forms the basis of this paper, arose from exposure to *fresh* enteric stools; but, whilst this is the proposition which will be maintained in reference to the origin of these cases, we do not mean to say that cases do not arise from decomposing or decomposed stools or from emanations from the lungs and skin.

Further, it will be our object to show that, whilst we do not deny that enteric poison is sometimes contained in filth and in drains, and

* Population of Bagdad—Shiah Mohammedans, 70,000; Jews, 30,000; Christians (chiefly Chaldeans) and Soonnee Mohammedans, 50,000; total, 150,000.