absence of the guarantee that none would be destroyed, and in presence of evidence that much is actually destroyed under those conditions, his very security makes it doubtful whether he employed even that moderate speed which his method permitted.

For the repetition of Dr. Pavy's, or other similar experiments, I can recommend a small Beart's coffee machine, and the cotton filters sold with the machine, as the speediest and best contrivance for effecting quick filtration.

As the result of many experiments, Dr. Pavy found that there was no sugar present in the liver; but, on the other hand, he gives as the result of sixty observations, that sugar is only found to the extent of the merest trace in the blood of the right side of the heart, under a natural or ordinary condition, during life. Even this result, although of a positive nature, and speaking against his conclusions relative to the liver, is not without objections, based upon the mode of analysis employed. He defibrinated the blood, probably by stirring, treated it with spirit, and pressed through flannel. The residue of the evaporation was tested with Barreswil's solution. Blood to be analysed for sugar, in order to find a maximum, must be analysed much as for urea; it must be allowed to flow directly into absolute alcohol, and afterwards the additional precaution must be taken of removing its alkalinity when the filtrate concentrates on the water-bath, otherwise much sugar is necessarily destroyed.

I had formed the above positive opinions and conclusions on Dr. Pavy's experiments many months ago, as many friends can testify, who were either present at one or the other of the experiments, or were in conversation informed of my conclusions. For this reason, my results and reflections, which were obtained quite independently, may be considered a strong confirmation of some of the propositions of Dr. Harley, as contained in the published abstract of his paper.

ON YELLOW FEVER.

By GEORGE BROWNING, M.D.

[Read before the Harveian Society, February 16th, 1860.]

THE importance of the subject which I have selected for this paper will at once be conceded, occupying as it does a foremost rank in the catalogue of epidemic diseases, whether we consider the various countries in which it is most prominent, or the havoc and death which have prevailed, and which still prevail, in those subject to its fearful visitations.

The subject of epidemic diseases generally seems scarcely to have claimed from individuals or from governments that high consideration which their importance demands; for, although "they are portentous things unto the climate that they point upon", they may sometimes render "fearful objects so familiar" that we seem not to feel the danger, in the general distress by which we are surrounded.

There doubtless is, in epidemic seasons, a little more activity in the general pulse. Authorities meet and discuss quarantine and other grave questions. The subject of free ventilation may be agitated; the importance of large supplies of pure water may be admitted; dust-carts and scavengers may be called so early into requisition, that the potent rays of the sun may not yet have disengaged any noxious odour; drains and cesspools are forthwith to be only imaginary nuisances; and a ruthless enemy is so assailed in every quarter, that we might fancy a hasty retreat being beaten to some mountain height.

In like manner is the public mind aroused to sympathy at intervals by some melancholy and startling announcement; as when the steamboat boilers explode, and instantly human fragments, even by dozens, are scattered in the air, and death in terrible form meets the eye; or as when a ship founders, or is wrecked at sea, and hundreds perhaps are doomed to measure the interval between dismay and dread reality by minutes or hours.

Social reforms are yearly agitated, and glaring evils boldly exposed; whilst there is too much reason to believe that in each case, after a little time, we become apathetic. The thousands who have been swept off by an epidemic rest quietly in their graves, and occupy a page in Death's statistics. Accidents by sea and land may have the doubtful light of executive investigation thrown upon them; and many of the social evils may be reproduced another year, to undergo the national purification of a vaunted reform!

As early as the days of Sydenham, down to those of modern writers, different forms of epidemic diseases have been attri-

buted to what has been designated an epidemic or pestilential constitution of the air, to which may be added a certain susceptible state of the body; but, as yet, little seems to be definitely known of this peculiarity, which in a great measure is capable of causing epidemic diseases. Speculation, whilst it might attempt to remove the veil and solve the mystery, would still leave us in the suspension of doubt and the mist of uncertainty. We know, however, that one effect is to produce malignant fever, in one or other of its varieties; and upon that called the yellow fever I now purpose to make a few general remarks.

This fever is generally met with in low and level localities. Some parts of the West Indies, and certain parts of North and South America, present all the natural and geographical advantages necessary for the origin and spread of this disease. Sometimes it stretches across the Atlantic, and rages in Cadiz, Seville, Barcelona, and Gibraltar; having visited Lisbon and Leghorn, spreading extensively in this last city, in 1804.

The more elevated parts of the West India Islands are exempt from this disease. Thus, some towns in Jamaica, at an elevation of 2,000 feet, are healthy, as well as the higher parts of St. Domingo. Major Tullock reports that, at an elevation of between 600 and 700 feet, at Dominica, he could not secure a healthy position; whilst, at an elevation of from 2,000 to 2,500 feet, his men were likely to be wholly exempt from this disease, or to encounter it in so very modified a form that the mortality from all causes will not, in the average of a series of years, materially exceed that to which an equal number of European troops would be subject in their native country.

Humboldt, again, has assigned in Mexico an elevation of more than 3,000 feet for the required exemption. Until recently, the river Amazon formed its boundary south of the equator. Within the last few years, it has prevailed at Rio Janeiro, Pernambuco, and other contiguous cities. It has rarely invaded the Pacific coast, and on these occasions it has only visited Panama and Callao. Of late years, the cities in the northern portion of the United States (if we except Philadelphia in 1853) have been almost exempt from yellow fever; whilst some of the cities and surrounding country, in some of the southern States, have yearly visitations.

Unlike cholera, small-pox, and other epidemic diseases, the yellow fever has geographical limits, beyond which it does not appear, and only at intervals at some of the places within these limits. In the West Indies, and in some parts of North and South America, it has its most permanent abode. Thus we find that it extends about 44 degrees north and 23 degrees south of the equator, and from about the 60th to 97th degrees of west longitude, exclusively of those points in Europe where it occasionally prevails, embracing altogether a large portion of the earth's surface.

Not to attempt any historical review of the date and order in which yellow fever has prevailed in different parts of the world, I may observe that, so far back as 1692, the fever was imported into Boston from the West Indies; and in 1699, it appeared in Charleston, South Carolina, and in Philadelphia, it being only a few years after the settlement of the last named city, and the population numbering at this time only a few hundred souls.

Having glanced at the topography of the disease, I may pass on to the predisposing and exciting causes, some of the peculiarities of the mode of invasion, its symptoms, and termination.

Long continued heat and drought are atmospheric conditions favourable to the origin and spread of yellow fever; although, in some of the epidemics in British Guiana and some parts of the West Indies, these auxiliaries are not always found to exert an influence on its development. Thus, observes the late Dr. Blair of Demarara, the year 1853, during which the very beds of the navigable canals were deeply cracked from drought, was not followed or accompanied by any invasion; and the epidemic was long on the decline before the dry season of 1845 and 1846. It is also remarked by another writer, referring to the West Indies, that, in the majority of instances, the most severe attacks of the disease have occurred in the cold season, and not unfrequently when the weather has been peculiarly agreeable as regards sensation, and, it might be supposed, not unfavourable to health. These conditions do not apply to the localities generally where I have witnessed the origin and spread of the disease, although I have known them to obtain after it has become epidemic.

Predisposing Causes. An important predisposing cause, not to be lost sight of in this enumeration, is the constitutional condition induced by previous residence in high latitudes and cold climates. Thus the percentage of mortality gradually de-

creases from a fresh importation of Russians into what has been called the Yellow Fever Zone, down to the Italians, who, like the Creoles of the West Indies and the southern states of America, feel less sensibly the enervating influence of high temperature and the scorching rays of the unobscured sun.

This circumstance should demand seriously the attention of the government in sending troops to the West Indies. Regiments fresh from India or Gibraltar are less likely to suffer from an outbreak of yellow fever, than those transferred immediately from the United Kingdom. In illustration of this assertion, may be cited the great mortality of the 15th foot in about three weeks, shortly after landing in Barbadoes, in 1805, as compared with the 68th, of recent date, which last regiment had only arrived on the same island a few weeks previously from Malta.

Under the impression that total seclusion from the outer world would secure exemption from an attack, I have been informed of those who, acting under the influence of an affrighted imagination, have sedulously confined their movements within the limits of their own houses, with no other effect than to find that they had been assailed by the malady in no mitigated form, and had become the victims of their own fears at the same time.

Intemperance and great exposure may be regarded as predisposing causes; but total abstinence from spirituous drinks has been found no protection. An observation from Dr. Blair on the point may be somewhat startling. "In fact," this writer says, "delirium tremens was not an unfavourable complication of the disease." Such an opinion must be received with caution; besides, it loses much of its significance, if not of its accuracy, when it is borne in mind that a large number in their field of observation have failed to discover even negative good resulting from the complication of delirium tremens with yellow fever.

Period of Incubation and Invasion. The period of incubation and the mode of invasion are subject to very considerable variation; some systems throwing off the secret agency that is at work for a long time, whilst others quickly succumb to its influence.

Sometimes the invasion commences with general *malaise*, lasting for several days; and again, an attack is ushered in by flushings and chills for twelve, or a greater number of hours, to be immediately succeeded by the hot stage. In the early hours of the night the onset is most frequent; and next in frequency from six to eight in the morning. I have observed that the morning hours are particularly applicable to sailors and officers of ships, who remain on board during the time their ships are in port. Driven from their berths by the combined effects of heat and mosquitoes, they seek questionable security and rest upon deck, to discover in a few hours that it has been purchased at the expense of a burning skin, a heavy, yellow, and injected eye—perhaps yellowness also of the skin, severe supraorbital and general muscular pain, with an expression of countenance that is distinctive. In truth, we have a case, taken in connexion with the place, regarding which, in answer to the first and earnest inquiry of friends or relatives, "What fever is it?" we cannot give even the advantage of significant doubt. It is the yellow fever.

Again, the mode of attack is frequently remarkable for its abruptness; persons being seized without warning, whilst pursuing their ordinary avocations, with languor, prostration of strength, severe pain in the head and muscles of the back and thighs. Sometimes, so sudden is the attack, that persons are stricken down in the streets, surviving only a few hours, death taking place by coma. It is most probable that, in cases having a fatal termination so rapidly, there are complications of disease; as I believe they occur mostly in persons who are exposed to the influence of the sun. In the generality of cases, however, the fever is ushered in by a slight chill and shivering, to be quickly followed by the severe pains and heat above indicated.

In opposition to Dr. Rochoux, but in accordance with the more general, and perhaps more authoritative, opinion upon the subject, I shall assume that yellow fever is the same in its pathology and pathognomonic features, in whatever country it may appear, whether sporadically or epidemically; being subject to the same variation in intensity that obtains in other epidemic diseases, even in the same locality in different seasons, resulting from a greater or less concentration of the morbid agent; which is again modified by temperature, humidity, and other surrounding phenomena essential to its existence. Of the various divisions of the stages of this fever by different authors, none perhaps can be found more correct than

that of Dr. La Roche of Philadelphia, who divides it into three stages:—1. Reaction; 2. Calm emission; and 3. Exhaustion.

The febrile stage varies from a few hours to two or three days, sometimes longer; and this, a single paroxysm, which is one of its marked features, is succeeded by one of repose, during which both patient and medical attendant indulge the idea that danger is well nigh past, and recovery beams brightly in the not far distant future. True, these expectations are not unfrequently realised, and a rapid convalescence ensues; whilst, in very many cases, it proves a treacherous delusion. Ejection of black vomit commences from the stomach, and frequently continues at intervals, until failing strength announces speedy dissolution on the sixth or seventh day.

The yellow or orange colour of the skin is a sign of the intensity of the disease, gradually extending from the eyes to the forehead, face, chest, and neck, until at last it becomes diffused over the whole surface of the body.

The sensation imparted to the touch is often exceedingly pungent and disagreeable. A thermometer placed in the armpit and on the chest sometimes rises to 108° and 105° respectively.

Pulse. The regularity of the pulse is a marked feature of the disease; the different stages being passed through frequently without any very great variation from the normal standard. It is highest in the first stage, especially if accompanied with any inflammatory signs; and uniformly slow during the convalescence. In some cases, the pulse is so slow that the poison seems to act as a sedative upon the heart's action.

Hæmorrhages. The great tendency to hæmorrhage is another distinguishing feature of this disease, depending, we may presume, upon an alteration in the blood, involving modifications in the capillary vessels. This tendency is also frequently exhibited after death; thus, blood continues to be discharged from the mouth, bowels, uterus, and gums. Although we meet with an oozing of blood in the early, it generally occurs in the later stages of the disease, and can then only be regarded as of grave import. Often preceding the discharge of real black vomit, and accompanied with this, are usually found dryness of the tongue and great thirst. The peculiar odour of the skin has been likened to that arising from fetid bile or putrid fish; but this, as well as the odour pertaining to black vomit, is not easily described, but which freely to have inhaled, is not to be forgotten.

Black Vomit. Some of the circumstances attending the discharge of black vomit are often very remarkable.

Dr. Belot, whose private and hospital practice at Havana was very ample, says that, while the brownish matter containing flocculi is invariably an indication of mortal issue, the chocolate coloured matter, which also passes under the name of black vomit, is not necessarily so. The adoption of this, like most unqualified opinions, it is believed, would lead to error; although objections to this doctrine, to be strictly valid, must be based upon a series of observations upon that *shade* of black vomit which Dr. Belot has indicated, a point upon which I have no remark to make.

In the severe epidemic in New Orleans of 1853, many cases of recovery from black vomit occurred; indeed, such is the case in every epidemic. The house surgeon of the Charity Hospital, in the year which I have just named, stated that seven per cent. of such cases recovered in that institution—a larger estimate, perhaps, than is usually made. In the *Maison de Santé*, a private hospital, there were 338 cases of black vomit, and fifteen recoveries; and amongst the numerous cases in private practice, a recovery after black vomit occasionally came under my own, as well as under the observation of other practitioners.

It must, however, be borne in mind, that recovery from black vomit in this season was larger than usual. The time of its continuance varies from a few hours to a day or two, exceptional cases longer. Dr. Dickson, formerly of Charleston, has recorded a single case that extended over a period of ten days before its fatal termination. The same writer says: I saw a patient in our Marine Hospital, in 1817, walking from ward to ward with a vessel under his arm, to receive the black vomit which he threw up from time to time. He continued this practice for ten days, until within fifteen minutes of his death, which took place suddenly and unexpectedly to the poor fellow; he had always expressed the most cheerful and confident expectation of his recovery, notwithstanding this usually dreaded symptom. A person went to the residence of a physician in New Orleans, saying that he had been persuaded to take advice, although he himself believed there was no neces-

sity for such a step. Whilst conversing, he asked for a basin, and threw up a large quantity of black vomit. These are what are termed walking cases; where, in the words of our great dramatist, it may be said: "The life of all his blood is touched corruptibly, and his pure brain (which some suppose the soul's frail dwelling-house) doth by the idle comments that it makes foretell the ending of mortality." And this (the mortality of yellow fever), to which I must now allude, is one of its least inviting aspects.

The enormous percentage of mortality consequent upon a severe epidemic; the sundering of domestic ties; the desolation of happy homes, where, in highways and byeways of terribly doomed cities, each may say to the other: "Friend after friend departs; who has not lost a friend?" The distress and misery it involves upon those to whom Providence has not been too lavish in her bounties; the interruption of commercial intercourse; the derangement or suspension of important enterprises, and the consequent sacrifices and losses which such interruption involves—these might well stimulate the best qualified to hearty investigation.

Mortality. The percentage of mortality differs widely in different localities, and in the same locality in different seasons, always of course being greater in hospital than in private practice. To give statistical tables would be to enter too minutely into detail; and, to select certain seasons and places, would be but an approximation to accuracy. I may state, however, that the mortality seems to be slightly greater in European cities, when visited by an epidemic, than it is in tropical climates. The range is in Europe from 1 in 1.1 to 1 in 9.6; in tropical climates, from 1 in 1.1 to 1 in 8; whilst in the United States the range is from 1 in 1 to 1 in 10: the extremes being taken in each instance.

Post Mortem Appearances. In nearly all the fatal cases there is a yellow suffusion of the eye. The stomach frequently contains black vomit, and is congested. The same fluid is also met with in the intestines. The liver is frequently gorged with bile, enlarged and friable; its external colour being deep or pale yellow. The kidneys are often congested.

Treatment. It will naturally occur to every one, that in a disease of this character various modes of treatment should have been adopted; some, perhaps, having been introduced by caprice, and sustained for a time by fashion.

Enormous depletion has had its advocates; and, in the absence of all depletion, fancied safety has been sought: whilst others, again, upon more rational grounds, have found efficacy in the moderate abstraction of blood by cups or leeches in a certain class of cases. By the lancet, seventy or more ounces were taken by Dr. Barton of New Orleans at one time in 1833; and in twelve or eighteen hours after, from ten to twenty more, when the disease was of an inflammatory character. Such practice at the present day would find few, if any, supporters; a careful husbanding of vitality being expedient for a favourable result. When, however, the face is much suffused, the eye injected, and the frontal headache severe and persistent, the abstraction of from six to twelve ounces of blood from the back of the neck, affords relief. Great irritability of the stomach and tenderness of the epigastrium may also be frequently relieved by a few leeches or cups; sometimes by the application of dry cups alone. Depletion is admissible only in the first stage of the disease.

Pediluvia and sinapisms (domestic remedies very generally resorted to before the arrival of the medical attendant), and blisters, are of much value; and morphia or the liquor opii sedativus, cautiously administered, are useful in allaying restlessness, inability to sleep, and the jactitation, sighing, and distress, which frequently supervene upon the fever. Lumps of ice, too, are found salutary as well as agreeable. I single out two articles which have been more extensively used than all others; and too often, it may be feared, with so reckless a profusion, that if the fever were cured, the patient has not long survived the remedy. I refer to quinine and calomel. I may state that these, in moderate doses, frequently act as resolvents of the fever. The effect of large doses of quinine—say from twenty to thirty or more grains—has not, I believe, at any rate, in the more recent epidemics, met with such general favour amongst the profession, nor has its use been attended with such beneficial results, as were once accorded to it. Smaller doses—from ten to fifteen grains; with or without from five to ten grains of calomel—will better fulfil the indications. Overmedication should be strictly avoided, and careful nursing rigidly enforced.

In the later stages of the disease, when stimulants are often required, Rhenish wines or champagne may be classed

amongst the best, as well as the most agreeable. This, however, it may be observed, is directly opposed to the opinion and practice of Dr. Blair, who very generally prescribed twenty-four grains of quinine and twenty of calomel, to be repeated two or three times, at intervals of six hours, as occasion might require. Dr. Blair says that, in thirteen years, he prescribed quinine to the extent of several thousands of ounces, without danger from its effects.

The sedative effect of frequent sponging with cold water or lemon-juice, when the skin is hot and dry, produces a sensation of comfort, allays irritability, tranquilises vascular action, and reduces the heat of the body. Sometimes tepid sponging better answers the requirements of the case.

I have now endeavoured to point out as concisely as possible some of the leading features and peculiarities which belong to yellow fever. To contrast these with other types of fever; to introduce the subject of contagion, the tendency to relapse, the infrequency of second attacks, with many other relevant points connected with so comprehensive a disease,—would be to exceed the prescribed limits of this paper, and to overtax your patience. If I have succeeded, so far as I have entered upon the subject, in indicating some of the characteristics which pertain to this fever; if its mode of invasion, its assigned geographical limits, its single paroxysm, its tendency to hæmorrhage, its uniformity of pulse, are such as do not mark the origin and progress of any other fever,—I shall then have expressed an opinion in accordance with those who assign to it a distinctive character—who believe it to be a disease *sui generis*.

10, St. Stephen's Crescent, Westbourne Park, W.

LETTERS AND COMMUNICATIONS.

Letters or communications for the JOURNAL should be addressed to Dr. WYNTER, Coleherne Court, Old Brompton, S.W.

Letters regarding the business department of the JOURNAL, and corrected proofs, should be sent to 37, Great Queen Street, Lincoln's Inn Fields, W.C.

British Medical Journal.

SATURDAY, MARCH 17TH, 1860.

MEDICAL REPRESENTATIVES IN PARLIAMENT.

THE new Reform Bill is brought in, and the so-called Fancy Franchises are thrown over by Lord John Russell. The resolution of the College of Physicians to apply to his Lordship for a representative for their body will, therefore, fall upon unwilling ears. We cannot help thinking that we have ourselves to blame chiefly for this miscarriage. Medicine, as a profession, has made no sign of her desire to be represented in the councils of the nation. As individuals, we all of us deplore the want of medical men in Parliament, to attend to the great questions of public hygiene which are constantly arising and passing under discussion, and then collapsing or coming to nought, simply through the ignorance of members of the vast bearing which medical and sanitary questions have upon public affairs. If we only look back for half a dozen years, we find the annals of Parliament strewed with the minutes of legislative acts relating to our profession, simply through the want of knowledge of the men who carried them. How many abortive attempts have been made to pass a Vaccination Bill? and how many more failures may we expect before we have a perfect measure? When shall we have a working bill on the question of Poisoning? How many more Commissions of Inquiry shall we have with respect to Lunacy? Will the botching given to the Medical Act last out the present year, or shall