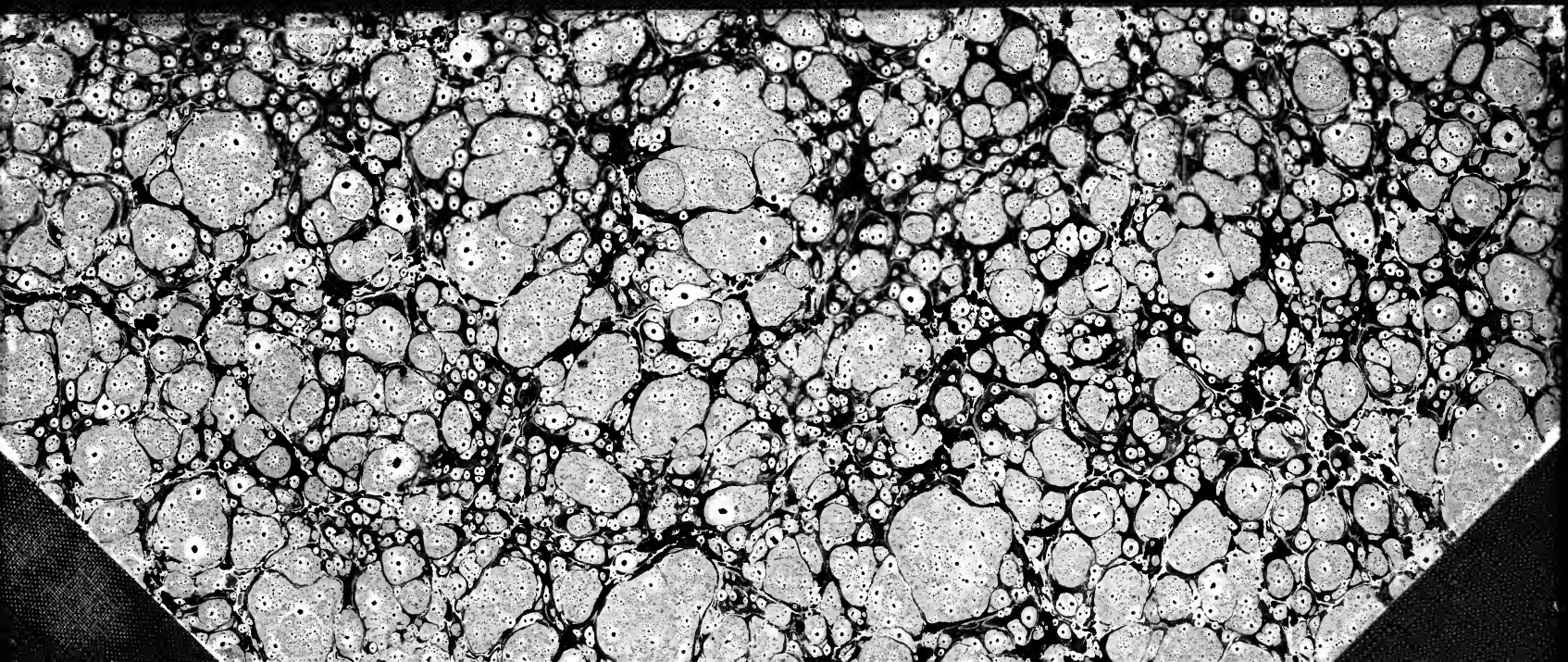


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James Dalrymple

A TREATISE

ON THE

Salem Mass.

PLAGUE

AND

YELLOW FEVER.

With an APPENDIX, containing

HISTORIES OF THE PLAGUE AT ATHENS IN THE TIME OF THE PELOPONNESIAN WAR; AT CONSTANTINOPLE IN THE TIME OF JUSTINIAN; AT LONDON IN 1665; AT MARSEILLES IN 1720; &c.

BY JAMES TYTLER,

Compiler of the Medical Part of the Encyclopædia Britannica.

Let every one, Phyſician or not, freely declare his own ſentiments about it; let him aſſign any credible account of its riſe, or the cauſes ſtrong enough, in his opinion, to introduce ſo terrible a ſcene.

THUCYDIDES.

'Twas all the buſineſs then
To tend the ſick, and in their turns to die.
In heaps they fell.

ARMSTRONG.

Publiſhed according to Act of Congreſs.

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1799.

Oldsch

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A TREATISE

A

TREATISE

ON THE

Plague and Yellow Fever.

PART FIRST.

Of the Aſiatic *or* True *Plague.*

SECTION I.

Of the Plague in general.—Inquiry into the Antiquity of the Diſtemper.—Of the Plagues mentioned in the Old Teſtament.—Hiſtory of ſeveral remarkable Plagues which, at various times, have deſolated the world.

AMONG the many diſeaſes which afflict the human race, we find ONE, upon record, ſo irreſiſtible in its progreſs, ſo fatal in its attacks, and ſo entirely beyond the powers of medicine; that, like the ſerpent *Python*, the *Leviathan*, or the *Mammoth*, among animals, it has generally been diſtinguiſhed by names expreſſive of its deſtroying nature; not, like other diſeaſes, by any particular appellation derived from its ſymptoms. In the Hebrew language this diſtemper is expreſſed by the word which ſignifies *perdition*;* in Greek

* Thus Dr. Hodges; but Calmet informs us, that the Hebrews call by the name of plagues all diſeaſes ſent by way of puniſhment or correction from God; as the peſtilence, infection, the leproſy, ſudden deaths, famines, tem-

Greek it is called *loimos*, from *luo*, to deſtroy; in Latin, *peſtis*, from *peſſundo*, to overthrow; and in Engliſh, the *plague*, from the Latin *plaga*, a ſtroke with a whip; alluding to the common opinion, that it is a ſcourge from heaven, taking vengeance on mankind for their ſins.

Other diſtempers, called by the general name of *Epidemics*, have at different times infeſted whole cities, and even overſpread extenſive regions; but theſe, though ſometimes very fatal, have always been found ſo much inferior to the diſtemper of which we treat, that, on a compariſon, we may juſtly ſay, though epidemics have ſlain their *thouſands*, the true plague has ſlain its *ten thouſands*. In ſpeaking of the deſtructive ravages of epidemics, we may count the dead by tens, by hundreds, or by thouſands; but in the true plague, always by thouſands, by myriads,* or by millions. Procopius, when ſpeaking of a plague which deſolated the world in his time, compares the number of the dead to the ſand of the ſea; and Mr. Gibbon, who attempts to ſpecify, thinks they might amount to an hundred millions;† and I cannot help being of opinion, that the deſtruction generally occaſioned by violent plagues, amounts to about one half of the population; the

peſts: in a word, all calamities, whether public or private. *Calmet's Dict.* vol. ii. fol. 412. *Plaga.*

Parkhurſt derives the Greek term *loimos*, either from *luo*, as above, or from another Greek word ſignifying *to faint*; the ſame from which the Engliſh word *eclipſe* has its origin; or it may be from the Hebrew *lehem*, to conſume.

A friend obſerves, that "we no where find the word *perdition* in our verſion of the Old Teſtament. We have, however, the word *deſtruction*, which is of a ſimilar import; as, for inſtance, in Prov. xv. 11. where the Hebrew is *abdun*. In Rev. xvii. 8 & 11, we find the Engliſh word *perdition*; but as we have no Hebrew verſion of the New Teſtament, we may advert to the ancient Syriac verſion. The Syriac being a ſiſter dialect of the Hebrew, differs, radically, but little from it. The Syriac of the two places referred to above is *abdna*; hence the word *abaddon*, whoſe root is *abd*, and is the ſame with that of the Hebrew word above.

"As to the word *plague*, we often find it in the Old Teſtament, but perhaps never in that ſpecific ſenſe in which the moderns uſe it. The original word, rendered plague, is pretty generally *ngp*, or its derivations; as Exod. xii. 13. ii. Sam. xxiv. 21, &c." On this laſt occaſion, however, as the word *peſtilence* had been uſed before, in the ſame chapter, we can ſcarce doubt its having been really ſome kind of diſeaſe: and we know that modern plagues will ſometimes deſtroy as quickly as this is ſaid to have done.

* A myriad is generally ſuppoſed to contain ten thouſand.

† Gibbon's Hiſtory, vol. iv.

the reaſons for which opinion will be given in the courſe of this work. In all violent plagues, we hear of the dead being left unburied; of their being caſt into pits, &c. But if we wiſh to make any groſs compariſon between the deſtructive power of the true plague, and that of any other violent epidemic, we cannot, perhaps, have a better inſtance than that which took place at Baſſorah (a city on the confines of Perſia) in the years 1773 and 1780.* In the former of theſe years that city was viſited by the true plague; and in the latter, by an epidemic remittent fever. The fever was moſt violent in its kind, and deſtroyed twenty-five thouſand in the city and neighbourhood; but the true plague, no fewer than two hundred and ſeventy-five thouſand in the ſame place. Suppoſing the two computations therefore to be equally exact, we muſt calculate this plague to have been eleven times more deadly than the epidemic. If therefore the ingenious claſſifiers, in modern times, have brought into alliance the plague with other epidemic diſeaſes, and characteriſed the former from the latter; we may juſtly ſay, that they have fallen into the ſame error with other naturaliſts, who characteriſe the ſuperior from the inferior; the lion from the cat, not the cat from the lion. As to the remedies applied in theſe diſeaſes, doubtful in epidemics, they ſo univerſally fail in the true plague, that, notwithſtanding the improved ſtate of medicine, we may yet ſay, it ſtands among diſeaſes, in a great meaſure, like a giant without any champion to oppoſe; like a poiſon without any antidote.

In this unhappy predicament, the breaking out of a plague, in any city or country, proves a moſt diſtreſſing calamity, not only on account of the numbers deſtroyed by the diſeaſe itſelf, but by reaſon of the bonds of ſociety being looſed; ſo that humanity gives way to terror; children are abandoned by their parents, and parents by their children; every thing wears the appearance of ruin and deſolation; while, in too many inſtances, avarice urges on the unprincipled

* Tranſact. of Society for improving Medical Knowledge.

unprincipled to rapine, or even to murder. Nor are the cruel modes of prevention, ſometimes practiſed even by the authority of the magiſtrate, leſs abhorrent to humanity, than the lawleſs outrages of the thief or murderer. Inſtances of all this will appear in the courſe of the work; the following are ſo remarkable, that I cannot help inſerting them in this place. In the great plague at Marſeilles, in 1720, the town being almoſt deſerted, and few chooſing to venture into it, "three ſea-captains, and ſome hundreds "of ſailors, having the courage to enter the city, from "the ſea-ſide, found therein a gang of murderers, who "made it their buſineſs to deſtroy people ſeized with the "plague, and to plunder their houſes. The ringleader "of them, named *Rouanne*, a gunſmith, was broken alive "upon the wheel, and forty others were hanged. Rou-"anne owned that he had killed a thouſand perſons. "There were found, upon one of the murderers, jewels "to the value of more than thirty thouſand livres."* During the time of this public calamity, four men, who came from Marſeilles to Aix, were ſhot by order of the parliament, leſt they ſhould have brought the infection along with them.† Even this is not equal to what Mr. Howard informs us was practiſed in a hamlet of Dalmatia, where, the plague having raged with ſuch violence, that only two or three remained; the neighbouring magiſtrates ordered theſe miſerable ſurvivors to be ſhot. At ſuch prices will people buy a precarious, nay, an imaginary, ſafety. In ſhort, what Mr. Gibbon ſays of the ſituation of people in the time of violent earthquakes, will alſo, in a great meaſure, hold good in the time of peſtilence, or any great public calamity. "Inſtead of the mutual ſympathy which might comfort "and aſſiſt the diſtreſſed, they dreadfully experience "the vices and paſſions which are releaſed from a fear "of puniſhment; the houſes are pillaged by intrepid "avarice, revenge embraces the moment, and ſelects "the victim: while ‡ vengeance frequently overtakes "the

* Political State for 1720. † Political ſtate, ibid.

‡ Mr. Gibbon, agreeably to the ſubject on which he writes, particulariſes the mode of vengeance; ſaying, "the *earth frequently ſwallows up* the aſſaſſin," &c. It is hoped the ſubſtitution of the word *vengeance*, in general, will not be deemed a material alteration.

" the aſſaſſin or raviſher in the conſummation of his " crimes."

Whether the world hath been in the ſame predicament ever ſince the human race began to multiply, or whether plagues have originated at ſome remote period, is a queſtion not eaſily determined. It is certain that, as far as hiſtories go, they give us accounts of plagues; much leſs frequent indeed in very ancient times than in thoſe which followed; but the compaſs of hiſtorical knowledge is narrow. There are no authentic hiſtories of any nation previous to the termination of thoſe of the Old Teſtament. Where ſacred hiſtory ends, profane hiſtory begins. The fabulous period affords many accounts of wars, heroes, giants, and monſters, but ſcarce any of plagues. Diodorus Siculus indeed makes mention of a plague which happened in Greece, after the flood of Deucalion; and which, he ſays, was occaſioned by the general corruption of vegetables, &c. conſequent on the flood. Deucalion's flood is ſuppoſed to have been nearly cotemporary with the departure of the Iſraelites from Egypt; ſo that, if there is any truth in the relation of Diodorus, it is not improbable that ſome of the Egyptian plagues might have ſpread into Greece. We are likewiſe told of a peſtilence at Athens in the time of Theſeus;* but all the accounts of theſe times are ſo uncertain, and ſo much involved in fable, that little or no dependence can be placed on any of them.

The firſt diſtinct account we have of plagues of any kind, then, is in the book of Exodus, where we are told of many heavy judgments ſent upon the Egyptians becauſe of their diſobedience. Before this, indeed, we read of plagues ſent on the king of Egypt, for having taken Abraham's wife; but as theſe fell only upon the king and his houſehold, we cannot ſuppoſe any thing like a general peſtilence to have taken place among the people. In like manner did it happen to Abimelech, king of Gerar, on the ſame account. All the women belonging to the king's houſehold were rendered barren for

* Univ. Hiſt. vol. vi.

for a time; but we hear of nothing happening to the nation at large. Again, when Moſes and Aaron went in before Pharaoh, they ſaid to him, "Let us go and ſacrifice to the Lord our God; leſt he fall upon us with the ſword, or with *peſtilence*." This ſhews indeed that both Moſes and Pharaoh knew that ſuch a thing as *peſtilence* exiſted, or might exiſt; but it cannot prove that the diſeaſe we now call the plague or peſtilence commonly took place among nations in thoſe days as it has done ſince. Even among the plagues inflicted upon the Egyptians by the hand of Moſes and Aaron, we find only two that can be ſuppoſed to have any ſimilarity to the diſeaſe we now call the *plague*; viz. the *boil*, and the deſtruction of their firſt born. The former *may* have been peſtilential buboes; the latter alſo *may* have been the effect of a moſt malignant peſtilence; ſuch as, in the beginning of it, is ſaid frequently to kill ſuddenly, as by lightning; but whether it was ſo or not, we cannot now determine.

In the hiſtory of Job, who is ſuppoſed to have been cotemporary with Moſes, we have a caſe more in point. The boils, with which he was covered, are by Dr. Mead ſuppoſed to have been the ſmall pox; though in the true plague the body is ſometimes covered with gangrenous puſtules, conſtituting a diſeaſe ſtill more dangerous and painful than the ſmall pox; but whatever the diſeaſe of Job was, we may reaſonably conclude, that in his time there was none ſimilar to it commonly exiſting among mankind.

After the departure of the Iſraelites from Egypt, we find frequent mention of a plague as a diſeaſe commonly to be met with; but it was always that of leproſy; thoſe deſtructive plagues, which might be ſuppoſed to reſemble the diſeaſe we now call by that name, being all miraculous. Concerning the prevalence of the leproſy among the Jews, Diodorus ſays that they "were driven "out of Egypt as impious, and hateful to the gods; for "their bodies being overſpread and infected with the "itch and leproſy, (by way of expiation) they got them "together, and, as profane and wicked wretches, expelled "them

" them out of their coaſts." This he tells us was a reaſon given to one of the kings of Syria why he ſhould exterminate the Jews. In another place our author gives the following account of the origin of the Jewiſh nation. " In ancient times there happened a great plague in E-" gypt, and many aſcribed the cauſe of it to God, who " was offended with them. For there being multitudes " of ſtrangers of ſeveral nations who inhabited there, who " uſed foreign ceremonies, the ancient manner of wor-" ſhip was quite loſt and forgotten. Hence the natural " inhabitants concluded, that unleſs the ſtrangers were " driven out, they ſhould never be freed from their " miſeries. Upon which they were all expelled," &c. He then tells us that ſome of them came into Greece under the conduct of Danaus and Cadmus; but the greater part entered Judea, then quite deſert aud uninhabited. Their leader " was one *Moſes*, a very wiſe and valiant man," &c.*

The alluſion, in this laſt paſſage of Diodorus, to the plagues of Egypt, mentioned in Exodus, is manifeſt; and it is equally manifeſt, that the Egyptians themſelves, as well as the ſacred hiſtorian, owned them to be miraculous. Here, however, let it be remarked, that, though theſe, and others inflicted on the Iſraelites, were miraculous, we are not from thence to conclude that they took place without the intervention of natural cauſes. On the contrary, in ſpeaking of the plagues of Egypt, we are told, that when the locuſts came, " the " Lord ſent a ſtrong *eaſt wind*, all that day and all that " night; and when it was morning, the *eaſt wind* " brought the locuſts." In like manner " the Lord " turned a mighty ſtrong *weſt wind*, which took away " the locuſts, and caſt them into the Red ſea." Again, when the ſea itſelf was divided, " the Lord cauſed it to go back by a ſtrong *eaſt wind* all that night." The Egyptians were witneſſes to this; but, as they did not believe that the powers of nature had any ſuperior, they could never be induced to think that any of the elements would take part in a diſpute between two nations, or favour the one more than the other. In

* Diodor. Sic. Frag.

In diſeaſes inflicted on the human body, we are aſſured that the powers of nature were as much employed as in the miracles already mentioned. When it was told David that the child born to him by Bathſheba ſhould die, the infant was ſeized with a natural diſtemper, probably a fever, and died the ſeventh day. When Hezekiah was informed that he ſhould die, he did not, any more than David had done, give himſelf up to deſpair; but uſed, for his recovery, ſuch means as were in his power, viz. prayers to God; from whom, by the conſtitution of things under the Old Teſtament, he would receive a direct anſwer. And it is remarkable, that though the anſwer was favourable, yet the diſeaſe was not removed by any inviſible power operating like a charm, but by the uſe of a remedy. It is plain therefore that this diſeaſe was occaſioned by one natural power, and removed by another. The boil (for that was the diſtemper) was brought to maturity by a poultice of figs, and the king recovered.* If then the ſcripture informs us, that even where the Deity himſelf ſpeaks, he has directed the uſe of a remedy, much more ought we to be diligent in the uſe of ſuch as our feeble ſkill can ſuggeſt, in thoſe caſes where he leaves us entirely to the exerciſe of our own judgments. To ſit down ſupinely, in caſe of a dangerous diſtemper, with a notion, that if God wills us to die we certainly ſhall die, *in any uſe of natural means*; and if he wills the contrary, that we ſhall as certainly recover, *in any neglect of them*; is a conduct equally unſcriptural and abſurd.

In the books of Moſes we find the Iſraelites, in caſe of diſobedience, threatened with the *botch* of Egypt; with terror, conſumption, and the *burning ague*. From the name of this laſt we may reaſonably ſuppoſe it to have been the ſame with the remitting fever of the Eaſt, which is attended with the moſt intolerable ſenſation of burning in the bowels; but whatever the nature of theſe diſeaſes might have been, they certainly were not very common in the world at that time, or they would not have been threatened as extraordinary judgments.

* Mead.

judgments. They were not the ſame with the peſtilence; becauſe we find, that after they had been threatened with fever, conſumption, and extreme burning, it is added, "I will make the *peſtilence* cleave unto thee:" as if it had been ſaid, that the peſtilence, which hitherto had appeared only on extraordinary occaſions, ſhould then become *endemic*, and never leave them. But, on the whole, the firſt account we have of any general plague, ſeems to be that which was inflicted on the Jews on account of the ſin of their king in numbering the people. David was nearly cotemporary with the Trojan war; and Homer, in the firſt book of his Iliad, informs us, that a plague likewiſe took place in the camp of the Greeks; and that too for the ſin of their king in carrying off the daughter of the prieſt of Apollo, and refuſing to reſtore her at the entreaty of her father.

In comparing the account of the ſacred hiſtorian with that given by Homer, we cannot help obſerving a ſtriking ſimilarity between them. Both plagues were inflicted on the people for the ſin of their kings; both were miraculous; the one continued three days, the other nine. In both the Deity himſelf appeared: an angel brandiſhed a drawn ſword over Jeruſalem; and Homer ſays, that, from the top of Olympus, Apollo ſhot his arrows into the Grecian camp. Laſtly, both were ſtopped in a ſimilar manner: David offered ſacrifices to the true God; and Agamemnon returned Chryſeis, his captive, to her father, the prieſt of Apollo, by whoſe prayers and ſacrifices the plague was ſtopped. Hence it ſeems not impoſſible, that the ſtory told by Homer, is only that of David, altered as he thought moſt proper for embelliſhing his poem; and that this was the firſt remarkable plague in the world.

In the year 767 B. C. we hear of a univerſal peſtilence; but the imperfect ſtate of hiſtory in thoſe early periods affords few accounts that can be depended upon, either concerning that or any thing elſe.* Till after the foundation of Rome, indeed, authentic hiſtory ſcarce

* In the ſubſequent ſection this plague will be more fully treated of.

ſcarce commences; and it is not till the 279th year of that city, that we hear of its being in any remarkable degree infected with a peſtilential diſorder.* The plague we ſpeak of is ſaid to have taken place about the year 469 B. C. which comes within 38 years of that of Athens in the time of the Peloponneſian war. The near coincidence of theſe dates, in times ſo remote, and when chronology was ſo little ſettled, tends to excite a ſuſpicion that both aroſe from the ſame infection. Of its ravages at Athens we have an excellent account by the hiſtorian Thucydides,† who was an eye witneſs of what he writes. He ſays, that according to report it began in Ethiopia, from whence it came down into Egypt, and thence into other countries. It is poſſible, therefore, that it might reach Italy ſome time before it came into Greece; for it ſeems ſcarce probable, that ſuch a very violent infection could have taken place in Italy without being communicated to the neighbouring countries; whence we may reaſonably conclude, that the firſt plague at Rome, and that of Thucydides, were the ſame. At Rome, we are informed, it ſwept away almoſt all the flower of the youth who were able to bear arms, the greateſt part of the tribunes, and both the conſuls. The mortality was ſo great, that no place of ſepulture could be found for the dead bodies, but they were thrown promiſcuouſly into the Tiber. In ſhort, ſo low were the Romans at this time reduced, that the Æqui and Volſci, two Italian nations with whom they were almoſt always at war, made an immediate attack, in hopes of being eaſily able to carry the city; but in this they were diſappointed. The ſituation of Athens was truly deplorable; being not only engaged in a foreign war, but crowded with people from the country; numbers dying daily in the ſtreets, and the ſurvivors giving themſelves up to all manner of licentiouſneſs.‡

As

* A plague is ſpoken of in the time of Romulus; but the accounts of this, and ſome others, are extremely obſcure and indiſtinct.

† See Appendix No. I.

‡ See Thucydides's account at large, Appendix No. I.

As it ſeems probable that the ſame infection deſolated both Rome and Athens, ſo it ſeems not unlikely that it was a continuance of the ſame which deſtroyed the Carthaginian army in Sicily, while carrying on a ſucceſsful war againſt Dionyſius, tyrant of Syracuſe. The plague, as we are informed by the Univerſal Hiſtory, was common in the Carthaginian territories, eſpecially thoſe on the continent of Africa; and this peſtilence broke out ſoon after the concluſion of the Peloponneſian war. As it originally came from Africa, it is probable that it had never been quite extinguiſhed there; and the compilers of the Univerſal Hiſtory think it probable that the army might have brought the ſeeds of it along with them into Sicily. But, whatever was the origin, the diſtemper ſoon became ſo malignant, that the living were not ſufficient to bury the dead; and thoſe who attended the ſick periſhed in ſuch a manner, that, after ſome time, few dared to come near them. At firſt they gave the dead a kind of burial; but in time the number became ſo great, and the ſurvivors ſo few and weak, that an hundred and fifty thouſand are ſaid to have rotted above ground. "Juſtin ſeems to intimate that almoſt the whole Car-"thaginian army periſhed by the plague; and that in "a manner all at once, as it were in an inſtant. Dio-"dorus, however, informs us, that a conſiderable body "of Africans and Iberians ſurvived the dreadful calami-"ty. It is worth obſervation, that not a ſingle perſon "of thoſe who attended the ſick ſurvived." The miſerable remains of this army, conſiſting at firſt of more than three hundred thouſand, were now attacked by their enemies, whom they were no longer able to reſiſt. Their land forces were entirely defeated, and their fleet was burnt: "the Gods themſelves, (ſays Diodorus) "when the ſhips were all in a blaze, and the flames "aſcending above the maſts, ſeeming to deſtroy the "Carthaginians with lightning from heaven." Forty gallies ſtill remained, and the unfortunate general was now obliged to purchaſe liberty to return with the few men he had left. But even theſe were treacherouſly attacked

attacked by the tyrant's fleet, and ſeveral of them ſunk. On his arrival at Carthage, he found the whole city not only in mourning, but in deſpair; "the wretched in-"habitants giving full vent to their grief, made the "ſhore ring with their groans and lamentations. In "ſhort, a greater ſcene of horror, except the ſpot of "ground where the Carthaginian army encamped be-"fore Syracuſe, than Carthage now was, cannot well be "conceived." This reception completed the deſpair of the unhappy general. Clothing himſelf in mean and ſordid attire, he joined with the reſt in bewailing their common calamities. After ſome deſperate exclamations againſt the gods, whom he accuſed of partiality, "The enemy, ſaid he, may rejoice at our miſery, but "have no reaſon to glory in it. The troops we have "loſt did not fall by their valour, nor did they now "oblige thoſe that arrived here to leave Sicily by force. "We return victorious over the Syracuſians, and are "only defeated by the plague. As for the baggage "found in our camp, this ought not to be looked upon "as the ſpoils of a conquered enemy, but as moveables "which the caſual death of their owners has left the "Syracuſians in poſſeſſion of." Having then gone on to expreſs his grief for the loſs of his army, and declared his intention not to outlive them, he ſhut himſelf up in his houſe, refuſing admittance even to his own children, and put an end to his life.*

Whether the unfortunate remains of this army brought with them the infection to Carthage, and there produced a new ſcene of deſolation, we are not informed; but there ſeems to have been a very great tendency to peſtilential diſorders in the Carthaginian armies; for, in the time of the ſiege of Syracuſe by Marcellus, a plague broke out in the camp of the Carthaginians who had come to aſſiſt the Syracuſians. From them it paſſed into the city itſelf, with ſo much malignity, that nothing was to be ſeen but heaps of dead and dying. None durſt receive or aſſiſt the ſick, for fear of being infected by them; and the bodies of the dead were, for the

* Univ. Hiſt. vol. xvii.

the ſame reaſon, left unburied, to infect and poiſon the air with their putridity and corruption. Nothing was heard, night and day, but groans of dying men; and the heaps of dead bodies continually preſented mournful objects to the living, who expected every moment the ſame fate.* The infection reached the Roman camp; but we do not hear of its being conveyed, at this time, either to Rome or Carthage. In the time of the conteſt with Jugurtha, however, a very terrible calamity took place in Africa. "According to Oroſius, "a great part of Africa was covered with locuſts, which "deſtroyed all the produce of the earth, and even devoured dry wood. But, at laſt, they were all carried by the "wind into the ſea, out of which being thrown in vaſt "heaps upon the ſhore, a plague enſued, which ſwept "away an infinite number of animals of all kinds. In "Numidia only, periſhed eight hundred thouſand men; "and in Africa Propria, two hundred thouſand; among "the reſt, thirty thouſand Roman ſoldiers, quartered in "and about Utica for the defence of the laſt mentioned "province. At Utica, in particular, the plague raged "with ſuch violence, that fifteen hundred dead bodies "were carried out of one gate in a day."†

From the time that the Romans finiſhed their African wars, till they had accompliſhed moſt of their conqueſts in Aſia, their empire ſeems to have continued free from this dreadful ſcourge; but ſoon after the deſtruction of Jeruſalem by Titus, ſuch a violent infection ſeized on the city, that for ſome time upwards of twenty thouſand are ſaid to have died in it daily.

As the Roman arms were carried ſtill farther to the eaſtward, and all the countries reduced, to the confines of Perſia, the plague ſeems to have become more common among them. In the time of Marcus Aurelius, a war was undertaken againſt the Parthians, which was carried on by the Romans with great ſucceſs, and with no leſs cruelty; for, though the city of Seleucia opened its gates to the Roman general, he cauſed the inhabitants, to the number of four hundred thouſand, to be maſſacred.

* Univ. Hiſt. vol. viii. † Id. vol. xviii.

maſſacred. But they ſoon paid dear for this cruelty, by a dreadful peſtilence, which broke out, according to the hiſtorian Ammianus Marcellinus, in the very city which they had deſolated, and was brought by their army into Italy, from whence it ſpread throughout the whole empire. Other hiſtorians ſay, that it originated in Ethiopia, from whence it ſpread into Egypt, and thence into the country of the Parthians. We know not how long the infection continued; only that, ſome years afterwards, when the emperor was defeated by the Germans, the peſtilence ſtill raged to ſuch a degree, that ſlaves, gladiators, and even the banditti of Dalmatia and Dardania, were enliſted for the defence of the empire. It is certain that great havock muſt have been made by it, as we find that the barbarians were encouraged to invade the empire on all ſides, and could ſcarcely be repulſed; inſomuch that hiſtorians compare this with the moſt deſtructive wars the Romans had ever waged.*

During the time that the empire was overrun by the northern barbarians, the plague frequently made its appearance; which we ſhall have occaſion to notice more particularly in the following ſection; but in thoſe times the deſtruction by the ſword was ſo extraordinary, that leſs mention is made by hiſtory of any peſtilential diſorder. In the time of Juſtinian, however, about ſixty-five years after the final deſtruction of the weſtern empire, the moſt violent plague recorded in hiſtory took place. Of this we have a particular account by Procopius.† "The diſtemper (ſays Mr. Gibbon) aroſe in the "neighbourhood of Peluſium, on the confines of Egypt, "between the Sarbonian bog and the eaſtern channel "of the Nile. From thence, tracing, as it were, a "double path, it ſpread to the eaſt, over Syria, Perſia, "and the Indies, and penetrated to the weſt, along the "coaſt of Africa, and over the continent of Europe. "In the ſpring of the ſecond year, Conſtantinople, dur-"ing three or four months, was viſited by this peſti-"lence. Such was the corruption of the air, that the peſ-

tilence

* Univ. Hiſt. vol. xv. † See Appendix, No. II.

"tilence was not checked, nor alleviated, by any differ-
"ence of ſeaſons. The numbers that periſhed in this
"extraordinary mortality have not been recorded; only
"we find that, during three months, there died at Con-
"ſtantinople five, and at laſt ten thouſand a day. Many
"cities of the eaſt were left vacant, and, in ſeveral diſ-
"tricts of Italy, the harveſt and vintage withered on the
"ground. The triple ſcourge of war, peſtilence and
"famine afflicted the ſubjects of Juſtinian; and his
"reign is diſgraced by a viſible decreaſe of the human
"ſpecies, which has never been repaired, in ſome of the
"faireſt countries of the globe."*

This plague broke out in the time of Juſtinian, in the year 541 or 542 of the chriſtian era; and not only ravaged Conſtantinople in the time of Juſtinian, but returned with increaſed violence during the reigns of many of his ſucceſſors. In the time of Mauritius we find the Avari, a barbarous nation to the north of the Danube, driven back by the plague after they had croſſed that river to invade the Roman territories. The reign of Phocas, ſucceſſor to Mauritius, was ſtill more unfortunate. "Great numbers were ſwept off, either
"by famine or peſtilence; the earth refuſed her fruits
"in ſeaſon; the winters were ſo ſevere, that the ſeas
"were frozen, and the fiſh deſtroyed." Phocas aſcended the imperial throne in 603; but in the midſt of ſuch confuſion as then filled the world, we can ſcarce expect an accurate account of the time when this moſt malignant peſtilence ceaſed. We can ſcarcely ſuppoſe it to have laſted two centuries; but, in the reign of Conſtantine Copronymus, which began in 742, we find the diſtemper ſtill raging, and the ſame dreadful phenomena of nature ſtill continuing. The plague, we are now told, broke out in Calabria in Italy; whence it ſoon ſpread

* Gibbon's Hiſt. vol. iv. Procopius, in ſpeaking of the numbers who died in this extraordinary plague, compares them to the ſand of the ſea; and afterwards expreſſes them by a phraſe which has been tranſlated *two hundred millions*. The phraſe is *myriadas myriadon myrias*. Mr. Gibbon, by dropping the firſt word, reſtricts the ſenſe to *one hundred millions*; which he thinks not wholly inadmiſſible; but the probability ſeems to be, that Procopius did not mean to ſpecify the number, but to repreſent it as incalculable. This is done by putting a comma, or ſemicolon, after the firſt word; and we may then read, that there periſhed *myriads; a myriad of myriads*. The grammar is rectified by reading *myriades* inſtead of *myriadas*.

ſpread over Greece, Sicily, the iſlands in the Ægean ſea, and at laſt reached Conſtantinople; where it raged for three years together, with ſuch fury, that the living were ſcarce ſufficient to bury the dead. The earthquakes, which accompanied or preceded this peſtilence, were ſuch as had never been known in any age. In Syria and Paleſtine ſeveral cities were ſwallowed up; others, entirely ruined; and ſome, if we may give credit to Nicephorus, removed without any conſiderable damage, ſix miles and upwards from their former ſeats. At the ſame time happened an extraordinary darkneſs, which laſted from the fourth of Auguſt to the firſt of October, there being little or no diſtinction, during all that time, between day and night.* During the reign of the ſame prince, there happened ſuch an extraordinary froſt, that, at Conſtantinople, both ſeas were frozen for an hundred miles from the ſhore; the ice being covered with ſnow twenty cubits deep, and ſufficiently ſtrong to bear the heavieſt carriages. When the froſt broke, mountains of ice and frozen ſnow, being driven by the wind through the ſtraits, did a great deal of damage to the walls of Conſtantinople. The month following, ſeveral prodigies appeared, or were thought to appear, in the air. At the ſame time a comet, which the Greeks called *Docites*, becauſe it reſembled a beam, was ſeen for ten days in the eaſt, from whence it moved into the weſt, and ſhone there for one and twenty days more. The people were ſtruck with terror and amazement at the ſight of the prodigies, and apprehended the laſt day to be at hand.† Dreadful earthquakes, ſtrange phenomena in the heavens, inundations, &c. occurred in the year 812, during the reign of Michael Balbus; but no remarkable plague is mentioned by the Greek hiſtorians, till the year 1025, when a new train of calamities took place. The plague broke out in Cappadocia, raging with ſuch violence there, as well as in Paphlagonia and Armenia, that the people were forced to abandon their dwellings. A terrible famine followed; after which the earthquakes again commenced with redoubled

* Univ. Hiſt. vol. xvii. † Ibid.

bled fury: at Conſtantinople they continued forty days together; while people were terrified by a *comet* (probably a large meteor) which paſſed with a dreadful noiſe from north to ſouth; the whole horizon appearing to be in a flame.

From theſe calamities the world, at leaſt that part of it known to the Greek hiſtorians, appears to have enjoyed ſome reſpite till the year 1346. Indeed we may now ſay, as in the time of the invaſion by the northern barbarians, that the ſword, and not the peſtilence, was the plague of thoſe times. A moſt violent and univerſal peſtilence, however, now took place; though, for want of ſuch hiſtorians as Thucydides and Procopius, we cannot here give a particular account of it. In general we are told, that it began in the kingdom of Cathay (the northern part of China) from whence it gradually overſpread all the countries between that and the weſtern extremity of Aſia. Invading, at laſt, Conſtantinople, it proceeded from thence to Greece, Italy, France, Africa, Germany, Hungary, Denmark, Britain and Ireland. Thus, it ſeems to have been as extenſive a contagion as ever appeared in the world. It is even probable, that, from the remains of this contagion, Europe hath been but very lately ſet at liberty; as we hear, not long after, of plagues being very frequent in different parts of that continent. In England it aſſumed ſomewhat of a new form towards the end of the fifteenth century; being then known by the name of the Engliſh Sweating Sickneſs. But, except in the greater propenſity to ſweat, the diſeaſe appears not to have differed from the true plague. The ſweating ſickneſs firſt made its appearance in the army of Henry VII, when he landed at Milford in 1483; and that year invaded London, where it continued only from the 21ſt of September to the end of October. It returned in 1485, 1506, 1517, 1528 and 1551; ſince which time it has not been known in Britain. In 1517 it was extremely violent and mortal; ſometimes killing the ſick in three hours; and ſo general was the infection, that, in ſome places, one half of the inhabitants

died. In 1528 it alſo raged with great violence; the ſick ſometimes dying in four hours. The laſt attack, in 1551, was alſo very violent. In 1529 it appeared in Holland and Germany, deſtroying great numbers of people; but it hath not been obſerved, at leaſt in any remarkable degree, in thoſe countries ſince that time. In the courſe of the 17th century, various parts of Europe have ſuffered very much from the plague in its uſual form. Indeed (for reaſons given in the ſubſequent ſection) we can ſcarce ſuppoſe the peſtilential contagion ever to have ceaſed entirely. In 1603, London was viſited with the plague; and on this occaſion the practice of ſhutting up infected houſes was firſt introduced.* In 1656 another plague took place in the ſame metropolis, but does not appear to have made any violent attack. In Naples it raged that year with great fury; deſtroying, according to ſome accounts, fifteen thouſand, according to others, twenty thouſand, a day. But theſe accounts the author of the Journal juſt quoted, with great probability, ſuppoſes to have been exaggerated. Others ſay, that four hundred thouſand Neapolitans were deſtroyed by this infection; ſo that we muſt at any rate believe it to have been very violent. In the plague of London in 1665, immenſe numbers periſhed; and particular accounts were publiſhed of this calamity; of which an abridgment is given in the Appendix to this work, No III. Since that time it has not been known in Britain; but other parts of Europe have not been equally fortunate. In the beginning of the eighteenth century it appeared in ſeveral parts of the continent; particularly in Copenhagen in the year 1711; where it committed great ravages, as it had done at Dantzic two years before; but in 1720 it appeared at Marſeilles in France, where it raged with ſuch fury as to deſtroy ſixty out of the hundred thouſand ſuppoſed to be the whole population of the place.† Since that time France hath been free from the diſtemper; but in Sicily, the dominions of the Ottoman Porte, and places adjacent, it hath been felt

* Journal of the Plague Year. † See Appendix, No. IV.

felt very ſeverely. In 1743 it was ſuppoſed to have deſtroyed two thirds of the inhabitants of Meſſina. A particular account of its ravages was read before the Royal Society of London by Dr. Mead. The following is taken from Dr. Lobb's Treatiſe on the Plague. "From the beginning of June to the end of July, of "forty thouſand inhabitants, two thirds periſhed. The "diſorders in the city were incredible. All the bakers "died, and no bread was baked for many days. The "ſtreets were full of dead bodies; at one time from "twelve to fifteen thouſand remaining in the open "air: men, women and children, rich and poor, all toge-"ther dragged to the church doors. The vaults being "full, and the living not ſufficient to carry the dead "out of the city, they were obliged to put them on "funeral piles, and burn them promiſcuouſly. No-"thing was more ſhocking than to ſee people, far above "the common ſtations, go about begging for a loaf of "bread, when they could hardly walk, with their "tumours upon them; and few were in a ſtate to help "them. All theſe calamities did not hinder the moſt "execrable villanies, which were committed every mo-"ment; and, though ſo few ſurvived, the governor "was obliged to make ſeveral public examples."

In the Turkiſh dominions, though we have not read of ſuch extraordinary devaſtations as formerly took place, yet we are aſſured that the peſtilence rages there very frequently. From 1756 to 1762 we have hiſtories of it by Dr. Ruſſel and others, the ſubſtance of which accounts is given in the Appendix, No. V. In the time of the great war between the Turks and Ruſſians, it found its way to Moſcow, which city it invaded in 1771. M. Savary ſays, it was brought thither by infected merchandiſe from the ſtore houſes of the Jews; and that it carried off two hundred thouſand people. In the ſixth volume of the Medical Commentaries, however, we are told that it was brought from the army by two ſoldiers; both of whom were carried into the military hoſpital, and both died. The anatomiſt who diſſected their bodies died alſo. The infection quickly ſeized the

the hoſpital, and thence the whole city. This happening in the beginning of the year, its progreſs was for ſome time checked by the cold; but its ravages became greater as the ſummer advanced. It raged moſt violently during the months of July, Auguſt and September; in which time there were inſtances of its deſtroying twelve hundred perſons in a day. Twenty-five thouſand died in the month of September; in the courſe of which month ſcarce one in an hundred of the infected recovered. Only ſeventy thouſand, according to this account, periſhed by the diſeaſe. The year 1773 proved very fatal to Baſſorah; where, as formerly mentioned, two hundred and ſeventy-five thouſand periſhed in the ſummer ſeaſon, through the violence of the diſtemper.* But in countries where the plague rages ſo frequently, and where there are few that make obſervations with any accuracy, we cannot expect complete hiſtories of every attack made by it; neither would the limits of this Treatiſe admit of a detail of them, though there were. We know, however, that ſince the year we ſpeak of, the plague has ravaged Dalmatia, particularly in the year 1784, when it almoſt deſolated the town of Spalatro, deſtroying three or four thouſand of its inhabitants. Though ſome countries therefore have for a number of years remained free from the attacks of this terrible enemy, yet there are others where it is as it were ſtored up, and from whence it may, on a proper occaſion, break forth as formerly, and once more ſpread ruin and deſolation through the world.

SECTION

* An Engliſh gentleman, who reſided in Baſſorah at that time, preſerved himſelf from the infection by retiring to a mud-houſe, where he had no communication with the inhabitants. Having a large quantity of Bengal cotton, he ſold it to the people to wrap their dead in. The price was put in a baſket, which he hauled up by a rope to his ware-room; lowering it again with the proportionate quantity of cloth. In the courſe of the ſummer he had an account of *ſeventy thouſand* winding ſheets thus diſpoſed of!
(Tranſact. of a Society for improving Medical Knowledge.)

SECTION II.

Of the Countries where the Plague is ſuppoſed to originate.—The Influence of Climate in producing Diſeaſes—And of the Moral Conduct of the Human Race in producing and influencing the ſame.

IN conſidering the origin of a calamity ſo dreadful and ſo univerſal, we might reaſonably ſuppoſe that the fatal ſpots which gave riſe to it would long ago have been marked out and abandoned by the human race altogether. But this is far from being the caſe. In the accounts already given of various plagues, they are always ſaid to have been imported from country to country, but never to have originated in that of the perſon who wrote of them. If a plague aroſe in Greece, we are told it came from Egypt; if in Egypt, it came from Ethiopia; and had we any Ethiopic hiſtorians, they would no doubt have told us that it came from the land of the Hottentots, from Terra Auſtralis Incognita, or ſome other country as far diſtant as poſſible from their own. In ſhort, though it has been a moſt generally received opinion, that plagues are the immediate effects of the diſpleaſure of the Deity on account of the ſins of men; yet, except David and Homer (already quoted) we find not one who has had the candour to acknowledge that a plague originated among his countrymen on account of their ſins in particular. In former times Egypt and Ethiopia were marked out as the two great ſources of the plague; and even as late as the writings of Dr. Mead we find that the ſame opinion prevailed. The Doctor, who attempts to explain the cauſes of the plague, derives it entirely from the filth of the city of Cairo, particularly of the canal that runs through it. But later writers, who have viſited and reſided in Egypt, aſſure us that the country is extremely healthy, and that the plague is always brought there from Conſtantinople. It is true that Dr. Timone, in the Philoſophical Tranſactions, No. 364, tells us, that it appears from daily obſervation, as well as from hiſtory, that the plague comes

comes to Conſtantinople from Egypt; but the united teſtimonies of Savary, Volney, Mariti and Ruſſel, who all agree that Egypt receives the infection from Conſtantinople, muſt undoubtedly preponderate.

"The peſtilence (ſays M. Savary) is not a native of "Egypt. I have collected information from the Egyp- "tians, and foreign phyſicians who have lived there "twenty or thirty years; which all tended to prove the "contrary. They have aſſured me that this epidemic "diſeaſe was brought thither by the Turks, though it "has committed great ravages. I myſelf ſaw the cara- "velles of the Grand Signior, in 1778, unlade, according "to cuſtom, the ſilks of Syria at Damietta. The plague "is almoſt always on board; and they landed, without "oppoſition, their merchandiſe, and their people who "had the plague. It was the month of Auguſt; and, "as the diſeaſe was then over in Egypt, it did not "communicate that ſeaſon. The veſſels ſet ſail, and "went to poiſon other places. The ſummer following, "the ſhips of Conſtantinople, alike infected, came to "the port of Alexandria, where they landed their diſ- "eaſed without injury to the inhabitants. It is an ob- "ſervation of ages, that if, during the months of June, "July and Auguſt, infected merchandiſe be brought "into Egypt, the plague expires of itſelf, and the peo- "ple have no fears; and if brought at other ſeaſons, "and communicated, it then ceaſes. A proof that it "is not a native of Egypt is, that, except in times of "great famine, it never breaks out in Grand Cairo, nor "the inland towns, but always begins at the ſeaports "on the arrival of Turkiſh veſſels, and travels to the "capital; whence it proceeds as far as Syria. Having "come to a period in Cairo, and being again intro- "duced by the people of Upper Egypt, it renews with "greater fury, and ſometimes ſweeps off two or three "hundred thouſand ſouls; but always ſtops in the "month of June, or thoſe who catch it then are eaſily "cured. Smyrna and Conſtantinople are now the "reſidence of this moſt dreadful affliction."

M. Volney

M. Volney informs us, that the European merchants reſiding at Alexandria agree in declaring that the diſeaſe never proceeds from the internal parts of the country, but always makes its firſt appearance on the ſea-coaſts at Alexandria; from thence it paſſes to Roſetta, from Roſetta to Cairo, and from Cairo to Damietta, and through the reſt of the Delta. It is invariably preceded by the arrival of ſome veſſel from Smyrna or Conſtantinople; and it is obſerved, that if the plague has been violent during the ſummer, the danger is greater for the Alexandrians during the following winter.

To the ſame purpoſe, the Abbe Mariti ſays, "The "plague does not uſually reſide in Syria, nor is this "the place where it uſually begins. It receives this "fatal preſent from Egypt, where its uſual ſeat is "Alexandria, Cairo or Damietta. The plague of 1760 "came at once from Cairo and Alexandria; to the "latter of which it had been brought from Conſtanti-"nople. When it comes from that capital, as well as "from the cities of Smyrna and Salonica, it acquires a "peculiar malignity; and its activity never expands "itſelf with more fury than in the plains of Egypt, "which it overſpreads with incredible rapidity. It is "obſerved, that this plague, ſo deſtructive to Egypt, "ſeldom attacks Syria; but that the latter has every "thing to dread from a plague hatched in the boſom "of Egypt."

The teſtimony of theſe three authors, who have all been lately on the ſpot, muſt certainly have very great weight, eſpecially when corroborated by that of Dr. Ruſſel; for which ſee Appendix, No. V. But ſtill there is ſome difficulty. M. Savary informs us, that, *except in caſes of great famine*, the diſeaſe never breaks out in Cairo; which certainly implies that in caſes of famine it does originate in the city itſelf; and Mariti, by ſaying that the Syrians have much reaſon to dread a plague *hatched in the boſom* of Egypt, undoubtedly intimates that plagues ſometimes do originate in Egypt. Smyrna and Salonica likewiſe ſeem to come in for their ſhare of the blame; and Dr. M'Bride, in his Practice of Phyſic, informs

informs us, that ſome parts of Turky are viſited by the plague once in ſix or ſeven years; and M. Savary ſays, that Egypt is viſited with it once in four or five years; but if Egypt never receives it but from Turky, it would ſeem that the plague could at leaſt be no more frequent than in that country; or, if the fact be otherwiſe, that the diſeaſe muſt either originate in Egypt itſelf, or be brought to it from ſome other country than Turky. Dr. Timone, in the paper already quoted,* tells us, that the plague has taken up its reſidence in Conſtantinople; but that, though the ſeeds of the old plague are ſcarce ever wanting, yet a new infection is likewiſe imported from time to time. Thus, in attempting to find out the countries where the plague originates, we are led in a circle. Conſtantinople accuſes Egypt, and Egypt recriminates on Conſtantinople. Ethiopia, the moſt diſtant and leaſt known of thoſe countries which in former times had any connexion with the more civilized parts of the world, for a long time bore the blame of all; but the Jeſuit miſſionaries who reſided long in Abyſſinia (the ancient Ethiopia) do not mention the plague as more common in that country than ſome others; neither does Mr. Bruce, in the accounts he has publiſhed, take notice of any ſuch thing. Ethiopia could not ſpeak for itſelf, by reaſon of the ignorance and barbarity of its inhabitants; and Conſtantinople is now very much in the ſame predicament. The inveſtigation of this ſubject therefore would require an accurate account of the climates of thoſe countries where the plague is found to commit the greateſt ravages, and a compariſon of them with thoſe which are now accounted the moſt unhealthy in other reſpects, and likewiſe a compariſon of the diſeaſes produced in the latter, with the true plague.

The moſt unhealthy climates now exiſting (thoſe where the plague commonly rages excepted) are to be met with in the hotteſt parts of the world; the Eaſt and Weſt Indies, the waſtes of Africa, and ſome parts of America. In all theſe, Dr. Lind, who has written a treatiſe

* Philoſoph. Tranſact. No. 364.

treatiſe on the diſeaſes incident to Europeans in hot climates, ſeems to lay the whole blame upon the heat and moiſture accompanying it. In the Eaſt Indies Bencoolen, in the iſland of Sumatra, is the moſt unhealthy of all the Engliſh ſettlements; but he informs us, that by building their fort on a dry, elevated place, about three miles from the town, it became ſufficiently healthy. Next to this, Bengal is moſt ſubject to ſickneſs; for which he aſſigns the following reaſon: "The "rainy ſeaſon commences at Bengal in June, and conti- "nues till October; the remainder of the year is healthy "and pleaſant. During the rains, this rich and fertile "country is covered by the Ganges, and converted as it "were into a large pool of water. In the month of Octo- "ber, when the ſtagnated water begins to be exhaled by "the heat of the ſun, the air is then greatly polluted by "the vapours from the ſlime and mud left by the Ganges, "and by the corruption of dead fiſh and other animals. "Diſeaſes then rage, attacking chiefly ſuch as are lately "arrived. The diſtempers are fevers of the remitting or "intermitting kind; for, though ſometimes they may "continue ſeveral days without ſenſible remiſſion, yet "they have in general a great tendency to it. If the ſea- "ſon be very ſickly, ſome are ſeized with a malignant fe- "ver, of which they ſoon die. The body is covered with "blotches of a livid colour, and the corpſe, in a few "hours, turns quite livid and corrupted. At this time "fluxes prevail, which may be called bilious or putrid, "the better to diſtinguiſh them from others which are "accompanied with inflammation of the bowels. The "iſland of Bombay has of late been rendered much more "healthy than it formerly was, by a wall built to prevent "the encroachments of the ſea, where it formed a ſalt "marſh; and by an order that none of the natives ſhould "manure their cocoa-trees with putrid fiſh.

"Batavia, the capital of the Dutch Eaſt India do- "minions, is annually ſubject to a fatal and conſuming "ſickneſs. Here the Dutch, in attempting to make this, "their capital in India, reſemble their cities in Europe, "have adorned it with canals or ditches, interſecting each

" other, running through every part of it. Notwithſtand-
" ing the utmoſt care to keep theſe clean, during the
" rainy ſeaſon, and after it, they become extremely nox-
" ious to the inhabitants, but eſpecially to ſtrangers. It
" has been remarked, that the ſickneſs rages with the
" greateſt violence when the rains have abated, and the
" ſun has evaporated the water in the ditches, ſo that the
" mud begins to appear. This happened in 1764, when
" ſome Britiſh ſhips of war had occaſion to ſtay for a little
" time at Batavia. The ſtench from the mud was into-
" lerable; the fever was of the remitting kind; ſome were
" ſuddenly ſeized with a delirium, and died in the firſt
" fit; but none ſurvived the attack of a third. Nor was
" the ſickneſs at that time confined to the ſhips; the
" whole city afforded a ſcene of diſeaſe and death; ſtreets
" covered with funerals, bells tolling from morning to
" night, and horſes jaded with dragging the dead in her-
" ſes to their graves. At that time a ſlight cut of the ſkin,
" the leaſt ſcratch of a nail, or the moſt inconſiderable
" wound, turned quickly into a putrid, ſpreading ulcer,
" which, in twenty-four hours, conſumed the fleſh, even
" to the bone. Beſides theſe malignant and remitting fe-
" vers, which rage during the wet ſeaſon in the unhealthy
" parts of the Eaſt Indies, Europeans, eſpecially ſuch as
" live intemperately, are alſo ſubject to fluxes, and to an
" inflammation, or diſeaſe of the liver; which laſt is almoſt
" peculiar to India, and particularly to the Coromandel
" coaſt."

In the ſame work we have an extract from Mr. Ives's ournal of a journey from India to Europe by land. " Gambroon in Perſia, ſays he, is very unhealthful. " Few Europeans eſcape being ſeized with putrid inter-
" mitting fevers, which rage from May to September,
" and are often followed with obſtructions of the liver.
" Various authors who have treated of Gambroon, do,
" as well as the preſent Engliſh factory, impute its un-
" healthfulneſs, during the ſummer months, to the nox-
' ious effluvia with which the air is contaminated, from
' the great quantities of blubber fiſh left by the ſea up-
' on the ſhore, and which very ſoon become highly of-

" fenſive.

" fenſive. In the rainy ſeaſons, at the iſland of Karee, " in the Perſian Gulf, intermitting fevers and fluxes are " the uſual diſtempers. On our arrival at Bagdad (ſup- " poſed to contain 500,000 ſouls) we found a purple " fever raging in the city; but though it was computed " that an eighth part of the inhabitants were ill, yet the " diſtemper was far from being mortal. Here we were " informed that the Arabs had broken down the banks " of the river near Baſſorah, with a deſign to cover with " water the deſerts in its neighbourhood. This, it ſeems, " is the uſual method of revenge taken by the Arabs for " any injury done them by the Turks at Baſſorah; and " was repreſented to us as an act of the moſt ſhocking " barbarity, ſince a general conſuming ſickneſs would " undoubtedly be the conſequence. This was the caſe " fifteen years before, when the Arabs, by demoliſhing " the banks of this river, laid the environs of Baſſorah " under water. The ſtagnating and putrefying water in " the adjacent country, and the great quantity of dead " and corrupted fiſh at that time lying upon the ſhore, " polluted the whole atmoſphere, and produced a putrid " and moſt mortal fever, of which between twelve and " fourteen thouſand of the inhabitants periſhed; and, at " the ſame time, not above two or three of the Europeans " who were ſettled there eſcaped. The effects of the " violent heats we endured were, an entire loſs of appe- " tite, a faintneſs and gripes, with frequent and bilious " ſtools; which greatly exhauſted our ſtrength. My " ſtomach was often ſo weak, that it could receive only " a little milk. Several of us became feveriſh through " the exceſſive heat, and were obliged to have recourſe " to gentle vomits, &c. Though we were furniſhed " with the moſt ample conveniencies for travelling, " which money, or the ſtrongeſt recommendations to " the principal chriſtians, as well as mahometan cheifs, " could procure, and had laid in a quantity of excellent " madeira, claret, and other proviſions, &c. yet moſt " of us ſuffered in our conſtitutions by this long and fa- " tiguing journey."

On

On theſe climates in general Dr. Lind obſerves, that in well cultivated countries, ſuch as China, the air is temperate and wholeſome; while the woody and uncultivated parts prove fatal to multitudes accuſtomed to breathe a purer air. In all places alſo, near the muddy and impure banks of rivers, or the foul ſhores of the ſea, mortal diſeaſes are produced from the exhalations, eſpecially during the rainy ſeaſon. "There is a place "near Indrapour, in Sumatra, where no European can "venture to remain, or ſleep one night on ſhore, during "the rainy ſeaſon, without running the hazard of his "life, or at leaſt of a dangerous fit of ſickneſs; and at "Podang, a Dutch ſettlement on Sumatra, the air has "been found ſo bad, that it is commonly called the "Plague-Coaſt. Here a thick, peſtilential vapour or fog "ariſes, after the rains, from the marſhes, which de-"ſtroys all the white inhabitants."

In treating of the diſeaſes of Africa, the ſame author takes notice of thoſe of Egypt; which country, he ſays, is rendered unwholeſome by the annual inundation of the Nile, and being ſurrounded on three ſides by large and extenſive deſerts of ſand, by which means it is expoſed to the effects of that noiſome vapour, which, during the ſummer months, ariſes from ſultry, hot ſand. He doth not, however, ſay, that the true plague originates in this country, either from the inundation of the Nile or any other cauſe. On the climate of Egypt I ſhall once more quote M. Savary, who is a ſtrenuous advocate for its healthineſs, and is at pains to confute the opinion of Mr. Pauw, and others, who aſſert the contrary. "Mr. Pauw (ſays he) pretends, that at pre-"ſent Egypt is become, by the negligence of the Turks "and Arabs, the cradle of the peſtilence; that another "epidemical diſeaſe, equally dreadful, appears here, by "the caravans of Nubia; that the culture of rice en-"genders numerous maladies; that the want of rain "and thunder occaſions the air of the Thebais to acquire "a virulence that ferments the humours of the human "body, &c." "Theſe aſſertions (M. Savary obſerves) "have an air of probability, which might impoſe on "people

" people who have not lived in Egypt; but Mr. Pauw " has ventured opinions in his cloſet, without the guid- " ance of experience. In vallies, indeed, encloſed by " high mountains, where the atmoſphere is not conti- " nually renewed by a current of air, the culture of rice " is unwholeſome, but not ſo, near Damietta and Ro- " ſetta. The plains are nearly on a level with the ſea; " neither hill nor height impedes the refreſhing breath of " the north, which drives the clouds and exhalations off " the flooded fields ſouthwards, continually purifies the " atmoſphere, and preſerves the health of the people; " ſo that the huſbandmen who cultivate the rice are not " more ſubject to diſeaſes than thoſe who do not. The " heats of the Thebais certainly ſurpaſs thoſe of many " countries under the equator. Reamur's thermometer, " when the burning breath of the ſouth is felt, ſome- " times riſes to thirty-eight degrees above the freezing " point,* often to thirty-ſix. Were heat the principle " of diſeaſes, the *Said* (Upper Egypt) would not be habi- " table; but it only ſeems to occaſion a burning fever, " to which the inhabitants are ſubject; and which they " cure by regimen, drinking much water, and bathing " in the river: in other reſpects they are ſtrong and " healthy. Old men are numerous, and many ride on " horſeback at eighty. The food they eat in the hot " ſeaſon contributes much to the preſervation of their " health; it is chiefly vegetables, pulſe and milk. In " Lower Egypt, the neighbourhood of the ſea, the large " lakes, and the abundance of the waters, moderate the " ſun's heat, and preſerve a delightful temperature. " Strabo and Diodorus Siculus, who long lived here, " did not think the country unhealthy. There is, in- " deed, an unwholeſome ſeaſon in Egypt. From Febru- " ary till the end of May, the ſouth winds blow at in- " tervals, and load the atmoſphere with a ſubtile duſt, " which makes breathing difficult, and drive before " them pernicious exhalations. Sometimes the heat " becomes inſupportable, and the thermometer ſudden- " ly riſes twelve degrees. The inhabitants call this ſea- " ſon

* Water boils at eighty degrees of this thermometer.

" ſon *Khamſin*, *fifty*; becauſe theſe winds are moſt felt " between Eaſter and Whitſuntide; during which ſea- " ſon they eat rice, vegetables, freſh fiſh and fruit; " bathing frequently, and uſing plenty of perfumes and " lemon juice; with which regimen they prevent the " dangerous effects of the Khamſin. But it muſt not " be ſuppoſed that this wind, which corrupts meat in a " few hours, blows fifty days. Egypt would become a " deſert. It ſeldom blows three days together; and " ſometimes is only an impetuous whirlwind, which ra- " pidly paſſes, and injures only the traveller overtaken in " the deſerts. When at Alexandria a tempeſt of this " kind ſuddenly aroſe, driving before it torrents of burn- " ing ſand, the ſerenity of the ſky diſappeared, a thick " veil obſcured the heavens, and the ſun became blood- " coloured. The duſt penetrated even the chambers, and " burnt the face and eyes. In four hours the tempeſt " ceaſed, and the clearneſs of the day appeared. Some " wretches in the deſerts were ſuffocated, and ſeveral " I ſaw brought to appearance dead; ſome of whom, " by bathing in cold water, were reſtored to life."

The internal parts of the continent of Africa are but little known. The northern parts, containing the States of Barbary, are ſufficiently healthy; the middle parts of the weſtern coaſt, known by the names of Negro-land, Guinea, &c. are extremely unhealthy and perni- cious to ſtrangers. Dr. Lind informs us, that, at a diſtance, this country appears in moſt places flat, cover- ed with low, ſuſpended clouds; and on a nearer approach heavy dews fall in the night time; the land being every morning and evening wrapped up in a fog. The ground is clothed with a pleaſant and perpetual ver- dure, but altogether uncultivated, excepting a few ſpots, which are generally ſurrounded with foreſts or thickets of trees, impenetrable to refreſhing breezes, and fit only for the reſort of wild beaſts. The banks of the rivers and rivulets are overgrown with buſhes and weeds, continually covered with ſlime, which ſends forth an intolerable ſtench. All places however are not equally unhealthy; nor is any place equally un-

wholeſome

wholeſome at all times of the year. It is only with the rainy ſeaſon that the ſickneſs commences. But as it would be tedious, and not anſwer our preſent purpoſe, to enumerate thoſe places which are healthy, and thoſe which are not, I ſhall only extract from Dr. Lind's work an account of one which ſeems to be as bad as can well be imagined. It is called *Catchou*, a town belonging to the Portugueſe, and ſituated in 12 degrees N. lat. "I believe (ſays the author of this account) "there is ſcarce to be found on the whole face of the "earth a more unhealthy country than this during the "rainy ſeaſon. We were thirty miles diſtant from the "ſea, in a country altogether uncultivated, overflowed "with water, ſurrounded with thick, impenetrable "woods, and overrun with ſlime. The air was vitiated, "noiſome and thick, inſomuch that the lighted torches "or candles burnt dim, and ſeemed ready to be extin-"guiſhed; even the human voice loſt its natural tone. "The ſmell of the ground, and of the houſes, was raw "and offenſive; but the vapour ariſing from the putrid "water in the ditches was much worſe. All this, how-"ever, ſeemed tolerable, in reſpect of the infinite num-"bers of inſects ſwarming every where, both on the "ground and in the air; which, as they ſeemed to be "produced and cheriſhed by the putrefaction of the at-"moſphere, ſo they contributed greatly to increaſe its "impurity. The wild bees from the woods, together "with millions of ants, overran and deſtroyed the furni-"ture; while ſwarms of cock-roaches often darkened "the air, and extinguiſhed even the candles in their "flight; but the greateſt plague was the muſquetoes "and ſand-flies, whoſe inceſſant buzz and painful ſtings "were more inſupportable than any ſymptom of the fe-"ver. Beſides all theſe, an incredible number of frogs, "on the banks of the river, made ſuch a conſtant and "diſagreeable croaking, that nothing but being accuſ-"tomed to ſuch an hideous noiſe, could permit the en-"joyment of natural ſleep. In the beginning of Octo-"ber, as the rains abated, the weather became very hot, "the woods were covered with abundance of dead frogs,

"and

" and other vermin, left by the receſs of the river; all " the mangroves and ſhrubs were likewiſe overſpread " with ſtinking ſlime."

No doubt theſe accounts are calculated to inſpire us with dreadful ideas of the countries mentioned in them. What could be done by the putrefaction of dead animals and vegetables, certainly would be done here; the produce, however, was not the true plague; not even in *Catchou*; but " a ſickneſs which could not well be " characteriſed by any denomination commonly applied " to fevers; it however approached neareſt to what is " called a nervous fever, as the pulſe was always low, and " the brain and nerves principally affected," &c. Certainly if in any country heat, moiſture and putrefaction could produce a plague, it would be in this. Yet, in all the places we have mentioned, whether India, Arabia, Egypt, or Guinea, (and we might go through the whole world in the ſame manner) we have not been able to find either moiſt heat or dry heat, even when aided by putrefaction, inſects, and naſtineſs of all kinds (not juſtly chargeable upon any climate;) I ſay, we have not found the united powers of all theſe able to produce a plague. Nay, it is even doubtful whether climates can produce thoſe inferior diſeaſes above mentioned. Even Dr. Lind, who appears to be ſo willing to aſcribe every thing to climate, ſeems embarraſſed in this reſpect. " There " are many difficulties (ſays he) which occur in aſſigning " a ſatisfactory reaſon, why in ſome countries, as in thoſe " between the tropics, heavy and continual rains ſhould " produce ſickneſs; while in other places, eſpecially in " the ſouthern parts of Europe, a want of rain for two or " three months in ſummer brings on diſeaſes almoſt ſimi- " lar. Upon this occaſion (adds the Doctor) I cannot " help obſerving, that there is hardly a phyſical cauſe " which can be aſſigned for the produce of any diſeaſe, " that will not admit of ſome exceptions: thus, not only " the woods and moraſſes in Guinea are tolerably heal- " thy, with ſome exceptions, in the dry ſeaſon; but a few " inſtances might be produced of towns ſurrounded with " marſhes and a foggy air, where the inhabitants ſuffer

" no

" no inconvenience from their ſituation, even during the " rainy ſeaſon. Do the impetuous torrents of water pour- " ed from the clouds during the rainy ſeaſons, in tropical " countries, contain what is unfriendly to health? Thus " much is certain, that the natives of ſuch countries, eſpe- " cially the mulattoes, avoid being expoſed to theſe " rains as much as poſſible, and when wet with them " immediately plunge themſelves into ſalt water, if near " it. They generally bathe once a day, but never in " the freſh water rivers, when overflown with rains, " preferring at ſuch times the water of ſprings. Is the " ſickneſs of theſe ſeaſons to be aſcribed to the intenſe " heat of the then almoſt vertical ſun; which frequent- " ly, for an hour or two at noon, diſpels the clouds, and " with its direct beams inſtantly changes the refreſhing " coolneſs of the air into a heat almoſt inſupportable?

" Further: As the ſeaſon of thoſe ſudden and terrible " ſtorms, called the hurricanes, in the Eaſt and Weſt " Indies, and tornadoes on the coaſt of Guinea, partly " coincides with that of the rains, do theſe dreadful " tempeſts in any meaſure contribute to produce the " prevailing ſickneſs at thoſe times? It was remark- " able one year at Senegal, that, in the beginning of the " rainy ſeaſon, in the night ſucceeding one of theſe tor- " nadoes, a great number of the ſoldiers, and two thirds " of the Engliſh women, were taken ill, this garriſon " before having been uncommonly healthy.

" Laſtly: Is it not more probable, as in thoſe " countries the earth for ſix or eight months in the " year receives no moiſture from the heavens but what " falls in dews, which every night renew the vegetation, " and reinſtate the delightful verdure of the graſs, that " the ſurface of the ground in many places becomes " hard and incruſtated with a dry ſcurf, which pens up " the vapours below, until, by the continuance of the " rains for ſome time, this cruſt is ſoftened, and the " vapours ſet free? That theſe dews do not penetrate " deep into the ſurface of the earth, is evident from the " conſtant dryneſs and hardneſs of ſuch ſpots of ground, " in thoſe countries, as are not covered with graſs and

" other vegetables. Thus the large rivers, in the dry " ſeaſon, being confined within narrow bounds, leave a " great part of their channel uncovered, which, having " its moiſture totally exhaled, becomes a hard, dry cruſt; " but, no ſooner the rains fall, than, by degrees, this " long parched up cruſt of earth and clay gradually " ſoftens, and the ground, which before had not the " leaſt ſmell, begins to emit a ſtench, which in four or " five weeks becomes exceeding noiſome; at which time " the ſeaſon of ſickneſs commences."

From theſe quotations it muſt certainly appear, that the author himſelf is diſſatisfied with his theory; and that, though in the outſet he thought heat and moiſture, aſſiſted by the exhalations from putrid animal and vegetable ſubſtances, ſufficient to produce the diſorders of which he treats, yet, on a more minute inveſtigation, he is obliged to acknowledge, that ſomething inexplicable ſtill remains. This he now wiſhes to ſolve by unknown properties in the water, by confined exhalations, &c. But as the conſideration of theſe things belongs properly to the next ſection, I ſhall here only remark, that there hath not yet been given any ſatisfactory account of the origin of epidemic diſeaſes of what I call the *inferior* kind, much leſs of the true plague, which ſtands above them all, as I have already ſaid, like the ſerpent Python above other ſerpents.

To what has been quoted from Dr. Lind, I ſhall here ſubjoin the teſtimony of Dr. Clark, who had an opportunity of obſerving the epidemic diſeaſes which raged at Bengal in 1768 and 1769. Theſe were, " the remittent " fever and dyſentery, which begin in Auguſt, and " continue till November. During the beginning of " the epidemic, the fever is attended with extreme ma- " lignity and danger; frequently carrying off the patient " in twelve hours; and, if not ſtopped, generally proves " fatal on the third or fourth day. In Auguſt the re- " miſſions are very imperceptible; in October they " become more diſtinct; and, as the cold weather comes " on, the fever becomes a regular intermittent. At " that time, too, the putrid dyſentery begins to rage " with

" with the fever. Theſe diſeaſes were very fatal to ma-
" ny Europeans, particularly new comers, in 1768. But
" in the year 1770, when there was a ſcarcity of rice,
" it was computed, that about eighty thouſand natives,
" and one thouſand five hundred Europeans, died at
" Bengal. The ſtreets were covered with funerals; the
" river floated with dead carcaſes; and every place ex-
" hibited the moſt melancholy ſcenes of diſeaſe and
" death. During the ſickly ſeaſons at Bengal, the un-
" certainty of life is ſo great, that it frequently happens
" that one may leave a friend at night in perfect health,
" who ſhall not ſurvive next day. There have been
" ſeveral inſtances of perſons who have returned home
" in a ſtate of perfect health from performing the laſt
" duties to a deceaſed friend, and have next day been
" numbered with the dead. But the cool, agreeable
" ſeaſon, from December to March, is productive of no
" prevailing diſeaſes. The complaints to be met with
" are in general the conſequences, or remains, of the dif-
" eaſes of the former period. The complaints which
" the Europeans are ſubject to in the dry months are,
" the cholera and diarrhœa. Fluxes and fevers are then
" ſeldom epidemic; and, when they do happen, are not
" attended with much danger.

" At Batavia the rainy ſeaſon is from November to
" May, during which time malignant, remitting and
" continued fevers and the dyſentery rage with great fa-
" tality. Captain Cook, in his firſt voyage, arrived
" here in October 1779; the whole crew, excepting
" Tupia, a native of Otaheite, being in the moſt perfect
" health. But, in the courſe of nine days, they expe-
" rienced the fatal effects of the climate, and buried
" ſeven people at Batavia. On the 3d of December,
" the ſhip left the harbour. At that time the number
" of ſick amounted to forty; and the reſt of the ſhip's
" company were in a very feeble condition. When the
" ſhip anchored at Prince's Iſland, in the Straits of
" Sunda, the ſickneſs increaſed, and they buried twenty-
" three perſons more in the courſe of about ſix weeks.
" The Grenville Indiaman, which touched at this iſland

" in

" in 1771, ſuffered equally from the malignity of the " air. A few were taken on board, when the ſhip ſailed " from Batavia, ill of a malignant fever; which ſpread " by contagion at ſea, and carried off great numbers. " I viſited ſeveral in this ſhip, when ſhe arrived at Chi- " na, who were reduced to mere ſkeletons, by the du- " ration of the fever and dyſentery; both of which were " moſt certainly propagated by contagion.

" Thoſe parts of Sumatra lying immediately under " the line are continually ſubject to rain, and the " ground near the ſhore is low, and covered with thick " trees and underwood. The heat being intenſe, noi- " ſome fogs ariſe, which corrupt the air, and render the " country fatal to foreigners. The land of North " Iſland, which lies on this coaſt, near the beginning of " the Straits of Sunda, appears at a diſtance finely vari- " egated; but at the place where the wood and water " are to be got it is low, and covered with impenetrable " mangroves, and infeſted with a variety of inſects. It " is here that moſt of the Eaſt India ſhips take in wood " for their homeward voyage. A Daniſh ſhip, in 1768, " anchored in this iſland, and ſent twelve of her hands " on ſhore to fill water; where they only remained two " nights. Every one of them was ſeized with a fever, " whereof none recovered: but although the ſhip went " out to ſea, none, except the twelve who went on " ſhore, were attacked with the complaint."

With regard to China, this author ſays, that the " port of Canton is by no means ſo healthy as is gene- " rally repreſented. The comparative degree of health " which Europeans enjoy here has been aſcertained from " the inſtances of the ſupercargoes, which is, however, " a very erroneous ſtandard. The generous and regular " way in which theſe gentlemen live, for the moſt part, " exempts them from diſeaſes; and, being but few in " number, no great mortality can take place among " them. But ſeamen, who never obſerve much regula- " rity in their way of living, who work hard in the " day time, are but badly clothed, and not provided " againſt the damps and cold north-eaſterly winds at " night,

" night, ſeldom fail to be afflicted with the diſeaſes al-
" ready mentioned (fevers and fluxes.) Even the fac-
" tors of different nations, who reſide here for any con-
" ſiderable time, experience all the inconveniences pe-
" culiar to any ſultry climate: florid health is a ſtranger
" to their countenances; their conſtitutions are ſoon
" weakened and enfeebled; and they become ſubject to
" habitual fluxes and other complaints, the uſual con-
" ſequences of too great relaxation."

The climate of the ſouthern part of China, according to the ſame author, is exceſſively hot during the ſummer months. Even in September and October, when the nights are cold, the days continue to be ſultry. The cold months are, December, January and February; " and during this time the viciſſitudes of the weather " are more quick than in any other part of the world. " When the wind is northerly, and the thermometer at " 46, upon a change of the wind to the ſouth, it is next " day up to 60 or 70. People who reſide here are al-" ways at a loſs with regard to their clothing; one day " finding a ſilk coat ſufficient; and the next, upon a " ſudden change of wind, finding it neceſſary to wear a " flannel waiſtcoat."

On the ſubject of climate, therefore, I muſt conclude with the following obſervations:—Firſt: That, as the diſeaſes above mentioned are produced both in moiſt and dry countries, in thoſe in the torrid and thoſe in the temperate zone, they can neither be the offſpring of moiſture or drought, of heat or cold, of ſeptics or antiſeptics, but of ſomething not yet diſcovered. Second: That, upon fair inveſtigation, it does not appear, that ancient hiſtorians have been able to aſcertain the origin of any plague whatever: they have univerſally aſcribed it to the anger of the Deity, while their own pride would never allow it to have originated in any country with which they were connected. Third: It doth not by any means appear, that the climates of thoſe countries, where the plague is known to bemoſt common, are at all inferior to thoſe already deſcribed, excepting the very circumſtance of having the plague frequently in them: nay,

nay, indeed, that they are equally bad. Nobody will pretend to argue, that the climate of Aſia Minor, of Greece, of the Morea, or of any of the countries moſt infeſted with the plague, was, or is, worſe than that of *Catchou* in Africa, already deſcribed; yet it is certain, that we have a number of teſtimonies that the plague has ravaged Aſia Minor, while we have not one of its viſiting *Catchou*. Ancient Greece, the Peloponneſus (Morea) and Aſia Minor, were accounted healthy and fine countries; and modern travellers aſſure us, that they have not degenerated in this reſpect; yet theſe countries are deſolated by the plague, while the unwholeſome regions above deſcribed are entirely free from it, unleſs imported from ſome other quarter. To give this matter, however, as fair a diſcuſſion as poſſible, I ſhall here conſider the account we have of the climate of Baſſorah, given by the gentleman reſiding there in 1780; whoſe caſe, in the remitting fever, is given, Appendix, No. VI. "The overflowing of the Euphrates, "and its waters ſtagnating in the deſert, have always "been accounted primary cauſes of epidemical diſeaſes "at Baſſorah. The great floods from the melting of "the ſnow on the mountains of Diarbekir, the ancient "Aſſyria, happened in the year 1780, early in the "month of May, when the heats in Perſia and Arabia "begin to be exceſſive. The deſert, which reaches to "the gates of Baſſorah, is, for many miles, incruſted "with a ſurface of ſalt; which, when mixed with the "ſtagnated waters, and expoſed to the ſun, produces "the moſt noxious effluvia. As early as the 25th of "May, the town was ſurrounded by a ſalt marſh, the "heated ſteam ariſing from which was, at times, almoſt "intolerable; but the canal that runs through a great "part of the city being filled with the bodies of ani-"mals, and all kinds of putrid matter; and, at low "tides, all theſe ſubſtances expoſed to the ſun, made "the air in the town ſcarce ſupportable; and, being "totally deſtitute of police, the ſtreets were in many "places covered with human ordure, the bodies of "dead dogs and cats, &c. which emitted a ſtench more

"diſagreeable

" diſagreeable and putrid than any thing I ever experi-
" enced in my life. As to the degree of ſolar heat, it
" far exceeded what I conceived the human frame to be
" capable of bearing. The ſenſation under this heat
" was totally different from what I had ever experien-
" ced; it reſembled the approach of an heated ſubſtance
" to the body. The quickſilver, in Fahrenheit's ther-
" mometer, roſe to between 156 and 162 degrees.*
" From the 30th of May I never ſaw it ſo low as 156,
" but generally between 158 and 160. After I left
" Baſſorah I was told that it roſe ſtill higher. In the
" cooleſt part of the houſe, with the aid of every inven-
" tion to decreaſe the heat, the quickſilver roſe to 115;
" but after I came away, I was informed that it roſe
" ſtill higher, even at ſeven in the morning, the hour
" which we accounted the cooleſt in the day. Once
" the heat was ſaid to be ſo intolerable, that no one
" could expoſe himſelf to it long enough to obſerve the
" thermometer in the ſun. Some of the oldeſt inhabi-
" tants of Baſſorah ſaid that they never remembered to
" have heard of ſuch a heat in any part of Perſia or
" Arabia. The natives of the country appeared more
" alarmed at the heat than the Europeans: nothing
" could induce them to expoſe themſelves to the ſun
" after ten o'clock. I left Baſſorah for Aleppo on the
" 30th of May. On our arrival at Zabira, the heat was
" ſo intenſe, that even the Arabs ſunk under it."

From this account it was natural to expect that violent ſickneſs would enſue. This was the opinion of the inhabitants, and they were not deceived. The ſickneſs, however, was not the true plague, but a violent remitting fever; and even this did not originate in the city itſelf, but was obſerved to approach from Aſia Minor, ravaging Diarbekir, and keeping the courſe of the Tigris, to Bagdad, where many died. From thence it followed the courſe of the Euphrates to Baſſorah, and for about twenty miles lower. The oppoſite, or Perſian ſhore, though within a few miles, was exempted, and

* Spirit of wine boils at 175.

and it did not ſpread more than twenty miles into the deſert.*

I might now proceed to give an abſtract of what has been ſaid of the power of climate in producing diſeaſes on the Weſtern Continent, and Weſt India iſlands; but as this belongs more eſpecially to the ſecond part of this Treatiſe, I ſhall here paſs it over, as well as what Dr. Smith has ſaid of the climate of Greece, in the Medical Repoſitory, and which he endeavours to prove to be ſimilar to the climate of North America. But, before we proceed to conſider what diſeaſes may be produced by *climate* alone, it is proper to diſcuſs the queſtion, how far man is naturally ſubject to diſeaſes of any kind? Many, no doubt, will be apt to ſuppoſe this a very abſurd queſtion; for as man is now, by nature, ſubject to death, it ſeems to follow, that he is alſo naturally ſubject to diſeaſe, as the means of bringing on death. But, however plauſible this may appear, experience ſhows, that diſeaſe and death are not always connected. Many people die of mere old age; the powers of life being exhauſted, and the ſyſtem ſo far decayed, that the various parts of it can no longer perform their offices. On the other hand, a diſeaſe deſtroys by attacking ſome particular organ, and either totally conſuming or altering it in ſuch a manner, that it diſturbs the vital operations, while yet ſtrong and vigorous. We may therefore compare the death of a perſon from mere old age to the natural extinction of a candle when the tallow is totally conſumed; and death from diſeaſe, to the blowing out of a candle while a part of it remains, and might have burned for a conſiderably longer time. Thus I am inclined to conſider all diſeaſes as merely accidental; and this with the greater certainty, becauſe, though, in common with other believers in revealed religion, I think that death is the conſequence of Adam's tranſgreſſion, yet I do not find that diſeaſe of any kind was threatened except in caſes of poſitive tranſgreſſion, long after the days of Adam.

Every

* Tranſactions of Society for improving Medical Knowledge.

Every one allows, that, though ſome diſeaſes are natural, ſome are likewiſe artificial; but nobody hath attempted to draw the line of demarcation between them. Every thing is charged upon climate, heat, moiſture, drought, vapour, &c. and yet, upon examination, we ſhall find the utmoſt difficulty in deriving a ſingle diſeaſe from the cauſes we aſſign. No perſon in his ſenſes will ſay that Adam, in conſequence of eating the forbidden fruit, became liable to the venereal diſeaſe. As little can we ſay for the gout, the ſtone, or the dropſy; and if we cannot particularize the diſeaſes to which he became naturally liable, we have no right to ſay that any kind of diſeaſe became natural to him in conſequence of his tranſgreſſion. If, therefore, death itſelf, originally not natural to man, did yet take place in conſequence of his moral conduct; and if diſeaſes, without number, have ariſen among his poſterity, though not natural to him in conſequence of his firſt tranſgreſſion, we have equal reaſon to believe that theſe diſeaſes have taken place among them in conſequence of their moral or rather *immoral* conduct, in totally deviating from the line preſcribed them by their Maker, and following others of their own invention; and this will appear the more probable, when we conſider, that, long after mankind became ſubject to death, we find diſeaſes, particularly the peſtilence, threatened as the conſequence of ſubſequent tranſgreſſions.

If, without taking ſcripture into conſideration, we attend only to what may be gathered from profane hiſtory, we find the teſtimony of all the ancients concurring in one general point, viz. that in times of great antiquity men were more healthy, and even ſtronger, than in the times when thoſe authors lived. This is taken notice of by Homer, when comparing the ſtrength of men in the time of the Trojan war with thoſe in his days, about two centuries later.* Virgil, who lived in much more modern

* A pond'rous ſtone bold Hector heav'd to throw,
Pointed above, and rough and groſs below;
Not *two* ſtrong men th' enormous weight could raiſe,
Such men as live in theſe degenerate days.

Iliad, B. xii.

modern times than Homer, carries his ideas of the degeneracy of man much farther; and informs us, that Turnus, when fighting with Æneas, took up and threw a ſtone which twelve men of that time could not have lifted. Now, though we know that both theſe accounts are fabulous, yet they perfectly coincide with the voice of hiſtorians of all nations; for we are univerſally told, that the firſt inhabitants of countries were a brave, hardy people, living according to the ſimplicity of nature, free from diſeaſes, and attaining to a good old age.

This is ſo conformable to what is generally ſaid at preſent, probably very often by rote, without regard to rational evidence, that, were we ſo inclined, ample room might be found for declamation againſt modern luxuries, particularly the practice of drinking ardent ſpirits, as pernicious to health, and deſtructive to the human body. On this ſubject, however, we may once for all obſerve, that, although we find ample evidence of the baleful influence of theſe liquors in producing other diſeaſes, yet we find none of their ever having had any ſhare in the production of an epidemic or general diſeaſe among mankind. In ancient times the art of diſtillation ſeems to have been unknown; ſo that whatever miſchief was done in thoſe days muſt have been done by wine, or other fermented liquors. In modern times, though the uſe both of fermented liquors and ardent ſpirits is undoubtedly carried to exceſs, yet there is no evidence of their producing an epidemic, or even making it more violent or general than it would otherwiſe have been. Dr. Cleghorn, having ſpoken largely of the manner of living of the natives in Minorca, proceeds thus: "I ſhould next give a circumſtantial account of the diet and way of life of the Britiſh ſoldiers in this iſland; but as this would be a diſagreeable taſk, I ſhall only obſerve, that the exceſs of drinking is among them an univerſal vice, confirmed into habit. But, however different the Spaniards be from the Engliſh, in their meat, drink, exerciſe, affections of the mind, and habit of body; yet the health of both nations is equally influenced by

"the

" the ſeaſons. An epidemical diſtemper ſeldom or " never attacks the one claſs of inhabitants without " attacking the other alſo; and, ſurpriſing as it may " appear, it is nevertheleſs true, that the peaſants, " remarkable for temperance and regularity, and the " ſoldiers, who, without meat and clothes, frequently " lie abroad drunk, expoſed to all weathers, have diſ- " eaſes almoſt ſimilar, both as to their violence and " duration."

There can be no doubt that exceſs in drinking hath put an end to the lives of many individuals; and it hath been obſerved, that ſuch as attempt to preſerve themſelves from the plague by the uſe of ſtrong liquors, have generally fallen ſacrifices to it;* but this cannot prove that ſuch exceſs would have brought on the diſtemper without ſome other cauſe. It hath been certainly found, that exceſs in drinking or eating, exceſs in venery, exceſſive fatigue by labour, watching, ſtudy, &c. will all make an epidemic diſeaſe more violent when it attacks a particular perſon; but no experience hath yet ſhown that the *firſt* perſon ſeized with an epidemic always fell under this deſcription. All that can be ſaid on the ſubject is, that, by ſuch exceſſes as have already been deſcribed, the body is prepared for receiving the diſeaſe, by an exhauſtion, or evaporation (if we pleaſe to call it ſo) of the vital principle; as wood is prepared for burning by the evaporation of its moiſture; but as wood, however dry, will not burn without the contact or application of fire, ſo neither will the body, though ever ſo well prepared, be attacked by any epidemic, unleſs the true cauſe of that epidemic be alſo applied.

Thus we are ſtill diſappointed in our attempts to diſcover the origin of the plague. We have ſeen that the moſt unhealthy climates in the world do not produce it of themſelves; neither can the conduct of any individual bring it upon himſelf, without an unknown *ſomething*, which nobody has yet found out. It was this difficulty of finding out the natural cauſe, which certainly induced by far the greateſt number of writers on

* See Sec. IV. Preventives of the Plague.

on the ſubject to aſcribe it to Divine Power; and even as late a writer as Dr. Hodges tells us, that he believes in the *to Theion*, the "finger of God," in the plague, as much as any body. As for thoſe who have endeavoured to account for the origin of this diſtemper from an inquiry into natural cauſes, and concluſions drawn from the late experiments on air, they have totally failed; as will be fully elucidated in the following ſection.

If then we are to believe that diſeaſes, eſpecially thoſe called epidemics, among which the plague holds the firſt place, have ariſen in conſequence of a certain line of conduct adopted by the human race, or have been inflicted by the Deity as puniſhments on that account, we are to look for their origin among thoſe to whom the Deity principally manifeſted himſelf; that is, the Jews, and nations who interfered with them. Among the Jews we hear of the firſt general plague diſtinctly mentioned; viz. the three days peſtilence of David, and to which it is poſſible that Homer alludes in his Iliad. Next to this is the great plague of 767 B. C. ſaid to have ſpread all over the world. This coincides with the time of Pul, king of Aſſyria; who, having overthrown the ancient kingdom of Syria, turned his arms againſt that of Iſrael, and no doubt extended his conqueſts among the eaſtern nations, as we know very well the Aſſyrian monarchs did. As the ten tribes, ever after their ſeparation from the houſe of David, had in a manner totally given themſelves up to idolatry, we are not to wonder if the peſtilence, ſo frequently threatened by Moſes, was very common, or, as phyſicians term it, *endemic*, among them. Thus, whatever enemy invaded the country, would almoſt certainly carry the diſeaſe along with them, and ſpread it among the other nations with whom they afterwards had any connexion. At this time, or even before this, during the wars of Syria with Iſrael and Judah, this dreadful peſtilence might begin; but, as to its being all over the world in any particular year, I do not ſee how it can be aſcertained; becauſe there are no general hiſtories of the world in thoſe early times. It appears more probable that this general

general peſtilence took place at the time that Sennacherib's army was deſtroyed. I have no doubt, indeed, for the reaſons already given, that the plague had infected Sennacherib's army before he went into Ethiopia. In that country, in all probability, he would leave it; and, after his return to Judea, when the dreadful cataſtrophe befel him of an hundred and eighty-five thouſand of his men being deſtroyed in one night, there can be no doubt that the remains of his army would carry with them the ſeeds of a moſt malignant peſtilence, capable of ſpreading deſtruction far and wide. It is true, we are not directly told, in Scripture, that the Aſſyrian army was deſtoyed by a plague, but that the angel of the Lord deſtroyed them; but, as this expreſſion is quite ſimilar to what we read of the peſtilence in David's time, there can be but little doubt that the means of deſtruction made uſe of in both caſes were the ſame. Joſephus expreſsly ſays, that Sennacherib's army was deſtroyed by a peſtilence. Neither are we to conclude, becauſe this peſtilence was miraculous, that it therefore certainly killed every one on whom it fell; or that it would not infect thoſe who came near the ſick, as any other diſeaſe of the kind would do.

From the ſame ſource may we derive the propenſity in the Carthaginian armies to peſtilential diſorders. Carthage was a colony of Tyre; and the Tyrians were in cloſe alliance with the Jews, during the reigns of David and Solomon, and very probably afterwards; ſo that from them the diſtemper might be communicated in ſuch a manner as to be almoſt endemic; and thus hardly an army could be ſent out but what would have the infection with it, breaking out with violence now and then, as occaſional cauſes tended to give life to the contagion. It is impoſſible, however, from the ſource juſt mentioned to trace the plague of Athens, or the firſt plague in Rome; but it is very natural to ſuppoſe that the violent one which raged in Rome, during the reign of Titus, came from Jeruſalem. That city had ſuſtained a moſt dreadful ſiege, and the obſtinate and wretched inhabitants had endured ſuch calamities as

have

have ſcarcely been recorded in the hiſtory of nations. Among theſe calamities was a peſtilence, which, in all probability, would be conveyed to Rome, and there occaſion the deſtruction already mentioned.

But what ſeems to render this account of the origin of the plague more probable is, that the Jews are to this day accuſed of propagating the diſeaſe in thoſe countries where it is moſt frequent. Baron de Tott is of opinion that the plague in Conſtantinople originates among the Jewiſh dealers in old clothes; for theſe avaricious dealers, purchaſing the infected goods, ſell them indiſcriminately to every one who will buy, and that without the leaſt care taken to remove the infection from them; by which means it is no wonder to find the plague, as well as other diſeaſes, diſſeminated among them in great plenty. Dr. Ruſſel informs us, that the Jews are moſt liable to the plague, the moſt fearful of it, and the moſt ready to fly from the infection. The Abbe Mariti agrees in the ſame accuſation againſt this unfortunate people. "The "Jews (ſays he) purchaſe at a low price the goods and "wares which remain when moſt of the family are de- "ceaſed, and then ſtore them up; which, when the "plague is over, they ſell at a dear rate to thoſe will "buy, and thus propagate the peſtilential poiſon: again "it kindles, and preſently cauſes new deſtruction. "Thus this opprobrious nation, preferring gold to life, "ſell the plague to muſſulmen, who purchaſe it with- "out fear, and ſleep with it, till, renewed of itſelf, it "hurries them to the grave." M. Volney, though he does not mention the Jews in ſuch expreſs terms as Mariti and Ruſſel, yet agrees as to the mode of its propagation in Conſtantinople, and the reaſon of its continuance in that city. "It is certain (ſays he) that the "plague originates in Conſtantinople, where it is per- "petuated by the abſurd negligence of the Turks, "which is ſo great, that they publicly ſell the effects of "perſons dead of the diſtemper. The ſhips which go "to Alexandria never fail to carry furs and woolen "clothes, purchaſed on theſe occaſions, which they ex- "poſe to ſale in the bazar of the city, and thereby ſpread "the

" the contagion. The Greeks who deal in theſe goods " are almoſt always the firſt victims."

Thus the account we have of the origin of the plague at preſent is, that the city of Conſtantinople, having been long and deeply infected, the infection is ſtored up through the avarice of the Jewiſh merchants, who buy the goods and clothes of the infected. The ſtupidity of the Turks allows theſe goods to be ſold in Conſtantinople, or exported freely to all parts to which their veſſels ſail, particularly to Alexandria; where the avarice of the Greeks prompts them to buy without examination or precaution, to the deſtruction of their own lives, and of multitudes of others. Egypt being the principal place of traffick, the plague is more frequent there than in other parts of the empire. Syria is comparatively free from it; which M. Volney ſuppoſes to be owing to the ſmall number of veſſels which come there directly from Conſtantinople.

In this way we may, in a pretty plauſible manner, account for the origin of this diſtemper; viz. that it originally fell upon the Jews as a puniſhment for their iniquities; that from the Jews it has been at different times conveyed to other nations; and, by a mixture of thoſe nations, has, at times, become general all over the world. At laſt it has, by the avarice of that people who firſt had been the occaſion of its being introduced into the world, become permanent in Conſtantinople, whence it is ſtill diffuſed among different nations in proportion to their dealings with that capital.

But it may now be ſaid, 'Allowing the poſitions contended for to be true in their utmoſt extent, how comes it to paſs that the plague hath not been general in every age and in every country? Since the deſtruction of Jeruſalem, the Jews have been diſperſed over all nations: if nothing then were wanting to produce a peſtilence but Jews and old clothes, no age or country ought to have been free from it; nevertheleſs it is certain that violent plagues take place only at particular times, with long intervals between; and of late the peſtilential diſpoſition ſeems to have become much leſs frequent

frequent than formerly; the weſtern parts of Europe, particularly Britain, having been free from it for a great number of years. There muſt therefore be ſome cauſe, different from what has yet been mentioned, by which the infection is occaſionally rouſed from inactivity, and excited to ſpread deſolation all around.'

That there are prediſpoſing cauſes to epidemic diſorders, eſpecially to the plague, the moſt fatal of them all, is not denied. Theſe prepare the body for receiving the infection, but they will not, without that infection, produce the diſorder. Of theſe cauſes ſo many are to be found in the conduct of mankind themſelves, that we ſcarcely need to look for them any where elſe. In looking over the hiſtories of plagues, we find them in an eſpecial manner connected with famines and wars. The former ſometimes take place in conſequence of the failure of crops through natural cauſes; but, conſidering the general fertility of the earth, we muſt certainly account it owing to bad management, in ſome reſpect or other, that every country hath not as much laid up within itſelf as would guard againſt the conſequences of at leaſt one or two bad crops. Yet we believe there is not, at preſent, a country upon earth in this predicament. If a crop fails any where, the inhabitants muſt import largely, or they muſt ſtarve. This is the caſe even in the fertile regions of the Eaſt, where the earth produces in exceſſive abundance,* and there is little or nothing of any kind of proviſion exported to other countries. A remarkable inſtance of this occurred in the plague at Aleppo, a hiſtory of which is given by Dr. Ruſſel. He tells us, that the winter of 1756 proved exceſſively cold, which was followed by a famine next year. This account is confirmed by Mr. Dawes, in a letter to the biſhop of Carliſle.† He tells us, that in the courſe of the winter many periſhed through cold; that the inhabitants were reduced to ſuch extremities, by the ſingle failure of the crop in 1757, that women were

* Herodotus ſays, that in his time the province of Babylonia produced commonly two hundred, and in plentiful years three hundred fold.

† Philoſ. Tranſact. vol. liv.

were known to eat their own children as ſoon as they expired in their arms with hunger; and that human creatures might be ſeen contending with dogs, and ſcratching for the ſame bone with them in a dunghill. A dreadful plague followed; which, the two ſucceeding years, ſwept off not fewer than ſixty thouſand in the city of Aleppo.

It is probable that in this caſe the famine either produced the plague, or made it worſe than it would have otherwiſe been; and it is not denied that the cold and bad ſeaſon was the direct cauſe of the famine. But as little can it be denied, that had the people, or their governors, been ſo provident as to have laid up ſtores ſufficient to ſupply the country for one year, this famine would not have been felt. As far, therefore, as the plague was connected with the famine, we muſt own that it was chargeable on the human race themſelves; not the ſins of this or that particular perſon, but a general deviation from the taſk aſſigned them by their Maker, viz. that of cultivating the ground; and, inſtead of this, ſpending their time in folly and trifling, to ſay no worſe.

But famines are occaſioned not only by natural cauſes, but by wars; in which mankind, acting in direct oppoſition to the laws of God and nature, deſtroy and lay waſte the earth, taking every opportunity of reducing to extremity both thoſe whom they call innocent and thoſe whom they call guilty. Thus vaſt multitudes are reduced to want, to deſpair, and rendered a prey to grief, terror, and every depreſſing paſſion of the human mind; they are expoſed to every inclemency of the weather; to the ſcorching heats of the day, and the chilling damps of the night; in ſhort, to every thing that we can conceive capable of prediſpoſing the body for the reception of diſeaſes of the very worſt kind. No wonder therefore that war and peſtilence go hand in hand; and, by taking a review of the hiſtory of mankind, we ſhall ſee, that, always at thoſe times when the nations have been moſt actively employed in the trade of butchering one another, then, or very ſoon after, they have been afflicted

with peſtilence. To begin with the great plague of 767 B. C. which coincides with the riſe of the Aſſyrian empire: Till this time, though there had been numberleſs wars, yet they were carried on upon a much ſmaller ſcale than now, when great empires were to be ſet up, and when the moſt diſtant nations were to be aſſembled in order to gratify the pride and ambition of an individual. The Aſſyrians, we know, penetrated into Ethiopia; but how far eaſt or how far weſt they went, we are not certainly informed. To their wars, however, we may with reaſon aſcribe the deſolations occaſioned by this firſt plague. From Thucydides's account of the plague at Athens, it ſeems plain that it was occaſioned, or at leaſt rendered more violent, by the wars of the Greeks with one another at that time. Had the Carthaginian army ſtaid at home when they went to war with Dionyſius, tyrant of Syracuſe,* it is very probable that the peſtilence would not have broke out among them. The like may be ſaid of the plague which broke out among them in the time of Marcellus.† That in the time of Jugurtha, indeed, is ſaid to have been occaſioned by locuſts; but, had not vaſt bodies of men been collected together for the purpoſes of war, the plague could never have committed ſuch ravages. The plague in the time of Titus could not have been brought from Jeruſalem, nor perhaps would it have exiſted there, had not Titus made war againſt that city; and ſo of others.

The plague which began in the reign of Juſtinian, as it was more violent than any recorded in hiſtory, ſo it was preceded by wars equally unexampled. The Romans had indeed for ages employed themſelves in war; but, by their conſtant ſuperiority to every adverſary, their empire had become ſo amazingly extenſive, that, whatever wars were carried on in the remote provinces, the great body of the empire always remained at peace; and this was the caſe even in their moſt violent civil wars. On the acceſſion of Alexander Severus, about the year 232, they began to encounter enemies ſo numerous and formidable, that all their power proved inſufficient to repel them. In the tenth year of Alexander's

* See Sec. i. p. 10. † Ibid. p. 12.

ander's reign, the Perſians, having overthrown the ancient empire of the Parthians, turned their arms againſt the Romans, and, though frequently defeated at that time with great ſlaughter, renewed their incurſions in the reign of Gordian, about the year 242, when they were in like manner defeated and obliged to retire. As theſe defeats, however, did not at all affect the ſtrength of the Perſian empire, the Romans ſtill found them as formidable enemies as ever; while the Goths, Sarmatians, Franks, and other northern nations, haraſſed them in other parts. In the reign of Decius, who aſcended the throne in 249, they became extremely formidable, inſomuch that the emperor himſelf, with his whole army, was at laſt cut off by them. The conſequence of this was, that the empire was inſtantly invaded in many different parts, and, though the barbarians were at times defeated, we never find that the empire regained its former tranquillity. The Perſians and Scythians, taking advantage of the general confuſion, invaded the provinces next them, while the finiſhing ſtroke ſeemed to be given to the Roman affairs by the defeat and captivity of Valerian by the Perſians.

This diſaſter, as may well be imagined, produced an immediate invaſion by numberleſs barbarians, while ſuch multitudes of pretenders to the imperial crown were ſet up, each aſſerting his claim by force of arms, that the whole Roman territories were filled with bloodſhed and ſlaughter. At this time Gallienus, the ſon of Valerian, was the *lawful* emperor, if indeed we may apply the word to the domination of ſuch a monſter. His mode of government may be imagined from the following letter written to one of his officers in conſequence of a victory gained over an uſurper named *Ingenuus*. "I ſhall not be ſatisfied with your putting to death only "ſuch as have borne arms againſt me, and might "have fallen in the field: you muſt in every city deſtroy "all the males, old and young; ſpare none who have "*wiſhed* ill to me, none who have ſpoken ill of me, the "ſon of Valerian, the father and brother of princes. "*Ingenuus* emperor! Tear, kill, cut in pieces, without "mercy:

" mercy: you underſtand me; do then as you know " I would do, who have written to you with my own " hand." In conſequence of this horrible order, not a ſingle male child was left alive in ſome of the cities of Mœſia, where this inhuman tragedy was acted.

In the midſt of this dreadful commotion, we find the peſtilence contributing its ſhare to the common work of deſolation. In Alexandria in Egypt, ſays Dionyſius, biſhop of that place, " fury and diſcord raged to ſuch " a degree, that it was more eaſy to paſs from the eaſt " to the remoteſt provinces of the weſt, than from one " place of Alexandria to another. The inhabitants had " no intercourſe but by letters, which were with the " utmoſt difficulty conveyed from one friend to another. " The port reſembled the ſhores of the Red Sea ſtrewed " with the carcaſes of the drowned Egyptians: the ſea " was dyed with blood, and the Nile choked up with " dead bodies. The war was attended with a general " famine, and the famine with a dreadful plague, which " daily ſwept off great numbers of people, inſomuch " that there were then in Alexandria fewer inhabitants, " from the age of fourteen to that of eighty, than there " uſed to be from forty to ſeventy." It was not in Egypt alone that this calamity prevailed. It raged with great violence in Greece, and at Rome itſelf; where, for ſome time, it carried off five thouſand perſons a day. Many terrible phenomena of nature took place at the ſame time. The ſun was overcaſt with thick clouds, and great darkneſs took place for ſeveral days, attended with a violent earthquake, and loud claps of thunder, not in the air, but in the bowels of the earth, which opened in ſeveral places and ſwallowed up great numbers of people in their habitations. The ſea, ſwelling beyond meaſure, broke in upon the continent, and drowned whole cities.*

At laſt the civil commotions were ſettled by the acceſſion of Claudius to the empire in 268. He found the Roman force ſo exhauſted, that, when marching againſt the Goths, he wrote to the ſenate in the following terms:

* Univ. Hiſt. vol. xvi. p p. 433, 435.

terms: "If I ſhould not be attended with ſucceſs, you "will remember that I fight after the reign of Gallienus. "The whole empire is quite ſpent and exhauſted, partly "by him, and partly by the many tyrants who, during "his reign, uſurped the ſovereignty, and laid waſte our "provinces. We want even ſhields, ſwords and ſpears." In this miſerable plight, however, he gained a moſt extraordinary victory; three hundred thouſand of the enemy being killed or taken. But, while Claudius thus carried on the work of death ſucceſsfully againſt the barbarians, he was attacked from a quarter where he could make no reſiſtance: a violent plague broke out in his army, and carried off himſelf and a vaſt number of his men.

The dreadful defeat given to the Goths did not long preſerve the tranquillity of the empire. New invaſions took place, and new maſſacres enſued. At laſt, on the acceſſion of Diocleſian to the empire, it was thought proper, on account of the preſent emergences, to divide ſuch wide-extended territories into four parts, to be governed by four emperors of equal authority. By the activity and valour of theſe, particularly of one of them, named Galerius, the northern barbarians were repreſſed, and the Perſians reduced ſo low, that they were obliged to yield up a great part of their territories; and it is ſaid that their country might even have been reduced to a Roman province, had the emperor ſo inclined. We know not whether, in his eaſtern expedition, the Roman army received any infection, nor do we hear of any plague breaking out in it; but we are told that Galerius himſelf died of an uncommon diſtemper; an ulcer, attended with mortifications, violent pains, and the production of an infinite number of vermin, which devoured and tormented him day and night. This diſtemper, however, ſeems rather to have been a cancer than a peſtilential diſorder, as he laboured under it for more than a year. After his death, dreadful wars continued, both by reaſon of the incurſions of barbarians, and the conteſts of thoſe who enjoyed, or wiſhed to enjoy, the empire. The eaſtern parts, however, had for ſome time

time kept free from peſtilential contagion; of which the chriſtian writers ſay, that Maximin, who reigned there, had made his boaſt; and, being a heathen, aſcribed it to the care he took of preſerving the worſhip of the gods. But, if this was really the caſe, he ſoon found his gods unable to protect him; for, ſoon after the acceſſion of Conſtantine the great, and his embracing chriſtianity, the dominions of Maximin were afflicted with famine accompanied with peſtilence, and that attended by ſymptoms of a moſt extraordinary nature; particularly ulcers about the eyes, which rendered multitudes of thoſe who were infected with the diſtemper totally blind. The chriſtians did not fail to aſcribe this plague to the ſins of Maximin; but it muſt be obſerved, that to his other ſins he had added that of involving himſelf in a violent war, during which the peſtilence broke out, and which probably was one of the cauſes of it. We may likewiſe obſerve, that if the ſins of Maximin brought on the plague, the piety of Conſtantine could not keep it off; ſince we find that in the year 332, a conſiderable time after the death of Maximin, the territories of Conſtantine were ravaged by a dreadful plague, and the famine was ſo ſevere, that, at Antioch, wheat was ſold at four hundred pieces of ſilver per buſhel. The diſtemper which put an end to the life of Maximin himſelf was indeed ſo extraordinary, that we may reaſonably excuſe thoſe who called it a judgment ſent directly from heaven. His eyes and tongue are ſaid to have putrefied; "an inviſible fire was kindled "in his bowels, which, being attended with unrelenting "torments, reduced him in a few days to a perfect "ſkeleton; his whole body was covered over with a "kind of leproſy, and devoured by ſwarms of vermin: "he could not be prevailed upon to take any nouriſh-"ment, but greedily ſwallowed handfuls of earth, as if "he had hoped by that means to aſſuage his pains, and "allay the hunger with which he was tormented with-"out intermiſſion."* All this, we are told, was the effect of poiſon, which he had ſwallowed in deſpair, after

* Univ. Hiſt. vol. xvi.

after being defeated in battle; but the ſymptoms are unaccountable.

After the death of Conſtantine, the empire being again parted, civil diſſenſions took place; the northern barbarians and Perſians renewed their incurſions, and at length the battle of Murſa, between the emperor Conſtantius and an uſurper named Magnentius, deſtroyed ſuch numbers that the empire no more recovered its former ſtrength. From this time therefore the wars with the barbarians became more and more violent; and, though frequently overcome, the advantage was ultimately on their ſide. In 361, the firſt year of the emperor Julian, the peſtilence again made its appearance. It was accompanied by many other grievous calamities: Dreadful earthquakes were felt in every province; moſt of the cities in Paleſtine, Libya, Sicily and Greece, were overturned. Libanius writes, that not one city in Libya was left ſtanding, and but one in Greece; that Nice was utterly ruined, and Conſtantinople greatly damaged. The ſea, in ſeveral places, broke in upon the land, and deſtroyed whole cities with their inhabitants. At Alexandria, the ſea, retiring during an earthquake, returned again with ſuch violence, that it drowned ſeveral towns and villages in the neighbourhood. The earthquakes were followed by a famine, and the famine by a peſtilence. It was obſerved by the chriſtian writers, that the famine ſeemed to follow Julian from place to place: and no wonder that it did ſo; for he not only had always a large army along with him, which conſumed great quantities of proviſion, but, attempting to remedy the evil by fixing the prices of proviſions, he rendered it much worſe, as the dealers in corn were thereby tempted to convey it to other places.* Indeed this emperor ſeems to have been inclined to produce famines wherever he went; for, on his entering the territories of the Perſians, with whom he was at war, he waſted the country to ſuch a degree, that he could neither ſubſiſt nor return; while the enemy, imitating his example, deſtroyed all before him. The conſequence was, that,

* Univ. Hiſt. vol. xvi.

that, by the time Julian was killed, the famine raged in the Roman camp to ſuch a degree, that not a ſingle perſon could have eſcaped, had not the enemy mercifully granted them peace.

Notwithſtanding this diſmal ſituation, we hear of no plague invading the camp of the Romans at that time. The wars, however, continued with great violence; and, in the time of Valentinian, Valens and Gratian, became worſe than ever. The dreadful ſtate of the empire in the time of Gratian is thus deſcribed by St. Jerom: "The whole country, from Conſtantinople to the Julian "Alps, has been ſwimming theſe twenty years in Roman "blood. Scythia, Thrace, Macedon, Dardania, Dacia, "Theſſaly, Achaia, both Epiruſes, Dalmatia, both Pan-"nonias, are filled with Goths, Sarmatians, Quadians, "Alans, Huns, Vandals, Marcomans, &c. whoſe avarice "nothing has eſcaped, whoſe cruelty has been felt by "perſons of all ranks, ages and conditions." "What "evils, (ſays Gregory Nazianzen) have we not ſeen or "heard of! Whole countries have been deſtroyed with "fire and ſword; many thouſand perſons of all ranks "and ages have been inhumanly maſſacred; the rivers "are ſtill dyed with blood, and the ground covered with "heaps of dead bodies."

In the midſt of ſo great calamities, the peſtilence, as an evil of inferior nature, might in many caſes paſs unnoticed by the hiſtorians of the times; nevertheleſs, even during that diſtracted period, we find ſome accounts of it. In 384 we are told of a famine and plague at Antioch; and, in 407, of one in Paleſtine, ſaid to be occaſioned by multitudes of graſshoppers, which even obſcured the ſun, and turned day into night. After having done incredible miſchief, they were thrown by the wind partly into the Red Sea, and partly into the Mediterranean; whence being again caſt aſhore by the waves, they putrefied, and occaſioned a peſtilence. Two years after, when Rome had been firſt beſieged by Alaric the Goth, the city was reduced to ſuch ſtraits, that human fleſh was publicly ſold, and ſome mothers are ſaid to have devoured their children. This terrible famine was occaſioned

occaſioned by the uncultivated ſtate of the country, which had lain waſte for ſeveral years, by reaſon of the wars, and the ports of Africa being blocked up by Heraclianus leſt an uſurper ſhould become emperor; and thus this loyal admiral, for fear that the people ſhould have a bad governor, determined rather that there ſhould be no people to be governed. Notwithſtanding this terrible famine, however, we hear of no peſtilential diſorder taking place; not even after the taking of the city by Alaric, when bloodſhed and maſſacre were added to the other calamities.

All this time the empire, by the incurſions of barbarians, by uſurpations, civil wars, and the general licentiouſneſs of the people, had been in a ſituation not to be deſcribed. The invaſion of the Hunns, a new and more formidable enemy than they had ever experienced, now completed the ruin of the Romans. The whole weſtern part of the empire became one continued ſcene of carnage and deſolation. The common epithet beſtowed upon Attila, the king of theſe barbarians, was, "The *Scourge* of GOD, the *Deſtroyer* of *Armies*." As a ſpecimen of his behaviour, we ſhall ſelect the account of his taking of Aquileia in 452. That city, "being "well fortified, and defended by the flower of the Ro- "man troops, held out, in ſpite of his utmoſt efforts, for "three months; at the end of which it was taken by "aſſault, pillaged for ſeveral days together, and laid in "aſhes; not a ſingle houſe being left ſtanding, nor one "perſon alive that fell into the enemy's hands. The "cities of Trevigio, Verona, Mantua, Cremona, Breſcia "and Bergamo, underwent the ſame fate; the barba- "rians raging every where with ſuch fury as can hardly "be expreſſed or conceived, and putting all to the "ſword, without diſtinction of ſex, age, or condition."*

Every one muſt own that this was a very effectual method of preventing the plague in thoſe cities. It did not, however, prevent that, or ſome other diſeaſes, from deſtroying ſuch numbers of the tyrant's troops, that he was for that time prevented from taking Rome itſelf.

From

* Univ. Hiſt. vol. xvi.

From this time, to the total extinction of the weſtern empire, we do not hear of any remarkable infection taking place. The barbarians ſtill continued their wars with one another, while the emperors of Conſtantinople were likewiſe at continual variance with the Perſians. At laſt, in the year 532, they concluded what they called a *perpetual* or *eternal* peace, which laſted *eight years!* Other treaties and truces were concluded; notwithſtanding which, the war was almoſt continual in the eaſt; while, by the ſecond conqueſt of Italy, and the invaſion of the Gothic territories, new deſolations overſpread the weſt. Thus, for a great number of ages, mankind had been preparing themſelves for the dreadful peſtilence which was about to enſue. Whatever infection could be communicated to the air by multitudes of carcaſes rotting above ground had been done in an ample manner. Whatever debility could be communicated to the human frame by famine, expoſure to the inclemency of weather, by fatigue, terror, grief, and every thing that can render life miſerable, had alſo been communicated by the moſt powerful means. There only wanted *ſomething* to begin the calamity; and this, whatever it was, took place in the fifteenth year of Juſtinian. Mr. Gibbon aſcribes the origin of it to locuſts; and its univerſality, to the general mixture of all nations, and the unreſtrained intercourſe they had with one another. "No "reſtraints (ſays he) were impoſed on the frequent inter- "courſe of the Roman provinces. From Perſia to "France the nations were mingled by wars and emigra- "tions; and the peſtilential odour, which lurks for years "in a bale of cotton, was imported, by the abuſe of "trade, into the moſt diſtant regions. Procopius relates, "that it ſpread always from the ſea-coaſt to the inland "countries: the moſt ſequeſtered iſlands and mountains "were ſucceſſively viſited; the places which had eſcaped "the fury of its firſt paſſage, were alone expoſed to the "contagion of the enſuing year. In time, its malignity "was abated and diſperſed; the diſeaſe alternately lan- "guiſhed and revived; but it was not till the end of a "calamitous period of fifty-two years, that mankind re-

covered

"covered their health, or the air resumed its pure and "salubrious qualities."

Thus Mr. Gibbon endeavours to explain the causes of this plague from an alteration in the salubrity of the atmosphere, without taking into consideration the dreadful commotions among mankind, above related. But, now that we have noticed two very general infections, one in 767 B. C. the other 1300 years after, we find them both preceded and accompanied by wars uncommonly violent and destructive. The great plague in the time of Justinian is said by Mr. Gibbon to have continued only fifty-two years; but this we must understand of its first and most violent attack; for it appears, from the testimonies produced in the former section, that pestilential disorders, even very violent ones, continued at intervals for several centuries. Thus, from the year 541 to 593, the space of fifty-two years is included; nevertheless, in the time of Phocas, who began to reign ten years after, the same calamity continued; as did also violent wars with the Persians and other barbarians.

The year 622 is remarkable for the flight of Mahomet from Mecca to Medina, from which time we may date the rise of the empire of the Saracens; a people who, for desolation and destruction, were perhaps never equalled except by the Hunns and Moguls. In 630 the impostor himself died, after having just united the Arabs or Saracens, and fitted them for the work in which they were to be employed. Their first exploit was, to fall upon the empire of Persia, now weakened by its endless wars with the Romans. This was conquered in two years; after which they broke into Palestine, and conquered the provinces bordering upon Syria. In 634 they reduced Syria itself and Egypt. In 636 they took and plundered Jerusalem. In 642 they conquered the African provinces, and reduced some of the islands in the Levant. With unabated fury they proceeded to the east and west; laying siege, in 668, to Constantinople itself, where they received their first check by the shipwreck of their fleet, and the defeat of their army.

Thus,

Thus, in the ſpace of 38 years, the immenſe tract of country from the eaſtern part of Perſia to the confines of the Mediterranean Sea, with the northern coaſts of Africa, the whole including a ſpace ſcarce inferior to the empire of Alexander the Great, was reduced under ſubjection to a race of ſavage barbarians, who knew only how to plunder, deſtroy, and reduce other nations to ſlavery.

In this manner were the eaſtern parts of the world prepared for a new infection, ſuppoſing the old one to have been entirely gone off. The Saracens purſued their good fortune, ravaged and conquered from India to Spain, and from Spain were proceeding northward through France, to extend their conqueſts to the other countries of Europe. But here, in 728, their fury was ſtopped by Charles Martel, the father of Pepin, and grandfather of Charles the Great. After a moſt obſtinate and bloody battle, which laſted ſeven days, and in which the barbarians loſt three hundred and ſeventy-five thouſand men,* they were driven beyond the Pyrennean mountains, and never after durſt enter France. Thus was one fury ſtopped, only to give place to another. Charles, as ambitious and as cruel as the Saracens, having in vain attempted the conqueſt of Spain, reduced Italy and Germany; and, having dreadfully maſſacred the Saxons, and almoſt exterminated the Hunns, ſet up the German Empire, and was crowned emperor of the Weſt in 800.

While the nations were thus deluging the earth with blood, the peſtilence made its appearance in the eaſt, attended with extraordinary phenomena.† Some of theſe are taken notice of by the Arabian hiſtorians, and others are mentioned by them, concerning which the Greek hiſtories are

* M. Millot places this account among the "exaggerations which ought not to have a place in hiſtory;" but, as we have no evidence for or againſt the fact, it was thought proper to let it remain as related by the hiſtorians of thoſe times. It is certain that in thoſe days mankind aſſembled for the purpoſes of bloodſhed and ſlaughter in prodigious numbers; the deſtruction was commonly in proportion to the numbers aſſembled. The account is not more incredible than that of Tamerlane's filling up the harbour of Smyrna by cauſing each of his ſoldiers to throw a ſtone into it. Such an army could have ſpared the number in queſtion.

† See Sec. i.

are ſilent. In 636, particularly, we hear of violent ſtorms of hail throughout the Arabian Peninſula, and of Syria being ravaged by epidemic diſtempers. It would ſeem, indeed, that the plague, during the whole of theſe horrible periods, had never been extinguiſhed; for in 671 they tell us that a celebrated Arab, named *Ziyad*, died of the plague; though neither Greek nor Arabian hiſtorians take notice of any remarkable peſtilence as raging at that time. We are told that this man was attended by no fewer than *an hundred and fifty* phyſicians.* "But, *as the decree was ſealed*, and *the thing determined*, they found it impoſſible to ſave him." This diſtemper was attended with ſuch an excruciating pain in his right hand, that the unhappy patient had recourſe to a *cadi*, or judge, to inform him whether he might lawfully cut it off. The judge determined that it was abſolutely unlawful to do ſo; notwithſtanding which, Ziyad reſolved to proceed: but his heart failed him when he ſaw the inſtruments and cauteriſing irons to be employed in the operation; for in thoſe times of barbarity and ignorance they knew no other method of ſtopping blood but by a hot iron; and therefore ſome of the phyſicians in ancient times, when a limb was to be cut off, ordered the inciſion to be made down to the bone with a red hot razor. But, to return to our ſubject: In Syria and Meſopotamia ſwarms of locuſts infeſted the earth about the year 679; but, as it ſeems extremely probable that the plague was never out of the eaſtern regions, we cannot expect to hear much of it, unleſs when extremely violent. That in the time of Conſtantine Copronymus ſeems to have extended over Arabia, as we are told that the Khalif Yezid, who was cotemporary with Copronymus, died of the plague. We are alſo told, that the earthquakes which afflicted the territories of the Greek emperors extended themſelves to the countries about the Caſpian Sea. In thoſe ages indeed the phenomena of nature appear to have been ſo extraordinary, that we can ſcarcely account them any other than miraculous. Some of theſe have been deſcribed in the former

* Modern Univ. Hiſt. Arabia.

former ſection, on the authority of the Greek hiſtorians: the Arabians make mention of others ſimilar. They tell us, alſo, that once or twice it rained black ſtones, and that ſome of theſe were ſo inflammable, that an Arab having attempted to make a fire with one of them in his tent, it burſt out into ſuch a violent flame as conſumed the tent altogether.* This rain may be accounted for from the exploſion of a volcano; but how ſhall we account for the ſun himſelf loſing his light? a phenomenon acknowledged even by Mr. Gibbon; though that author huddles things together in ſuch a manner as ſeems totally inconſiſtent with the regular chain of events. He tells us, that the dreadful plague, which broke out in the time of Juſtinian, was preceded by comets, and moſt violent earthquakes; and that theſe comets were attended with an extraordinary paleneſs of the ſun. This may be; but the word *paleneſs* cannot apply to the *darkneſs* which laſted from the fourth of Auguſt to the firſt of October, and to which he ſeems to allude, though it happened long after the time of Juſtinian; neither can it be applied to what I am now about to relate, viz. that in the year 782, a little after ſunriſe, the ſolar light was loſt without an eclipſe, and the darkneſs continued till noon. It is impoſſible to read the hiſtories of thoſe times without remembering the words of our Saviour, that there ſhould be ſigns in the ſun and in the moon, diſtreſs and perplexity of nations, the ſea and waves roaring, men's hearts failing them for fear, &c. But, however the God of nature might thus intimate to mankind his diſpleaſure with their proceedings, it is certain they made no alteration in their conduct. The Saracens, having conquered immenſe tracts of country, engaged in civil wars among themſelves; the weſtern nations, after having tried in vain

* That ſuch accounts are not to be looked upon as entirely fabulous, may be gathered from what is related by Mr. Thomſon in his travels through Paleſtine, viz. that on the brink of the lake Aſphaltites he found numbers of "ſmall *black pebbles*, which are ſoon ſet on fire by being held in the flame of a candle, and yield a ſmoke intolerably ſtinking and offenſive; but have this remarkable property, that by burning they loſe nothing of their weight, nor ſuffer any diminution in their bulk. They are capable of taking as fine a poliſh as black marble, and are likewiſe ſaid to be met with of conſiderable ſize in the neighbouring mountains."

vain to deſtroy each other, at laſt united in a romantic deſign of conquering Paleſtine from the Infidels; while the Turks, leaving their habitations about Mount Caucaſus, where, like the vultures of Prometheus, they had for ages remained unſeen and unknown, precipitated themſelves upon the Greeks and Saracens, and laſtly, as if all hell had broke looſe at once, the Moguls, from the moſt eaſterly part of Aſia, poured deſtruction upon the countries to the weſt, even as far as Ruſſia and Poland.

All theſe events took place in a few centuries. In 844 the Turks quitted Mount Caucaſus, and ſettled in Armenia Major. In 1030 they fell upon the Saracen empire, now divided among innumerable chieftains continually at war with each other. Among theſe was one called the Sultan of Perſia, and another of Babylon. The former being worſted, called in the Turks to his aſſiſtance. They ſent him an auxiliary army of only *three thouſand* men; and from this ſlender beginning has ariſen the vaſt empire of the Ottoman Porte. The three thouſand men were commanded by a general called by the Greeks *Tangrolipix*, and by the Aſiatics *Togrul Beg*. Being a man of ability, the Sultan of Perſia, by his aſſiſtance, got the better of his adverſary; but, refuſing to let the Turks depart, Tangrolipix with his army withdrew to the deſert of Carbonitis, where, being joined by numbers of diſcontented Perſians, he began to invade the territories of the Saracens. The Sultan of Perſia ſent againſt him an army of twenty thouſand men, whom Tangrolipix ſurpriſed and defeated, acquiring at the ſame time an immenſe booty. The fame of his victory, and his wealth, procured him bands of robbers, thieves, and blackguards, from all the neighbouring countries; ſo that he ſoon found himſelf at the head of fifty thouſand. Againſt ſuch a formidable force the Sultan of Perſia marched in perſon; but happening to loſe his life in the engagement by a fall from his horſe, his men threw down their arms and acknowledged Tangrolipix to be Sultan of Perſia.

The new ſultan inſtantly thought of deſtroying other ſultans and potentates; for which purpoſe he opened a paſſage

paſſage for his countrymen from Armenia to Perſia. The Sultan of Babylon was the firſt victim; after which Tangrolipix turned his arms unſucceſsfully againſt the Arabians, but afterwards more ſucceſsfully againſt the Greek emperors. The firſt invaſion by the Turks took place in 1041; and in four hundred and twelve years they became abſolute maſters of the empire. Though unſucceſsful at firſt againſt the Saracens, they prevailed greatly afterwards, and, by the time of the cruſades, we find them maſters of Paleſtine, as well as ſeveral other countries formerly conquered by the Arabs. From the time of their firſt invaſion, in 1041, we may ſay, the war never ceaſed; and there is the greateſt reaſon to ſuppoſe that the Greek empire would have been overthrown in a very ſhort time, had not the cruſaders checked their progreſs. The immenſe numbers with whom the barbarians had now to contend (amounting to no fewer than ſeven hundred thouſand) threatened with deſtruction the newly erected empire of the Turks; and had it not been for the want of unanimity among the cruſaders themſelves, and the jealouſy of the emperors of Conſtantinople, they certainly would have overthrown it. But, as matters went, all their labour was loſt; and they only increaſed the general carnage and deſolation to an extreme degree. The firſt cruſade was planned in 1093, publiſhed in 1095, and in March 1096 the firſt army ſet out. In 1097 they began their conqueſts, but ſoon found it very difficult to keep them. The Turks being at home, and united, had many advantages over foreign invaders; which the latter endeavoured to counteract by drawing continual ſupplies of freſh men from Europe. Thus, for ſeveral centuries, the weſtern part of Aſia was rendered a ſcene of bloodſhed and deſolation. When they had contended for ſomething more than *two hundred* years, Jenghiz Khan, the Mogul, ſeems to have formed the *noble* deſign of deſtroying the whole human race at once, excepting only his own immediate followers. His plan was, to *exterminate* man, woman and child wherever he went, and to plant the countries with his own people. It is impoſſible to do juſtice to

his

his exploits. Voltaire, ſpeaking of the irruption of the Moguls, ſays, that the people fled every where before them, like wild beaſts rouſed from their dens by other beaſts more ſavage than themſelves. In the Univerſal Hiſtory we are told, that he is ſuppoſed to have deſtroyed *fourteen millions and an half* of his fellow creatures. He died in 1227, and left ſucceſſors worthy of himſelf. Some of theſe proceeded eaſtward, and ſome weſtward. The latter, under the conduct of a *monſter* named *Hulaku*, overthrew, in the year 1256, the remains of the Saracen empire, by the taking of Bagdad. The miſerable Khalif, coming forth to meet his conqueror, was trampled under his horſe's feet, then ſewed up in a ſack, dragged through the ſtreets, and thrown into the river. The Moguls who proceeded eaſtward invaded China. The Chineſe reſiſted with innumerable multitudes, and battles were fought to which thoſe of the preſent age are mere ſkirmiſhes. The ſoldiers, overcome with thirſt, drank blood inſtead of water; hundreds of thouſands fell on both ſides, while human blood ran in ſtreams for five or ſix miles. At laſt the fury of the Moguls was ſtopped by the ocean; for, having attempted the conqueſt of Japan, their fleet was wrecked, and an hundred thouſand periſhed. Like other great empires, alſo, pretenders to the ſovereignty ſtarted up, and the whole was parcelled out into a number of little ſtates, which, of courſe, ceaſed to be formidable.

The decline of the Mogul empire did not reſtore peace to the world. The Turks continued their ravages; the weſtern nations continued their cruſades. England, which became a kingdom in 806, had been ravaged and conquered by the Danes and Normans, and likewiſe diſtreſſed by civil wars. At laſt, having emerged from its own difficulties, it began to inflict upon other nations the miſeries itſelf had endured. Wales and Scotland became objects of the ambition of Edward I, who had already ſignalized his valour in the cruſade. The Welſh were totally ſubjugated, and the Scots overthrown in the very bloody battle of Falkirk, where almoſt the whole force of the country was deſtroyed. The Scots,

however, were never totally ſubdued. Robert Bruce retaliated on the Engliſh in the battle of Bannock-burn, where two hundred thouſand Engliſh were defeated by thirty thouſand Scots. But Robert was not contented with aſſerting the liberty of his country. Jealous of his brother Edward, he ſent him with an army to conquer Ireland. We ſhall not doubt of his valour, or of the miſeries he inflicted, or was willing to inflict, upon the people among whom he came. In deſtroying them he deſtroyed his own army. They were reduced to the moſt dreadful ſtraits by famine, inſomuch that they were obliged to feed upon the moſt loathſome matters, their own excrements not excepted.

Being now arrived at the beginning of the fourteenth century, we ſee that, from Ireland to China, mankind had involved themſelves in one general work of deſtruction. Beſides the wars, famines had been ſo frequent, that the eating of one another ſeemed to be but a common affair. Indeed the hiſtory of mankind would tempt one to believe that they thought themſelves brought into the world for no other purpoſe but to deſtroy each other. As far back as the year 409, in the time of the wars of the Vandals in Spain, a dreadful famine took place, which, in 410, reduced many to the neceſſity of feeding upon human fleſh; parents devoured their children, and the wild beaſts, being deprived of the dead bodies which they uſed to feed upon, but which were at this time devoured by the living, fell upon the latter, and thus increaſed the general deſtruction. Such of the Romans as fled into ſtrong holds and fortreſſes, were in the end obliged to feed upon one another. To theſe calamities the peſtilence was added, which did not fail to rage in its uſual manner. Famine and peſtilence had alſo ravaged the city of Rome when beſieged by the Goths under Vitiges, and under Totila. In this laſt ſiege the unhappy citizens were reduced to ſuch ſtraits, that they conſumed even the graſs which grew near the walls, and were at laſt obliged to feed on their own excrements. We do not indeed hear, at this time, of any particular inſtances of people feeding upon one another; though,

though, in ſuch dreadful emergences, it is ſcarcely to be doubted that ſome would have recourſe to this terrible expedient in order to allay their hunger. But in the famines which took place during the ravages of the Saracens, Turks and Moguls, nothing ſeems to have been more common. In 1066 a moſt grievous famine took place at Alexandria in Egypt, and throughout the whole country. Three buſhels and a half of flour were ſold at eighty dinars, a dog at five, and a cat at three. The Viſir, having waited on the Khalif, left his horſe at the palace gate; but, before he returned, the animal had been carried off and eaten. Three men were hanged for this theft, and their bodies ordered to be expoſed upon gibbets; but next day they were found picked to the bones, their fleſh having been all cut off and devoured the preceding night. Bodies of men and women were boiled, and their fleſh publicly ſold. A violent plague followed, which ſwept away the greateſt part of the inhabitants. As the helliſh Moguls ſpread deſolation wherever they advanced, ſo their retreats were equally formidable. In 1243, having advanced as far as Aleppo in Syria, they found themſelves obliged to retreat, and that for a very odd reaſon, viz. that their horſes were not well ſhod. This, however, did not hinder them from deſtroying every thing the earth produced, and ſtripping every man, nay, every woman, they met, even of their clothes. The conſequence was, a terrible famine, ſo that people were fain to ſell their children for ſmall pieces of bread.

Such was the conduct of men, from one end of the earth to the other, during the interval, if any interval there was, between the plague in the time of Juſtinian and that of 1346. The peſtilence, which had continually raged in one place or other, now overſpread the whole world. At what time it began to decline we know not; and, indeed, as the ſame deſolations and maſſacres continued, if theſe had any ſhare in its production, it ought ſcarcely to have declined at all. That there was all this time little or no interval, appears from what Dr. Ruſh ſays, vol. iii. p. 165, that between the years

years 1006 and 1680, that is, in a period of 674 years, the plague was *fifty-two* times epidemic all over Europe. Suppoſing the intervals between every general infection then to have been equal, and the plague to have laſted only one year at a time, it muſt have recurred once in twelve years. But the intervals were not equal; for the Doctor tells us that it prevailed *fourteen* times in the fourteenth century; which gives an interval of leſs than ſeven years; and if the peſtilence ſo frequently overſpread the whole continent, we may be very ſure that it never was out of particular places of it. The Doctor adds, "The ſtate of Europe in this long period is well known." We ſhall alſo conſider that of Aſia.

The empire of the Moguls, which had fallen into decay, revived under Tamerlane; who, following the example of Jenghiz Khan, had the epithet of the *deſtroying prince* beſtowed upon him by the Indians, on account of his behaviour in their country. Building his captives into walls with ſtones and lime, pounding them by thouſands in large mortars, was his common practice; while the Turks, proceeding weſtward, waſted every thing with fire and ſword; the chriſtians all the while continuing their mad cruſades, and when driven from one place endeavouring to eſtabliſh themſelves in another. At laſt the Turks and Tartars, or Moguls, or rather their emperors, happening to quarrel, the battle of Angora, in Galatia, decided (at the expenſe of ſome hundred thouſand lives) the diſpute in favour of Tamerlane; but, as his empire ended with his life, the Turks ſoon recovered from the blow they had received; and, by the taking of Conſtantinople in 1453, put an end to the terrible commotions which had prevailed in the eaſt for ſo many ages. The cruſades had alſo for ſome time been diſcontinued, and the world hath ſince that time been comparatively in a ſtate of peace.

But, by ſo much intercourſe with the Aſiatics, eſpecially with the countries particularly ſubject to the plague, all Europe had been ſo deeply infected, that the diſtemper could not but prevail for a long time, even though it had not been kept up by the almoſt continual

wars

wars of the Europeans with one another, which was too much the caſe. Dr. Sydenham informs us that before his time the plague commonly viſited England once in forty years; but by this we muſt underſtand a very violent infection; for Dr. Ruſh tells us that plagues prevailed in London *every year* from 1593 to 1611, and from 1636 to 1649. The author of the Journal of the Plague Year (1665) mentions a viſitation in 1656; and Mr. Carey, in the beginning of his account of the plague of London in 1665, ſays, that the plague was *almoſt continually* among the diſeaſes enumerated in their bills of mortality; ſo that we may fairly conclude it to have been *endemic* in that city. Now let us ſee how England had employed itſelf. Its kings, as well as many of their ſubjects, had gone to the holy wars, as they called them, and, by continuing in that devoted country where moſt probably the peſtilence firſt originated, it is impoſſible to ſuppoſe that ſome of them did not receive the contagion. Having caught the peſtilence in the *holy war*, they came home to diffuſe it among their countrymen, and to keep it up by *profane wars*, I ſuppoſe, both foreign and domeſtic. Henry VII put an end to a very long and bloody conteſt between the houſes of York and Lancaſter; but he brought the peſtilence along with him, which raged violently during the fifteenth and ſixteenth centuries. A moſt violent war, for half a century, on the continent of Europe, and civil wars in England, would ſtill continue to keep the infection alive from 1600 to 1648, when a general peace was concluded; and from the ſubſequent ſtate of tranquillity, probably, after the violent attack in 1665, it ſeems to have languiſhed and died in England, as a plant in a ſoil not natural to it.

But, though England has ſince remained in peace, on the continent it has been otherwiſe. In the beginning of the eighteenth century, the heroic madneſs of Charles XII ſeemed ready to confound the north, while the glorious exploits of prince Eugene and the duke of Marlborough appeared equally confounding to France. In the midſt of theſe grand atchievments, the peſtilence ſilently

ſilently claimed its ſhare in the common work of deſtruction; carrying off upwards of two thouſand in a week for ſome time, in 1709, in the city of Dantzick, and, in 1711, twenty-five out of ſixty thouſand inhabitants in Copenhagen.

The infection, however, ſeemed now to be retiring to the place from whence it originally came. In 1666, or ſoon after, it ſeems to have totally abandoned the iſland of Britain; with the attack in 1711 it left the weſtern countries of the continent next to that iſland; in 1713, 1714 and 1715 we are informed by baron Van Swieten that it ravaged Auſtria; in 1721, or ſoon after, it abandoned France; in 1743 it made its laſt attack on Meſſina; and in 1784 we find it confined to Dalmatia and the eaſtern territories, where it has ſo long reigned without interruption.

From the view then which we have taken of the conduct of the human race, and the conſequences of that conduct, we may reaſonably conclude, that war will produce famine and peſtilence, and that after all violent wars a violent peſtilence may be expected, eſpecially if the contending parties interfere with thoſe nations where it is moſt frequent. Another piece of conduct by which mankind expoſe themſelves to peſtilential contagions is, the practice of cooping themſelves up in great cities. Mr. Gibbon, ſpeaking of earthquakes, ſays, that men, though always complaining, frequently bring miſchief upon themſelves. "The inſtitution of great ci-
"ties (adds he) which encloſe a nation within the limits
"of a wall, almoſt realiſes the wiſh of Caligula, that the
"Roman people had but one neck. In theſe diſaſ-
"ters (earthquakes) the architect becomes the enemy
"of mankind. The hut of a ſavage, or the tent of an
"Arab, is thrown down without injury to the inhabi-
"tant; and the Peruvians had reaſon to deride the
"folly of the Spaniſh conquerors, who with ſo much
"coſt and care erected their own ſepulchres. The rich
"marbles of a palace are daſhed on his own head, a
"whole people is buried under the ruins of public or
"private edifices, and the conflagration is kindled and
"propagated

"propagated by innumerable fires neceſſary for the "ſubſiſtence and manufactures of a great city." In plagues, great cities are unqueſtionably as pernicious as in earthquakes; not indeed by reaſon of the weight and bulk of the materials, but the confinement of the people within the ſphere of infection, and their continual expoſure to the cauſes which prepare the body for receiving it. In fact, it has always been found that plagues begin in cities; and were it not for the multitudes that continually fly out of them there can be no doubt that the mortality would be much greater than it is. The intercourſe of many nations with one another, the carrying from one end of the earth to the other of goods capable of bringing with them the infection, muſt alſo be ſuppoſed a very principal cauſe of peſtilence; but this laſt will be more fully conſidered in the next ſection. At preſent we may conclude, that, the peſtilential contagion having originally fallen upon mankind for their ſins, it is ſtill kept alive by the ſame cauſes; and, as far as we can conjecture, theſe ſins are, the propenſity to murder and deſtroy which breaks forth in war; the vanity, pride and luxury which produces great cities; and the ſame vanity, &c. joined with avarice, which gives life to commerce. Add to all this the neglect of the cultivation of the earth, which ought to be the principal buſineſs of man. In conſequence of this neglect, immenſe tracts of it are ſtill overrun with woods, covered with ſtagnant and noxious waters, or lying in waſte and now uninhabitable deſerts, fit only for ſerpents and the moſt deſtructive animals. Thus the very climate is changed from what it ought to be; the elements become hoſtile to man in an extreme degree, and the whole ſyſtem of nature, originally deſigned to give life and happineſs to the human race, is, through their own miſconduct, changed into a ſyſtem of miſery, diſeaſe and death.

The account juſt now given of the ways in which mankind bring upon themſelves the plague, and other diſeaſes almoſt equally terrible, is ſo conformable to the opinions of the learned Dr. Mead, that I ſhall conclude this

this ſection with a few extracts from his works. Of the ſmall pox he ſays, that he ſuppoſes this "to be a plague "of its own kind, originally bred in Africa, and more "eſpecially in Ethiopia, as the heat is exceſſive there; "and thence, like the true plague, was brought into "Arabia and Egypt, after the manner above men-"tioned" (i. e. by war and merchandiſe.) "Now (adds "he) if any one ſhould wonder why this contagion was "ſo long confined to its native ſoil, without ſpreading "into diſtant countries, I pray him to conſider, that "foreign commerce was much more ſparingly carried on "in ancient times than in our days, eſpecially between "Mediterranean nations; and likewiſe that the ancients "ſeldom or never undertook long voyages by ſea, as we "do. And Ludolfus obſerves, that the Ethiopians in "particular were ignorant of mercantile affairs. There-"fore when in proceſs of time the mutual intercourſe of "different nations became more frequent by wars, trade "and other cauſes, this contagious diſeaſe was ſpread "far and wide. But, towards the end of the eleventh "century, and beginning of the twelfth, it gained vaſt "ground by means of the wars waged by a confederacy "of chriſtain powers againſt the Saracens, for the re-"covery of the Holy Land; this being the only viſible "recompenſe of their religious expeditions, which they "brought back to their reſpective countries." Of the true plague he ſays, "It appears, I think, very plainly, "that the plague is a real poiſon, which, being bred in "the ſouthern parts of the world, is carried by com-"merce into other parts of the world, particularly into "Turky, where it maintains itſelf by a kind of circu-"lation from perſons to goods; which is chiefly owing "to the negligence of the people there, who are ſtupid-"ly careleſs in the affair: that, when the conſtitution "of the air happens to favour infection, it rages there "with great violence; that at that time, more eſpecially, "diſeaſed perſons give it to one another, and from them "contagious matter is lodged in goods of a ſoft, looſe "texture, which, being packed up and carried into other "countries, let out, when opened, the impriſoned ſeeds

"of

" of the contagion, and produce the diſeaſe whenever the " air is diſpoſed to give them force ; otherwiſe they may " be diſſipated without any conſiderable ill effects. The " air of our climate is ſo far from being ever the original " of the true plague, that moſt probably it never produces " thoſe milder infectious diſtempers, the ſmall pox and " meaſles. For theſe diſeaſes were not heard of in " Europe before the Moors had entered Spain ; and, as " already obſerved, they were afterwards propagated and " ſpread through all nations, chiefly by means of the " wars with the Saracens. The ſweating ſickneſs was " moſt probably of foreign original. It began in the " army with which king Henry VII came from France, " and landed in Wales ; and it has been ſuppoſed by " ſome to have been brought from the famous ſiege of " Rhodes, three or four years before, as may be collected " from one place of what Dr. Keyes ſays in his treatiſe " on the diſeaſe. We had here the ſame kind of fever " in 1713, about the month of September, which was " called the *Dunkirk fever*, as being brought by our " ſoldiers from that place. This, probably, had its origi- " nal from the plague which broke out at Dantzick a " few years before, and continued ſome time among the " cities of the north."

I now take leave, for the preſent, of this ſubject, which exhibits the conduct of mankind in ſuch a diſagreeable view. Some, like M. Millot above quoted, may be apt to ſuppoſe that many of the accounts are exaggerated. But it is evident, that in our days it is impoſſible to determine any thing to be a falſehood, ſaid to have happened in former ages, which is not abſolutely contradictory to reaſon. Every one of the accounts inſerted in this ſection has found a place in the works of hiſtorians reckoned authentic, particularly in the Univerſal Hiſtory. All who believe the New Teſtament muſt certainly believe, from the words of our Saviour, that extraordinary things were to happen in the ages ſubſequent to his appearance. Can we then diſcredit the relations of thoſe hiſtorians who inform us that extraordinary things have happened ? Modern hiſtorians,

making their own judgments the infallible meaſure of wiſdom, and the ſtrength of nations now exiſting the ultimate meaſure of human power, have endeavoured to turn into ridicule every thing which does not preciſely accord with theſe two. In this the French are particularly culpable; accounting every thing to be incredible which exceeds the power of modern France to accompliſh, though they certainly do not know even the extent of this power. Of ſuch ſcandalous vanity we have a notable inſtance in the works of preſident Goguet, who poſitively determines that the walls of ancient Babylon, the pyramids of Egypt, and all the wonderful works of Semiramis, Nebuchadnezzar, &c. were not equal to the canal of Languedoc made by Louis XIV!

SECTION III.

Of Diſeaſe in general.—The nature of the Plague as a Diſeaſe conſidered.—Of Contagion.—Whether the Plague is really Contagious or not.—Medical Hiſtory of the Diſtemper.—Inquiry into its Immediate Cauſes, and whether an approaching Plague is indicated by any viſible Signs.

HITHERTO we have conſidered the origin of the plague entirely in a moral point of view. We have ſeen, that, in conformity to the general opinion of mankind, it may reaſonably be ſuppoſed to have been inflicted upon mankind, the Jews particularly, for their tranſgreſſions; that, having been once introduced, it has been perpetuated, and ſpread from nation to nation, and that in proportion to the degree of immorality of a certain kind prevailing through the world. From this it is naturally to be inferred, that, were the human race to live at peace with one another, to diſperſe themſelves over the face of the earth for the purpoſe of improving it by cultivation, and were they to be contented with what the produce of each country affords, there would be no plague among them. But we know that

that ſuch a reformation is not to be expected, and we muſt take the world as we find it. The queſtion then is, By what means ſhall individuals ſecure themſelves from being deſtroyed by a plague which ſhall happen to invade any country; or how ſhall a perſon, already infected with it, be reſtored to health? For this purpoſe let us begin with conſidering the nature of diſeaſe in general, and of the plague particularly.

As to diſeaſe in general, phyſicians have differed very conſiderably in their definitions; and, though many have been given, few ſeem to be unexceptionable. that of Dr. Fordyce ſeems to be among the cleareſt and moſt expreſſive. "Diſeaſe (ſays he) is ſuch an alteration in the chemical properties of the fluids or ſolids, or of their organization, or of the action of the moving powers, as produces an inability or difficulty of performing the functions of the whole or any part of the ſyſtem, or pain, or preternatural evacuation." But as this definition, however juſt, cannot be eaſily underſtood by ſuch as are unaccuſtomed to medical language, I ſhall attempt the following explanation of the animal economy, and the diſeaſes to which it is ſubject.

1. By nature our bodies are formed of certain ſolid and fluid parts, operating upon one another in a manner of which we know but little. Anatomiſts have deſcribed the ſtructure of the human body and its parts in a certain degree, but have always found themſelves loſt in an inconceivable minuteneſs of texture. The whole ſtructure of the human body, viſible and inviſible, is called its ORGANIZATION.

2. This organized body is acted upon by certain powers reſiding in the atmoſphere, by which it becomes endowed with LIFE.

3. The operation of thoſe powers upon a well organized body conſtitutes that agreeable and vigorous ſtate which we call HEALTH.

4. The operation of any other power, ſubſtituted in place of the natural one, even upon a body perfectly organized, produces a ſtate very different from health; commonly

commonly attended with ſome uneaſy ſenſations, and which is called DISEASE. I ſay it is *commonly* attended with uneaſineſs, but not always; for many perſons within a few hours, nay, a few minutes, of their death, have imagined themſelves quite recovered and well. To illuſtrate the meaning of what is ſaid of the ſubſtitution of any power inſtead of the natural one: It is natural for man to breathe air of a certain quality; and while he does ſo he continues in health; but let him breathe the vapour of burning charcoal, or of fermenting liquor, mixed in conſiderable quantity with the air to which he has been accuſtomed, and he will very ſoon find himſelf diſeaſed. Many other kinds of elaſtic fluids may be ſubſtituted inſtead of the vapour juſt mentioned, all of which will in a ſhort time produce a diſeaſe in the moſt healthy man. The ſtate of a diſeaſed body being very different from that of a ſound one, the appearances are conſequently very different. The various appearances of diſeaſe in the human body are called *ſymptoms* of that diſeaſe, from a Greek word ſignifying *appearance*.*

5. A diſeaſe proves mortal only by the DISORGANIZATION of the body. By diſorganization I mean any conſiderable alteration in the ſtructure of the body, viſible or inviſible. The truth of this will appear from a conſideration of the method by which animals may be recovered, after being to appearance dead by breathing the vapour of charcoal, or fixed air in any other form, viz. by plunging them in cold water. In a cave in Italy a continual ſtream of this kind of air iſſues from the ground. It riſes but a ſmall way, ſo that a man may ſafely enter, becauſe his head is above the vapour; but, if he brings a ſmall dog with him, the animal, in conſequence of breathing the pernicious fluid, falls down as if dead, and would very ſoon die if left there. By throwing it into a lake in the neighbourhood, (cold water of any kind would anſwer as well) it recovers. In the

* "*Symptom* (ſays Dr. Fordyce) is the Greek name for *appearance*:" but, from the ſtrict etymology of the word, it ought rather to be tranſlated *accident*. The univerſal conſent of phyſicians, however, has applied it to every appearance produced in the human body by any diſtemper whatever.

the diſſection of ſome unfortunate people, who have been killed by breathing this pernicious fume, a manifeſt diſorganization has been obſerved, viz. a rarefaction of the blood, and too great dilation, or even rupture, of the ſmall veſſels.

6. A diſeaſe cannot always be cured by removing the cauſe which brought it on: it is neceſſary alſo to repair the injury done to the organization. This is exemplified in the caſe of the dog juſt mentioned. Taking him out of the vapour is not ſufficient for his recovery, becauſe the organization of the body is injured; the cold water by contracting the veſſels repairs the injury, and the cure is completed. To the entire preſervation of this organization it is probably owing, that people have frequently recovered after being thought dead for a long time.*

7. When

* Dr. Anthony Fothergill, in his prize diſſertation upon the ſuſpenſion of vital action, quotes ſome experiments of Dr. Kite, in which he was able to reſtore to life animals that had been immerſed in water for eight, ten or twelve minutes, though he acknowledges that this operation, though performed with great attention, often failed; while other animals, that had been longer immerſed, recovered ſpontaneouſly. He further adds, that if it be not attempted before the convulſions of the animal ceaſe, which on an average of many experiments happens in about eleven minutes and a half, it will not be ſufficient to renew the vital motions. But, "among the human ſpecies "(ſays Dr. Fothergill) there are not wanting well authenticated inſtances of "ſpontaneous recovery at an incomparably longer interval, and after every ex-"ternal mark of life had diſappeared. Such is the latent energy of the heart, "that it ſometimes, after remaining ſeveral hours quieſcent, renews on a ſudden "the ſecret ſprings of life, ſurmounts the barriers of the reſiſting blood, and "reſtores circulation with all the other functions. Hence the unexpected re-"coveries from death-like ſyncope brought on by ſudden terror, or great effu-"ſions of blood, even after the funeral obſequies have been prepared. Hence "ſome perſons have accidentally been brought to life, even after interment, by "the rude motion produced in ſacrelegious attempts to wreſt rings or brace-"lets from the apparently dead body."

Several ſurpriſing inſtances of the recovery of perſons ſuppoſed to be dead, even of the plague, are given by Fabricius Hildanus; to one of which Dr. Fothergill ſeems to allude in the above quotation. Hildanus relates, that in the year 1357, when the plague raged violently at Cologne, a certain noble lady, by name *Reichmuth Adoleh*, being ſeized with the diſeaſe, was thought to have died, and was buried accordingly. Her huſband, out of affection, would not take off her wedding ring, which ſhe happened to have on her finger. The undertakers being acquainted with this circumſtance, next night came to the church where ſhe was buried, opened the ſepulchre, and prepared to take off the ring; when to their utter aſtoniſhment ſhe began to raiſe herſelf up in the coffin. Struck with conſternation they fled in the utmoſt haſte, leaving to the fortunate lady the lanthorn with which they lighted themſelves to the church, and by means of which ſhe now found out where ſhe was, and after being come to herſelf, returned to her own houſe. Here being known by her voice, and the ring ſhe wore, ſhe found admittance, and by means of a generous diet gradually regained her health; bringing her huſband afterwards three children, and ſurviving the accident many years.

7. When the organization of the body is injured, the action of the natural powers themſelves occaſions uneaſineſs, and increaſes the diſeaſe. The cure then is, to ſubſtitute inſtead of the natural power, as far as poſſible, the action of ſome other power till the organization is reſtored; after which the natural power muſt be again allowed to act, or a diſeaſe of another kind will take place. This may be exemplified in a conſumption of the lungs; where, that part being very much diſorganized, pure air renders the diſeaſe worſe; and the ſick are relieved by mixing with the common atmoſphere ſuch kinds of air or vapour as would prove pernicious to people in health. But, ſuppoſing this method to be ſucceſsful, and the conſumption to be entirely removed, it is plain that the uſe of the pure atmoſphere muſt be reſumed, or the impure air would bring on a diſeaſe in the ſame manner as on a healthy perſon.

8. The body is waſted in the natural operations of life; part of it paſſing off with the vapour of the breath, part by inſenſible perſpiration, &c. Hence it naturally tends to diſorganization and death, unleſs the waſte be repaired.

9. This natural waſte of the body is repaired, and health kept up, by the food and drink taken into the ſtomach.

10. Hence

A ſecond inſtance no leſs remarkable is of a woman of the name of *Nicolle Lentille*, who, being ſuppoſed dead of the plague, had been thrown into a pit with a great number of the bodies of others, dead of the ſame diſtemper. After lying there a whole night, ſhe came to herſelf in the morning, but neither knew at firſt where ſhe was, nor, when ſhe did, could ſhe find any means of eſcaping, or extricating herſelf from the heap of dead bodies with which ſhe was oppreſſed. Being at a diſtance from any houſe, her cries were of no avail, and, in the mean time, having taken no nouriſhment for four days, ſhe was ſo tormented with hunger that ſhe eat part of the cloth which covered her face. At laſt, after remaining twenty-four hours in this dreadful ſituation, the pit being opened to bury ſome other perſon, ſhe exerted her utmoſt endeavours in calling for aſſiſtance, and at laſt was heard by thoſe who ſtood round. Being taken up and brought home, ſhe preſently recovered, and lived ſeveral years after.

A third example is given by our author of one who, being carried to a church to be buried, had his face previouſly ſprinkled with holy water by a prieſt. But this was no ſooner done than he ſhuddered and opened his eyes in a fright; on which he was carried home, recovered, and lived eight years after. Other examples might be brought, but theſe are ſufficient to ſhow what dreadful accidents may enſue from early burials, and how cautious people ought to be in conſigning their friends and relations to the duſt from whence they were taken.

10. Hence ariſes another ſet of diſeaſes; for as the reparation of the waſte, juſt mentioned, depends on the proper action of the ſtomach upon the food, and the aſſimilation of the latter with the ſubſtance of the body, it is plain that this operation depends both on the proper quality of the food, and the ſound ſtate of the ſtomach itſelf.

11. The body is compoſed of ſolids and fluids of different kinds, every one of which is ſubject to diſeaſes peculiar to itſelf; but, by reaſon of the connexion of the parts of the body with one another, it is impoſſible that any one can be very much diſordered without affecting all the reſt. As the bond of connexion, however, is in many caſes totally inviſible to us, ſurpriſing inſtances frequently occur of one part being affected in conſequence of an injury done to another very diſtant from it. This connexion between all parts of the body is called SYMPATHY. Dr. Gardiner of Edinburgh, in his obſervations on the animal economy, &c. ſays, that "the ſtomach is the principal ſeat of many of "the moſt remarkable ſympathetic affections which "happen in valetudinary ſtates of the body. Every "diſorder accompanied with ſevere pain affects the ſto-"mach, whilſt this viſcus affects not only in its diſ-"eaſed ſtate every part of the ſyſtem, but at other "times the effects of healthful ſtimuli applied to it are "inſtantly communicated to the reſt of the body, as "when we take food, wine, or medicine." Dr. Darwin in his Zoonomia informs us that the ſtomach is ſaid to ſympathize with almoſt every part of the body; but Dr. Moore, in his medical ſketches, tells us that the *heart* poſſeſſes a greater ſhare of ſympathy than any other part in the body, and next to it the ſtomach.*

12. The

* Dr. Gardiner, in his obſervations above quoted, gives the following curious anecdote. "An unmarried lady, of a healthy conſtitution, has ſuch a "peculiarity in the ſtructure of her nerves, that, though ſhe can, in general, "bear ſtrong odours as well as moſt people, yet ſhe cannot ſuffer a roſe to be in "her boſom, or to hold it in her hand a few minutes, without becoming "faint, and having an inclination to vomit. Conſerve of roſes, roſe-water, "and ſimilar articles made from roſes, have more powerful effects upon her, "and uſually excite vomiting. Going into a room where any of her com-"panions are waſhing with roſe-water, never fails to produce this effect; nor "does ſhe recover of her indiſpoſition in leſs than two hours."

12. The ſolid parts of the body are the bones, the muſcles, brain and nerves; the fluids are, the blood, and others produced from it. The bones are known to every one; the muſcles are the fleſhy parts throughout the whole body; and the nerves are a kind of cords ſeemingly originating from the brain, and from thence accompanying the blood veſſels through all parts of the body.

13. Much has been diſputed about what is to be accounted the primary part of the body, on which all the reſt depend; and one claſs of diſputants have arranged themſelves on the ſide of the *blood*, and the other on that of the *nerves*. The diſpute is like one about the beginning of a circle. It cannot be decided, becauſe the blood cannot act without nerves, nor the nerves without blood. I ſpeak of the human body, being aware that in ſome animals the poſition may be controverted. The following is a conciſe ſtate of the matter.

14. All the blood in the body paſſes through the heart; which has four cavities; two called *ventricles*, and two *auricles*. Theſe, from their poſition in the body, are called the *right* and *left*. The right ventricle communicates with the right auricle, as does alſo the left ventricle with the left auricle; but there is no communication between the right ventricle and the left, nor between the right auricle and the left. Through theſe cavities all the blood paſſes to every part of the body, and returns from every part; but, as in the former caſe, we are here at a great loſs where to begin its motion; for this is preciſely to find the beginning of a circle. As we muſt begin ſomewhere, however, we ſhall do ſo with the right ventricle of the heart. This receives the blood returning from all parts of the body, and propels it into the right ventricle; not the whole quantity at once, for it cannot contain one half of it; but by degrees. The auricle contracts as ſoon as it is full; and in the time that the auricle fills, the ventricle contracts, ſo that it may be empty, and ready to receive the blood from the auricle. By the contraction of the right ventricle

tricle the blood is driven into the pulmonary artery, and paſſes into the lungs. Here the artery branches into an infinite number of ſmall veſſels much finer than hairs; and theſe again, uniting into larger trunks, form at laſt the pulmonary vein, which brings back the blood to the heart. The pulmonary vein is inſerted into the left auricle of the heart, which, as ſoon as it is filled with blood, contracts, and expels the blood from it into the left ventricle. From the left ventricle iſſues a large artery called the *aorta*, which by its branches ſupplies the whole body with the vital fluid. In all parts of the body the arteries divide themſelves into innumerable ſmall branches, which terminate in veins equally ſmall as in the lungs; but it has been diſputed whether the arteries and veins actually join each other in the form of veſſels, or whether the arteries depoſit the blood in ſmall cells, from which the veins ſuck it up. The diſpute is of no conſequence, nor can it be abſolutely decided, on account of the exceeding ſmallneſs of the veſſels; though the microſcopical obſervations are rather favourable to the opinion of a continuation of veſſels. The veins from all parts of the body unite into larger veſſels, and theſe again uniting with one another, form at laſt one very large vein called the vena cava, which opens into the right auricle of the heart, from which the circulation goes on as already deſcribed. The two ventricles of the heart, and all the veins throughout the body, are furniſhed with a kind of valves, which allow the blood to proceed in the way of circulation, but prevent its returning in a contrary direction.

15. The lungs, through which all the blood in the body paſſes, receive likewiſe the air which we draw in every time we breathe. They conſiſt of two large bodies called *lobes*; from their ſituation called the right and left. The air is conveyed into them by the wind-pipe, called alſo the *trachea*, and the *aſpera arteria*. On entering the cavity of the breaſt, the wind-pipe divides into two large branches called the *bronchiæ*; one of which goes to the right and the other to the left lobe of the lungs. By the further diviſion and ſubdiviſion of

theſe veſſels the lungs are filled with an innumerable multitude of little tubes, terminating in exceedingly minute bladders or cells, which are the final receptacles of the air ſucked in when we breathe. Each of theſe cells is ſurrounded with a kind of network of blood-veſſels exceedingly ſmall, and conſiſting of very thin membranes; ſo that, in paſſing through the lungs, the blood is expoſed as much as poſſible to the action of the air.

16. It is a matter of great importance to find out what is the uſe of this expoſure of the blood; and great diſputes have taken place concerning it. In former times it was ſuppoſed that the blood received from the air a *vital ſpirit*, without which it would have been totally incapable of performing its offices in the body. Later phyſiologiſts endeavoured to explode this notion. Dr. Hales particularly, by ſhewing that the circulation of the blood through the lungs might be continued by inflating and contracting them alternately by the fumes of burning brimſtone, endeavoured to prove that the uſe of the air was only to give the lungs an opportunity of dilating and contracting alternately, by which means principally he thought the circulation might be carried on. This continued to be the moſt common hypotheſis as late as the time of Dr. Huxham. It was however thought alſo that by the compreſſion of the air the blood was altered in its texture, its bulk, &c. Accordingly Dr. Huxham tells us in the preface to his treatiſe on air and epidemic diſeaſes, that "air fit for reſpiration "ought neither to be too hot, nor very cold; for the "uſe of the inſpired air is to temperate the blood, which "would otherwiſe grow too hot, and putrefy, as is evi-"dent from the experiment of the moſt excellent Boer-"haave made in a hot houſe; for, if the air is more hot, "or even equally hot, as the blood of any animal, it cer-"tainly ſoon dies."*

17. The modern diſcoveries in the compoſition of air, have tended greatly to elucidate the uſe of this fluid in the lungs, and its action on the blood in reſpiration. Dr.

* This certainly does not hold good if we ſuppoſe the heat of the atmoſphere to be indicated by a thermometer; for we are aſſured that animals can live in a heat much ſuperior to that which raiſes the mercury to 97.

Dr. Prieſtly firſt determined it to be what he terms a *phlogiſtic proceſs*, i. e. a proceſs by which the parts of the blood no longer proper to be retained among the reſt, or at leaſt ſome of them, are carried off. That *ſomething* is carried off either from the lungs themſelves, or from the blood circulating through them, is evident; for the air which is taken into the lungs in a dry ſtate, comes out of them extremely moiſt, and loaded with vapour. An eſſential change is alſo made in the nature of the air itſelf; for it now aſſumes in a great meaſure the nature of what has been called fixed air, or the fume of charcoal, or fermenting liquor, and thus becomes unfit for being breathed a ſecond time. This change is made by the addition of ſome terreſtrial ſubſtance to the pure atmoſphere, which the latter volatilizes and carries along with it.*

18. But, whatever may be *carried off* from the blood, during its paſſage through the lungs, ſomething is certainly *added* to it, for the blood in the pulmonary artery is of a dark red, but when it has undergone the action of the air in the lungs, and returns by the pulmonary vein, it is then of a bright ſcarlet, which colour it retains through all the arteries of the body, but loſes it on its return through the veins. This ſcarlet colour is communicated to blood in all caſes when expoſed to the air; and Dr. Prieſtley has obſerved that it is acted upon by the air even through a bladder; much more then muſt it be ſo through thoſe very thin membranes which form the coats of the fine pulmonary veſſels. What this ſubtile matter is which the blood receives, ſhall be afterwards inquired into; at preſent it is ſufficient to take notice that it is abſolutely neceſſary, for the purpoſes of life, that the blood ſhould paſs through the lungs: for, as Dr. Huxham obſerves, "we ſee neither "nutrition, nor the motion of the muſcles, performed by

* The diſcoveries of modern chemiſts have determined that the aerial fluid, termed *fixed air* or *carbonic acid*, and which is nearly the ſame with the vapour ariſing from fermenting liquor, and is alſo largely contained in the fume of burning charcoal, is not a ſimple but a compound ſubſtance; one part conſiſting of the pure part of the atmoſphere, or *oxygene*, the other of real charcoal. The proportions, according to M. Chaptal, are 12,0288 parts of charcoal to 56,687 of oxygen.

" by any blood that hath not paſſed through the lungs; " this is obſervable from the coronary arteries* to the " ultimate ramifications of the aorta." As the previous circulation of the blood through the lungs therefore is abſolutely neceſſary to the growth and life of the body, and as the blood certainly receives *ſomething* from the air, we muſt account this a proof, and no inconſiderable one, that the air contains a *vital ſpirit*, which it imparts to the blood in the lungs. But, before we proceed farther on this ſubject, it is proper to take ſome notice of

19. *The nerves.* Theſe, which conſtitute ſuch a remarkable and important part of the human body, are white cords, of a ſoft pulpy ſubſtance, defended by a tough ſkin which goes along with them as far as they can be traced. All the nerves either originate from the brain, or terminate in it. The former doctrine hath been generally adopted, and in conformity to that doctrine the following account of the nerves is laid down. The brain is encloſed in the cavity of the ſcull, but not without the intervention of two membranes, called the *dura* and *pia mater*, to prevent injury from the hard bones, as well as for other purpoſes. The brain is divided into two lobes, the right and left. It is compoſed of two different kinds of ſubſtance, the outermoſt called the cortical, the innermoſt the medullary ſubſtance; the latter ſeems compoſed of fine fibres. The whole of the medullary part of the brain terminates in a ſubſtance called the *cerebellum*, very much reſembling the brain, but ſmaller. The cerebellum terminates in another ſubſtance reſembling the medullary part of the brain, called the *medulla oblongata*. The cerebellum lies in the back part of the head, and the medulla oblongata under it. The latter terminates in the ſpinal marrow, extending from the lower and back part of the head to the lower extremity of the back bone, and is encloſed in the hollow of that bone. The nerves proceed from theſe four ſubſtances, viz. the brain, the cerebellum, the medulla oblongata, and ſpinal marrow. As they paſs to all parts

* The name of the veſſels by which the heart itſelf is ſupplied with blood. Theſe come from the aorta by the circuitous way of the lungs.

parts of the body they accompany the arteries, dividing with them into innumerable ſmall branches; but they do not return with the veins; ſo that they ſeem not to contain any fluid which goes and comes, or which circulates like the blood. The nervous fluid, if any ſuch there be, ſeems to move conſtantly one way, either to the brain or from it.

20. Hitherto we have noticed only things which are evident to our ſenſes, and which the induſtry of anatomiſts has abundantly evinced; but now our ſubject renders it neceſſary to ſtep aſide a little into the obſcure regions of theory and conjecture. The muſcles, as we have formerly ſaid, are the fleſhy parts of the body; and by them all the motions of the body are performed. The fleſh is diſtributed into diſtinct portions, each of which is encloſed in a membrane belonging to itſelf. Each of theſe portions is a muſcle, and each muſcle has a branch of an artery and the branch of a nerve belonging to it. On both theſe the action of the muſcle depends; for, if we cut the nerve belonging to a muſcle, it immediately loſes all power of action; and if we cut the artery which accompanies the nerve, it does the ſame. As therefore the blood is found to receive *ſomething* from the air, and as it loſes this when paſſing through the arteries, and as the nerves loſe their power when the communication with the blood is cut off, it ſeems extremely probable, that what is imbibed by the blood in the lungs is taken up by the fine ramifications of the nerves, and is no other than the immediate principle of life and ſenſation. Thus we will eſtabliſh a doctrine directly oppoſite to that commonly received; for, inſtead of ſuppoſing that the nerves originate from the brain, we are now led to ſuppoſe that they terminate in it. Inſtead of ſuppoſing that the ſenſations originate in the brain, we will be led to ſuppoſe that every ſenſation originates in the organ appointed for that ſenſation. Thus we are conſcious that our *eyes*, not our *brain*, are the parts of our body which immediately perceive the light; our fingers, or any other parts of the body, *feel* what is applied to them; and of conſequence we have

reaſon

reaſon to believe that the *animal ſpirits*, *nervous fluid*, or whatever we pleaſe to call it, proceed from the ſurface of the body inwards to the brain, not outwards from the brain to the ſurface of the body. The brain itſelf ſeems to reſemble a large collection or reſervoir of water, in which the ſenſations, like ſo many ſmall ſtreams from every part of the body, unite, and in which our intellectual faculties reſide in a manner totally inexplicable by us. Thus far it ſeemed neceſſary to theoriſe, in order to form ſome idea, however obſcured, of the connexion between the nerves and our ſenſitive and intellectual, or, if we pleaſe to call them ſo, our *ſpiritual* faculties.

21. In conſequence of this very intimate connexion between the blood and nerves, it is eaſy to ſee that any injury done to the one may very greatly affect the other; and that a very ſlight, nay, to us imperceptible, change in the organization of either, may produce the moſt grievous, and even incurable diſorders throughout the whole body, or in any particular organ. Let us now conſider a little farther the blood-veſſels.

22. It hath been a queſtion, whether in the ſtructure of theſe veſſels nature hath obſerved an exact proportion. For inſtance, if the blood paſſes by a kind of ſtarts through four cavities, as we are aſſured that it does, it ſeems natural to ſuppoſe that theſe four ſhould be exactly equal. This, however, hath been denied; and ſome, from its accommodating the human frame to their theory, have fancied that they ſaw the uſe of ſuch diſproportionate work. Dr. Huxham expreſſes himſelf in the following words: "Nor doth the air only refrige-
"rate the blood, but, by preventing its too great ebul-
"lition, and condenſing it, hinders it from burſting the
"veſſels. This indeed is of exceeding great importance,
"if, with the very learned *Helvetius*, we ſuppoſe the capa-
"city of the right ventricle of the heart to be greater
"than that of the left, and that the pulmonary arteries
"are larger than the correſpondent veins; for it thence
"follows, that the blood ought to be conſiderably con-
"denſed by the inſpired air, that an equal quantity of
"blood may be received, in one and the ſame time, by
"the

" the pulmonary veins and left ventricle of the heart, " that is thrown off from the right ventricle, and " through the more capacious pulmonary arteries. This " indeed many deny, aſſerting quite the contrary. It is " neceſſary, however, that the aorta ſhould receive as " much blood from the left ventricle of the heart, as is " thrown off from the right ventricle through the pul- " monary artery; and that in the very ſame and equal " time, or a fatal deluge would ſoon overwhelm the " lungs, becauſe the contraction of each ventricle is " made at one and the ſame time; we always find " therefore the aorta and pulmonary artery, in a natural " ſtate, equal on this account; alſo the capacity of the " ventricles ought to be equal, that they may receive, " in one and the ſame ſpace of time, equal quantities of " blood," &c.

If any thing farther is neceſſary upon this ſubject, we may ſtill obſerve, that if the blood were at all condenſed by the air, it would be ſo unequally, becauſe the air is at ſome times much colder than at others; and thus the diſproportion of the cavities of the heart to one another could not fail of producing the moſt diſagreeable if not fatal effects. We often ſee what terrible conſequences enſue upon the enlargement of any part of an artery near the heart; and theſe would, ſometimes at leaſt, be felt by every individual.*

It is true, indeed, that this objection will in ſome degree hold, even though we ſuppoſe all the cavities of the heart

* But there is a ſtill more egregious blunder, and this the more ſurpriſing as it has been very general among phyſiologiſts, viz. that when an artery branches into two the capacity of the branches taken together is greater than that of the trunk. This would make the whole arterial ſyſtem one continued *aneuriſm*,* and, inſtead of promoting the circulation of the blood, would in the moſt effectual manner prevent it. In what manner an error ſo extraordinary in its nature could paſs the mathematical phyſicians of the laſt century, I cannot imagine; but certain it is, that, in the year 1780 or 1781, the Edinburgh College were ſchooled on this ſubject by one of their own ſtudents named *John Theodore Vander Kemp*, a Dutchman. This gentleman found, by accurate menſuration, that when an artery divides, if the diameters of the two branches are made the two ſhorter ſides of a right-angled triangle, the diameter of the trunk will be the hypothenuſe; and thus, as the areas of circles are to one another in proportion to the ſquares of their diameters, the ſum of the areas of the two branches will be equal to the area of the trunk. On looking into Blumenbach's phyſiology, I find the ſame remark.

* An aneuriſm is a preternatural enlargement of an artery. The blood ſtagnates in that place, and at length eats through the fleſh and ſkin.

heart to be equal, and the capacities of the blood veſſels to be perfectly uniform throughout the whole body. For, if we ſuppoſe the blood to be at all condenſed in the lungs by the coldneſs of the atmoſphere, it muſt undoubtedly follow, that while paſſing from them it occupies leſs ſpace than before it arrives at them. Hence the pulmonary vein, the left auricle of the heart, the left ventricle, the aorta, and all the reſt of the arteries for a conſiderable way, muſt be comparatively empty, even though they receive as much fluid as fills the vena cava, right auricle and ventricle of the heart, and pulmonary artery. The equality which ought to prevail in the ſyſtem, and which indeed cannot be diſpenſed with, can only take place in thoſe remoter branches of the arteries in which the blood has reaſſumed its former ſtate of dilation or rarefaction.

23. If we conſider this matter attentively, we ſhall find it not a little myſterious. Every time we breathe out the air we have ſucked into our lungs, a conſiderable quantity of moiſt vapour is breathed out along with it; but it has been proved by undeniable experiments that the emiſſion of aqueous vapour from any ſubſtance cools it in proportion to the quantity of vapour emitted. Every breath we draw, then, cools the lungs, and conſequently the blood, to a certain degree, and, as the number of times that we breathe in a day is exceedingly great, the cold produced by the evaporation ought to be in proportion. But we ſee that, notwithſtanding all this cooling, whether we breathe cold air or hot air, the temperature of the body remains ſtill the ſame. The air then, though conſtantly carrying off the heat of the body, does not cool it in the leaſt by its action on the lungs. The only poſſible way of ſolving this apparent contradiction is, by ſuppoſing that the air, when acting upon the blood in the lungs, leaves preciſely as much heat as it carries off, and therefore, though we breathe ever ſo long, we cannot by this means become either hotter or colder.

24. To illuſtrate this ſubject, we might now enter into an inquiry concerning the origin and cauſe of animal

animal heat; but this will be touched upon hereafter. We ſhall here only take notice that the heat of the body is almoſt univerſally allowed to proceed from the lungs. It has likewiſe been demonſtrated, that the air does in fact contain an incredible quantity of heat, even when it appears to us to be extremely cold. A certain proportion of this heat is ſeparated from it every time we breathe; and if, either by the mixture of other fluids with the air we breathe, or by any change in the organization of the body itſelf, a greater or ſmaller proportion of heat ſhould be communicated to the blood, diſeaſe muſt enſue.

25. To ſum up then what has been ſaid concerning the blood and nerves: The whole maſs of fluid paſſes from the right ſide of the heart to the lungs. In the lungs it receives from the air ſomething* neceſſary to the functions of life and ſenſation, and purifies itſelf from thoſe matters which might prove pernicious. From the lungs it paſſes to the left ſide of the heart, and thence through the whole body. In its paſſage through the body, it is accompanied with nerves, which, taking up from the arterial blood that *vital ſpirit* received from the air, convey it to all the organs of motion, of ſenſation, and to the brain, where the whole powers of perception being united form our *intellectual faculties*, and, as far as our ſenſes can perceive, the human ſpirit itſelf. The blood, thus deprived of its ſpirit, is collected from all parts of the body by the veins, and returned to the right ſide of the heart, from whence it is again ſent to the lungs, and the proceſs carried on as before. This hypotheſis concerning the peculiar function of the nerves I firſt inſerted in the ENCYCLOPÆDIA BRITANNICA, ſecond edition, under the article BLOOD, in the year 1778. It has been ſince continued in the third Scots edition, and from thence into the Iriſh and American editions.

26. It has already been obſerved, that the body is ſubjected to a continual waſte. One ſource of this waſte

* It ſeems now to be proved beyond a doubt that this *ſomething* ſo long unknown is that fluid called by Dr. Prieſtley *dephlogiſticated air*, and by Lavoiſier *oxygen*.

waſte is the breath, by which a conſiderable part paſſes off in vapour. A great quantity alſo paſſes off by the pores of the ſkin; frequently in a perceptible liquid called *ſweat*, but oftener in an inviſible vapour from all parts of the body, called *inſenſible perſpiration*. The latter has been thought to be the great ſource of waſte to the human body; and it is certain, that if any perſon in health be weighed when he riſes in the morning, he will be found conſiderably lighter than when he went to bed. The loſs of weight in this caſe proceeds not only from the pores of the ſkin, but from the lungs; but though phyſicians have made a general allowance for both theſe, I have not heard of any experiment by which we can determine how much paſſes off by the one, and how much by the other, nor indeed does it appear eaſy to make ſuch an experiment. Galen plainly overlooks the perſpiration from the lungs entirely. "This excremen-"titious vapour (ſays he) is expelled through ſmall ori-"fices, which the Greeks call pores, diſperſed all over "the body, and eſpecially over the ſkin, partly by ſweat, "and partly by inſenſible perſpiration, which eſcapes "the ſight, and is known to few." Sanctorius, and the ſucceeding writers, have claſſed both together indiſcriminately; allowing the diſcharge to be ſo great, that if eight pounds of aliment be taken in, five of them paſs off in this manner. In a ſyſtem of anatomy, publiſhed at Edinburgh in 1791, the author ſays, that the diſcharge by the ſkin "is even much larger than this (the "diſcharge from the lungs we may ſuppoſe) ſince it "not only throws off a quantity of the aliment, but "likewiſe what is added to the blood by inhalation, "which, entering often in a very conſiderable quantity, "is thus again expelled." The ſame author likewiſe ſays, that the "perſpirable matter from the ſkin is principally water," and that it iſſues in ſuch quantity as to be ſeen in ſubterraneous caverns evidently flying off from the ſurface of the body like a denſe vapour. But other phyſiologiſts, particularly Dr. Blumenbach, inform us, that the matter of inſenſible perſpiration is quite ſimilar to the diſcharge from the lungs, particularly containing

taining a great quantity of fixed air. The ſame account is given in Chaptal's chemiſtry, on the authority of Meſſrs. Milly and Fouquet. This may be looked upon as a valuable diſcovery, eſpecially in conjunction with that related by Drs. Beddoes and Girtanner, viz. that the fleſh of animals contains a quantity of oxygen. Dr. Girtanner obtained a quantity of this air from the raw fleſh of animals, and ſays that it may be repeatedly obtained by expoſing the fleſh to the atmoſphere, and diſtilling with a heat of 60 or 70 degrees of Reaumur's thermometer (ſomething below that of boiling water.) Hence it is natural to conclude, that, as the diſcharge from the lungs purifies the blood from its uſeleſs parts, ſo does the inſenſible diſcharge from the ſkin purify the ſolid parts from thoſe particles which are no longer uſeful. The probability of this alſo becomes greater by conſidering, that in diſeaſes, when the quantity of matter to be thrown off is very great, the ſkin becomes foul, the teeth furred with black ſordes, &c. all which diſappear as ſoon as the quantity of the offenſive particles is reduced to its natural ſtandard. As to any conſiderable quantity of aqueous vapour being diſcharged this way, unleſs in caſe of ſweat, it does not ſeem probable; for in ſuch a caſe our clothes would always be moiſt; and in the night time the accumulation of moiſture would certainly be perceptible. The ſweat is entirely of a different nature from the inſenſible perſpiration, and blood and even *ſand* has been known to iſſue through the ſkin along with it. *(See the Anatomical Syſtem above quoted.)*

27. This very conſiderable waſte of the body is repaired by the aliment taken into the ſtomach. In the mouth it is mixed with a conſiderable quantity of the liquid called *ſaliva*, and in the ſtomach with another called the *gaſtric juice*, with which that organ always abounds. From the ſtomach it paſſes into the inteſtines, where it is mixed with other two fluids; one called the *pancreatic juice*, the other the *bile*. This laſt is of a yellow colour, and is ſometimes produced in enormous quantities, inſomuch that Dr. Wade, in his account of the fevers in Bengal, mentions ſome patients who have

have voided by ſtool half a gallon of bilious matter in one day.

28. In the ſtomach principally the aliment undergoes a certain change called *digeſtion*, by which it becomes capable of being converted into the ſubſtance of the body. Much has been inquired and diſputed, to no purpoſe, about the nature of this change, and how it is effected. One party has declared for *attrition*; a ſecond for *putrefaction*; a third for *heat*; a fourth have ſuppoſed that our meat was digeſted by *chewing*; as if, like the lobſter, people had teeth in their ſtomach! and, laſtly, ſome learned moderns, after much pains and trouble, have found out that it is digeſted by *ſolution*. Dr. Moore has ſummed up the diſcoveries concerning digeſtion in the following words: "The food, being previouſly "divided and blended with the ſaliva and air by maſti- "cation, (chewing) is ſwallowed, and meets in the ſto- "mach with the gaſtric juice, whoſe diſſolving power, "aſſiſted by the natural heat of the place, is the princi- "pal agent in digeſtion. The proceſs is completed by "the pancreatic juice and bile, the nutritious parts of "the food being by this proceſs converted into chyle "for the ſupport of the body, and the groſſer parts "thrown out."*

29. The inſide of the ſtomach and inteſtines are full of the mouths of innumerable ſmall veſſels, which continually ſuck up from the aliment, as it paſſes downwards, the finer parts, in form of a white liquid, called *chyle*; and from the whiteneſs of their colour the veſſels have the name of *lacteals*, from the Latin word *lac*, milk. After paſſing through the ſubſtance of the ſtomach and inteſtines, and running along the membrane called the *meſentery*, to which the inteſtines are attached, the lacteals unite in a large reſervoir called the *thoracic duct*; and this again opens into a large vein on the left ſide, called the *ſubclavian*, which conveys the blood from half the upper part of the body; ſoon after terminating in the vena cava, by which the chyle is conveyed to the heart, thence to the lungs, and ſo on in the common courſe

* Moore's Medical Sketches.

courſe of circulation. The converſion of the chyle into blood is called the proceſs of *ſanguification.*

30. The blood, thus formed out of the aliment we ſwallow, is not one uniform fluid like water, but compoſed of three diſtinct ſubſtances; one, which gives it the red colour, and ſeems to be compoſed of little round globules; another, quite colourleſs, but of a viſcid nature, and which very ſoon coagulates, called the *lymph*; and a third, of a yellowiſh colour, and retaining its fluidity much longer, called the *ſerum.* A remarkable property of this laſt fluid is, that air can act through it upon the blood; for Dr. Prieſtly found that a portion of black blood aſſumed a bright, florid colour from the air, even though covered with ſerum an inch deep. When blood is drawn, the red globules are detained by the lymph which coagulates, and both together form the red maſs called *craſſamentum*; the ſerum remaining fluid, and retaining its name.

31. Beſides theſe fluids, the blood either inviſibly contains, or is capable of being converted into, a great many others; for all the fluids in the body are ſeparated from it, and all of them, the bile only excepted, from the arterial blood, before it has loſt that portion of its ſpirit which it imbibes from the air. When a fluid is to be ſecreted, ſometimes it is done only by an infinity of ſmall veſſels branching off from the arteries, and depoſiting the liquids which paſs through them in particular places; and ſuch are the fluids which moiſten the inſide of the body, and which are carried off by the breath, or by ſweat. But this ſeparation does not by any means hinder the artery from terminating in its uſual way in a vein, for in no caſe is the whole ſubſtance of the blood converted into any other liquid; all of them appear to be contained in it. But the greateſt number of fluids are ſeparated by means of certain ſubſtances called *glands.* Theſe are ſmall round or oval ſhaped bodies; each of them encloſed in a membrane or ſkin which ſeparates it from the other parts, and each furniſhed with a ſmall tube called the *excretory duct*, through which the liquor ſeparated in the gland paſſes to its place

place of deſtination. Each gland has alſo an artery and nerve, and a vein to bring back the blood after it has parted with the fluid intended to be ſeparated. The bile is ſeparated in the liver from the blood of a large vein called the *vena portarum*, formed by the union of ſome of the veins of the inteſtines and meſentery. This vein branches out through the liver like an artery, terminating in other veins, which at laſt bring back the blood to the heart.

32. As the human body is thus furniſhed with an apparatus for ſeparating and carrying off, it is alſo furniſhed with one for abſorbing or taking in. All the inward parts of the body are moiſt; and the moiſture is furniſhed by the ſmall veſſels above deſcribed, and which ſeparate part of the lymph from the blood. By ſuch continual ſeparation the cavities of the belly, breaſt, brain, &c. would ſoon be filled with liquid, were not ſome means provided for carrying it off as faſt as it is formed. The means in queſtion are a ſet of ſmall veſſels called *lymphatics*. Theſe "ariſe from the internal "ſurface of the breaſt, belly, and every cavity of the "body; they alſo overſpread the whole external ſurface "of the body, and large lymphatic veſſels are uſually "found cloſe to the large blood veſſels of the extremi-"ties, beſides thoſe ſmall ſuperficial ones which lie "above the muſcles in the cellular membrane (the fat "or rather the membrane containing it.) The large "viſcera generally have two ſets of lymphatics, one "lying on the ſurface of the viſcus, and the other "accompanying the blood veſſels belonging to it. The "faculty of abſorption, though refuſed to the lymphatics, "was aſcribed by many anatomiſts to common veins, "and this opinion continued to prevail in ſome degree, "until Hunter and Monro totally overturned it, "exploding at the ſame time the notion that any of the "lymphatics are continuations of arteries, and eſtabliſh-"ing, beyond a doubt, that all are abſorbent veſſels."* All the lymphatics terminate in the thoracic duct; ſo that the liquid ſeparated by the *exhalant arteries* (ſo the veſſels

* Moore's Medical Sketches.

veſſels are termed by which that fluid is ſeparated) is again mixed with the blood, and again performs the ſame offices.

We have now taken a review of the ſeveral parts of the human body, ſlight and ſuperficial indeed, but ſuch as the limits of this work would allow, and ſufficient to furniſh to thoſe entirely unacquainted with medical matters ſome general ideas on the ſubject. We have ſeen that the body, in general, conſiſts principally of four great parts, the blood-veſſels, the lymphatic veſſels, the nerves, and the muſcles. Beſides theſe we enumerate the glands and membranes; the former being nearly allied to the blood-veſſels, the latter *apparently* to the nerves. The bones, having no concern with our preſent inquiry, are not taken notice of. The ſtomach and inteſtines, being principally compoſed of muſcular fibres, nerves, and blood-veſſels, muſt be conſidered as belonging to theſe departments. Each of theſe large diviſions has obtained the name of *ſyſtem*; and even the ſubdiviſion of the blood-veſſels into arteries and veins. Thus the arteries of the body, taken collectively, are called the *arterial ſyſtem*; the veins the *venous ſyſtem*; the brain and nerves the *nervous ſyſtem*; the muſcles the *muſcular ſyſtem*; the lymphatics the *lymphatic ſyſtem*; and the glands the *glandular ſyſtem*; &c. Theſe appellations have been given for the ſake of diſtinctneſs and perſpicuity, but they have had a bad tendency. Inſignificant diſputes have ariſen concerning the ſuperiority of one ſyſtem to the other, and which is to be accounted the *primum mobile* of the body. By obſerving alſo the *general* ſtructure of the body in a more full and ample manner than that of the parts which compoſe it, phyſicians have been apt to generalize too much in their theories, and to fancy that from a few obvious laws they might be able to explain the phenomena of diſeaſe in almoſt every poſſible variety. To illuſtrate this, let us take the blood for an example. This to ſight appears an homogeneous fluid; and Boerhaave and others have aſcribed diſeaſes to ſome defect or bad quality of the blood. But this fluid conſiſts of three parts, each, as far as we can perceive, eſſentially diſtinct from the other; viz.

viz. the lymph, ſerum, and red globules. As each of theſe happens to be diſeaſed, the cure muſt be different; or if two happen to be diſeaſed, the medicines muſt ſtill be varied. But, beſides theſe general diſeaſes ariſing from what, like the blood, is common to the whole body, each component part of the body has an arterial ſyſtem, a venous ſyſtem, a nervous and lymphatic ſyſtem, &c. belonging to itſelf; all of which, though dependent on the body at large, have yet laws of their own, in conſequence of which any one of them may be conſiderably diſeaſed without much affecting the general ſyſtem; and this conſtitutes what is called *local* diſeaſe. Again: The parts of the body are ſo connected with one another, that the diſeaſe of one may ſhow itſelf in another; or it may affect the whole body in ſuch a manner as to produce a general diſeaſe; though Dr. Ruſh conſiders this laſt, at leaſt from injuries of the viſcera, as a rare occurrence;* but we certainly know that general diſeaſes are very often followed by evident diſeaſes of particular organs; and in theſe caſes it is impoſſible to ſay whether the general diſeaſe did not begin, though imperceptible to us, in that very organ in which we ſuppoſe it to terminate when the local diſeaſe was come to ſuch an height as to be evident to our ſenſes. In ſome caſes it is plain that local injuries will bring on moſt violent diſeaſes of the whole ſyſtem. Thus a local inflammation of the end of one of the fingers, by phyſicians called a *paronychia*, has been known to induce a moſt violent fever, nay, even to occaſion death. Theſe violent ſymptoms end as ſoon as the ſuppuration is completed; ſo that, were it not for the exceſſive pain of the inflammation, we might be apt to ſuppoſe that the fever terminated in the ſuppuration, whereas it evidently was occaſioned by the local diſeaſe, or the tendency of the part to ſuppurate; the pain and inflammation being neceſſary preliminaries. Again: When an intermittent fever is ſaid to terminate, or to be followed, by a hardneſs of the liver, we do not certainly know whether an original diſeaſe of the liver might not have

* Medical Inquiries and Obſervations, vol. iv, p. 133.

have been the cauſe of the intermittent. From a conſideration of all theſe things, viz. the extreme diverſity of parts which compoſe the human body, the ultimate inviſibility of the ſtructure of each, the incomprehenſible manner in which they are united, the equally incomprehenſible dependence they have upon one another in ſome caſes, and independence in others, the numerous laws by which they are governed, and which muſt be very much unknown to us, the inviſible and incomprehenſible nature of the powers which act upon them, &c. &c. I ſay, when we conſider all theſe things, the boldeſt theoriſt muſt be humbled when he attempts to account for the phenomena of diſeaſe in any one inſtance. The exceſſive difficulty in which we are involved is beautifully deſcribed by Dr. Ferriar when ſpeaking of hyſterics; and obſtacles equally inſuperable by our theories will undoubtedly be met with in any other diſtemper. "We are ignorant (ſays he) by what laws the body poſ-"ſeſſes a power of repreſenting the moſt hazardous diſ-"orders, without incurring danger; of counterfeiting "the greateſt derangement in the circulating ſyſtem, "without materially altering its movements; of produ-"cing madneſs, conſcious of its extravagances; and of "increaſing the acuteneſs of ſenſation by oppreſſing the "common ſenſorium. In hyſterical affections all theſe "appearances are excited, which are incompatible with "the reaſonings of every ſyſtem-maker who has yet en-"deavoured to explain the inexplicable. Nature, as if "in ridicule of the attempts to unmaſk her, has, in this "claſs of diſeaſes, reconciled contradictions, and realized "improbabilities, with a myſterious verſatility, which "inſpires the true philoſopher with diffidence, and re-"duces the ſyſtematic to deſpair."

Notwithſtanding all theſe difficulties, however, phyſicians have theoriſed, and that with ſuch animoſity, as if all the arcana of nature had been laid open to every profeſſor who thought proper to invent or new-model a ſyſtem; though the conſtant ſucceſſion of theories might certainly have ſhown them the vanity of ſuch attempts. Some of theſe we muſt now conſider.

Medical theoriſts have exerted their greateſt abilities in explaining the nature of thoſe general diſeaſes affecting the whole body, denominated *fevers*; and which are likewiſe called *acute* diſeaſes, from the violence with which they ſometimes attack, and the rapidity with which they run through their courſe. Dr. Fordyce ſays, that fever will ſometimes kill in *five minutes* from the firſt ſenſation of uneaſineſs. Ancient phyſicians have deſcribed a number of fevers, which they ſuppoſed to be of different ſpecies, and accordingly have diſtinguiſhed by different names. Modern ſyſtem-makers have added to the number; ſo that a bare detail of the names which they have given to their diviſions and ſubdiviſions, would conſtitute a very formidable catalogue; but the lateſt practitioners are decidedly of opinion that there is but one kind of fever, varying itſelf according to circumſtances. Dr. Ruſh declares himſelf of this opinion in the moſt expreſs and poſitive terms. "There is (ſays he) but one fever. However "different the prediſpoſing, remote or exciting cauſes "may be, ... ſtill, I repeat, there can be but one "fever. . . . . Thus fire is an unit, whether it be pro-"duced by friction, percuſſion, electricity, fermentation, "or by a piece of wood or coal in a ſtate of inflam-"mation."*

"I have ſaid that there is but one fever. Of courſe "I do not admit of its artificial diviſion into genera "and ſpecies; a diſeaſe which ſo frequently changes "its form and place, ſhould never have been deſignated, "like plants and animals, by unchangeable characters. ". . . . Much miſchief has been done by noſological "arrangements of diſeaſes. They erect imaginary "boundaries between things which are of an homo-"geneous nature. . . . . They gratify indolence in a "phyſician, by fixing his attention upon the name of a "diſeaſe, and thereby leading him to neglect the vary-"ing ſtate of the ſyſtem, &c."†

So much then having been ſaid and written upon the diſeaſe in queſtion, one might be apt to ſuppoſe that the nature

* Vol. iv, p. 133. † Ibid. p. 149.

nature of fever would have been thoroughly inveſtigated, and its cauſes explained in the moſt ſatisfactory manner, long before this time. Inſtead of this, however, we find it ſtill like a word which every body uſes, and nobody underſtands. Dr. Fordyce, who has lately written a treatiſe on the ſubject, endeavours to prove that there is not any ſingle ſymptom from the exiſtence of which we can certainly determine the preſence of this diſeaſe. "Fever (ſays he) has obtained its name in Greek, Latin, "Arabic and Perſian, principally from the idea of heat: "*pur*, in Greek fire; *febris* in Latin, from *fervere*, to "burn," &c. This idea, he goes on to demonſtrate, is erroneous; as the body of a feveriſh patient frequently ſinks the thermometer below the natural ſtandard; while the patient ſometimes finds himſelf cold when the thermometer ſhows him to be really hot, and hot while the ſame inſtrument ſhows him to be cold. Neither is cold, followed by heat, a certain indication of the preſence of fever, as many fevers begin without any previous ſenſation of cold. Frequency of the pulſe alſo is no certain ſign; and having diſcuſſed this laſt ſymptom he concludes thus. "If we examine the reſtleſſneſs, anxiety, "ſtate of the tongue, head-ach, or any other of the "ſymptoms which often take place in fever, we ſhall "find that they alſo may be preſent when there is no "fever, and abſent in a patient afflicted with this diſeaſe; "and therefore we cannot allow that there is any patho-"gnomic ſymptom of fever."* Dr. Ruſh declines giving any definition of fever;† but, with all due deference to theſe two very experienced phyſicians, we muſt account ſuch extreme ſcepticiſm altogether erroneous. If fever cannot be defined, it cannot be deſcribed; for a *definition* is no other than a ſhort *deſcription*. If again there be no ſingle ſymptom by which the preſence of fever can be known, it is impoſſible that there can be any *combination* by which it can be known, any more than we can form an unit by any combination of cyphers. In fact Dr. Fordyce himſelf is at laſt obliged to acknowledge

* A *Pathognomic* ſymptom is one which being preſent *certainly* indicates the preſence of a diſeaſe, and being abſent, the contrary.

† Vol. iv, p. 123.

ledge that there is a certain ſymptom with which fever *generally* begins; and, by his inſiſting upon it in various parts of the work, we muſt certainly be induced to ſuppoſe that it was by this ſign principally that he determined whether his patients had a fever or not. "The firſt appear-" ance (ſays he) which generally takes place is uneaſineſs " and reſtleſſneſs; a general uneaſineſs, the patient feel-" ing himſelf ill, but incapable of fixing on any particular " part of the body. This uneaſineſs affects the mind " at the ſame time. Perhaps in this caſe it is the mind " that is firſt affected. . . . . Along with this uneaſineſs " there is a reſtleſſneſs, the patient wiſhing to change " his place or poſture frequently; the mind cannot like-" wiſe reſt upon one object; it often wanders from one " to another ſubject. At the ſame time there is a feel " of wearineſs which reſiſts the diſpoſition in the patient " to change his place and poſture, and reſiſts the diſ-" poſition of the mind to alter the object of its atten-" tion, rendering the wiſh for ſuch changes ineffectual. " With theſe ariſes an actual inability of exerting the " muſcular powers, or performing any of the functions " of the body; and alſo an actual inability of exerciſing " the great faculties of the mind, the powers of percep-" tion, memory, arrangement of ideas, and of the judg-" ment, in the ſame degree that they exiſted in health. " The degree in which theſe take place is extremely " different in the attacks of different fevers; but theſe " appearances are *very rarely* abſent, although indeed " they may alſo happen in other diſeaſes."

Dr. Ruſh accounts the laſſitude with which fever begins, one of the tranſient phenomena of it; and this with other phenomena he calls *ſymptoms*. Such as are more permanent and fixed, and which by other writers have been reckoned different ſpecies, he calls *ſtates*; and of theſe he enumerates forty. Such as have any relation to the plague are as follow.

1. The MALIGNANT ſtate, known by attacking frequently without a chilly fit, is attended with coma, a depreſſed, ſlow or intermitting pulſe, and ſometimes by a natural temperature or coldneſs of the ſkin. . . . . .

This

This depreſſed ſtate of fever more frequently when left to itſelf terminates in petechiæ, buboes, carbuncles, abſceſſes and mortifications, according as the ſerum, lymph, or red blood, is effuſed in the viſcera or external parts of the body.

2. The SYNOCHA, or common inflammatory ſtate; attacking ſuddenly with chills, ſucceeded by a quick, frequent and tenſe pulſe, great heat, thirſt, and pains in the bones, joints, breaſt or ſides.

3. The BILIOUS ſtate of fever; known by a full, quick and tenſe pulſe, or by a quick, full and round pulſe without tenſion, and by a diſcharge of green, dark coloured or black bile from the ſtomach and bowels. This ſtate ſometimes aſſumes the form of an hectic; the patient feels no pain in his head, has a tolerable appetite, and is even able to ſit up and do buſineſs.

4. The TYPHUS ſtate; known by a weak and frequent pulſe, a diſpoſition to ſleep, a torpor of the alimentary canal, tremors of the hands, a dry tongue, and, in ſome inſtances, a diarrhœa. Sometimes it aſſumes ſymptoms of ſynocha on the eleventh, fourteenth, and even twentieth days. The common name of this ſtate is the *nervous* fever.

5. Intermiſſions, or the INTERMITTING and REMITTING ſtates, occur moſt diſtinctly and univerſally in thoſe which partake of the bilious diatheſis.

6. The SWEATING ſtate occurs not only in the plague, but in the yellow fever, ſmall pox, pleuriſy, rheumatiſm, hectic and intermitting ſtates.

7. The FAINTING ſtate; occurring in the plague, yellow fever, ſmall pox, and ſome ſtates of pleuriſy.

8. The BURNING ſtate. This is attended not only with an intolerable ſenſation of heat in the bowels, but with a burning ſenſation excited in thoſe who touch the patient's ſkin. It occurs moſtly in the remitting fevers of Aſia.

9. The CHILLY ſtate differs from a common chilly fit by continuing four or five days, and to ſuch a degree that the patient frequently cannot bear his arms out of bed. The coldneſs is moſt obſtinate in the hands and feet.

feet. A coolneſs only of the ſkin attends in ſome caſes, which is frequently miſtaken for an abſence of fever.

10. The INTESTINAL ſtate; including the cholera morbus, diarrhœa, and cholic.

11, 12, 13, 14, 15. The APOPLECTIC, PHRENETIC, PARALYTIC, LETHARGIC and VERTIGINOUS ſtates.

16. The ERUPTIVE ſtate; including the ſmall pox, meaſles, and other exanthemata of Dr. Cullen.

17. The HÆMORRHAGIC ſtate; known by fluxes of blood from various parts of the body.

18. The CONVULSIVE or SPASMODIC ſtate. Convulſions are frequently attendant on the malignant ſtate of fever.

19. The CUTANEOUS ſtate; attended with various eruptions on the ſkin, particularly *petechiæ*.

Theſe include the moſt remarkable varieties deſcribed by phyſicians as different ſpecies. From the ſubſequent account of the ſymptoms of the plague, it will appear that this ſingle diſtemper monopoliſes, as it were, the ſymptoms, at leaſt the moſt dangerous and terrible, belonging to them all. Thoſe noſologiſts therefore who ſuppoſe the ſtates of fever above deſcribed to be different ſpecies, inſtead of ſaying that the plague belongs to one kind of fever, ought to ſay that it is a complication of a great many different kinds. But here a queſtion ariſes: Do all the varieties of fever juſt now deſcribed, or do all the other fevers deſcribed by different authors, include all the different modes by which the plague makes its attack? If ſo, then we know that the plague really partakes of the nature of fever, or may be accounted the higheſt degree of it. This is the opinion of Dr. Ruſh; for in his 4th vol. p. 153, he conſiders the different inflammatory ſtates of fever, according to their ſtrength, in the following order. 1. The plague. 2. The yellow fever. 3. The natural ſmall pox. 4. The malignant ſore throat, &c. To this I can have but one objection, and to me it appears inſuperable; viz. that the plague frequently deſtroys without any ſymptom of fever; and, if ſo, we muſt certainly account it a diſtemper of another kind. To decide this matter,

matter, let us compare the ſymptoms of the moſt violent fever with what happens in times of violent peſtilence. We can ſcarce imagine a fever more powerful than that which deſtroys in five minutes, and the following is the deſcription of it from Dr. Fordyce. "When "the firſt attack of fever has been fatal, it has been "claſſed among ſudden deaths, and all of theſe have "been very erroneouſly called apoplexy, or ſyncopy "*(fainting.)* . . . . When the attack is fatal, it ſometimes "kills in five minutes, ſometimes it requires half an "hour, ſeldom longer than that time. While the pa-"tient is yet ſenſible, violent head-ach with great ſenſe "of chillineſs takes place, the extremities become very "cold, and perfectly inſenſible; there is great proſtration "of ſtrength, ſo that the patient is incapable of ſupport-"ing himſelf in an erect poſture; he becomes pale, his "ſkin is of a dirty brown, and he is ſoon inſenſible to "external objects; the eyes are half open, and the cor-"nea ſomewhat contracted. If the patient goes off very "ſoon, the pulſe is diminiſhed, and at laſt loſt, without "any frequency taking place; but if it be longer before "he dies, the pulſe becomes exceſſively ſmall and fre-"quent; all the appearances of life gradually ſubſide, "and the patient is carried off. Of this the author has "ſeen inſtances, ſometimes at the firſt attack, oftener in "the returns of the diſeaſe, although very few."

This no doubt is very terrible, and no plague whatever can exceed it. Indeed, when *death* is the termination, it ſignifies little what the *diſeaſe* is called. But the queſtion is not whether fever or plague is the moſt dreadful, but whether they are the ſame. Now, from the above deſcription, is is plain that fever never kills without ſome warning. In the preſent inſtance, head-ach and chillineſs give a certain, though ſhort, warning of the enſuing cataſtrophe; but, in violent plagues, Dr. Sydenham informs us, that people have been ſuddenly deſtroyed as if by lightning. Dr. Guthrie aſſures us that in the laſt plague at Moſcow he has ſeen ſoldiers drop down ſuddenly as if they had been ſtruck by lightning, or by a muſket ball; yet ſome of theſe recovered by

by bleeding and proper management; but it is certainly not unreaſonable to ſuppoſe that many, who were not thus taken care of, periſhed. Dr. Hodges ſpeaks of the contagion of the plague in the moſt energetic terms. He ſays, "it is ſo rare, ſubtile, volatile and fine, that it in- "ſinuates into, and reſides in, the very pores and inter- "ſtices of the aerial particles. It is ſaid to be of a "poiſonous nature alſo, from its ſimilitude to the nature "of a poiſon, ſo that they ſeem to differ in degree only; "for the deadly quality of a peſtilence vaſtly exceeds "either the arſenical minerals, the moſt poiſonous ani- "mals or inſects, or the killing vegetables; nay, the "peſtilence ſeems to be a compoſition of all the other "poiſons together, as well as in its fatal efficacies to ex- "cel them. . . . . The contagion of the plague is "more active than lightning, and in the twinkling of an "eye carries to a diſtance putrefaction, mortification "and death. As for the manner whereby it kills, its "approaches are generally ſo ſecret, that perſons ſeized "with it ſeem to be fallen into an ambuſcade or a "ſnare, of which there ſeems to be no ſuſpicion. . . . . "In the plague of 1665, as in many others, people fre- "quently died without any ſymptoms of horror, thirſt, "or concomitant fever. A woman, who was the only "one left alive of a family, and in her own opinion in per- "fect health, perceived upon her breaſt the peſtilential "ſpots, which ſhe looked upon to be the fatal *tokens*; "and in a very ſhort ſpace died, without feeling any "other diſorder, or forerunner of death. . . . . A youth "of a good conſtitution, after he had found himſelf ſud- "denly marked with the tokens, believed at firſt that "they were not the genuine marks, becauſe he found "himſelf ſo well; yet he was dead in leſs than four "hours, as his phyſician had prognoſticated. A fever, "however, did for the moſt part ſhew itſelf, and was "always of the worſt kind. Sometimes it ſeemed to re- "ſemble a quotidian, ſometimes a tertian; there never "was a total ceſſation, but every exacerbation was worſe "than before." In like manner the author of the Journal of the Plague Year informs us that many, ſup-

poſing

poſing themſelves, and ſuppoſed by others, to be in good health, would ſuddenly find themſelves ſeized with great ſickneſs, crawl to a bench, and inſtantly expire. "Many (ſays Dr. Hodges) in the middle of their employ, "with their friends and other engagements, would ſuddenly fall into profound, and often deadly ſleeps."

It is needleſs to multiply examples: the above are ſufficient to ſhow that the plague, when in its moſt violent ſtate, kills ſuddenly and imperceptibly, and that like the bite of a vampire,* without producing any ſenſible diſorder. In a ſtate ſomewhat inferior, it excites the moſt malignant fevers; in one ſtill inferior it produces fevers of a milder nature, and ſo on until we find it ſo mild, that thoſe infected with it are not even confined to their bed. In all this inquiry, however, we find the ſecrecy and inviſibility of the peſtilence, ſo often mentioned in ſcripture, ſtill confirmed. Other diſtempers may "waſte openly at noon-day," but this always "walks in darkneſs."

In one of the inferior ſtages of this diſtemper the body is affected with thoſe eruptions named buboes and carbuncles. Dr. Patrick Ruſſel, in his treatiſe on the plague at Aleppo, divides the ſymptoms of the diſtemper into ſix claſſes. In the firſt there were no eruptions, and all the patients of this claſs died. In the ſecond, and all the reſt, there were buboes and carbuncles. But, in the latter of theſe eſpecially, it is worthy of remark, that

* The vampire is a kind of bat, of a very large ſize, met with in ſome parts of South America and in the Eaſt Indies. This vile creature delights in human blood, and often attacks people in the night time in the moſt inſidious manner. A late traveller relates that at Surinam he was bit by one of them, which ſucked ſo much of his blood, that in the morning he found himſelf exceedingly weak and faint. He felt no pain, nor was ſenſible of the injury in any other way. The vampire commonly attacks the great toe, making a wound ſo exceedingly ſmall that the perſon is not awaked by it; it then ſucks till gorged with blood, and, leſt the patient ſhould awake, it keeps fanning him all the while with its large wings, the coolneſs of which, in that hot climate, promotes ſleep. In this manner ſome are ſaid to have been deſtroyed. Captain Cook relates an humourous anecdote of one of his ſailors, who being aſhore at New Holland, and having wandered a little way into the woods, returned in a fright, crying out that he had ſeen *the devil!* Being aſked in what ſhape Satan had appeared, he anſwered, "He was about the ſize of a *one gallon keg*, and very like it; and if I had not been *afear'd*, I might have touched him." It was a vampire. The man, notwithſtanding his fright, had not exaggerated its magnitude. People, though miſtaken and terrified, are not to be diſbelieved in every part of their relation.

that they appear neither as a ſuppuration, nor as a common mortification, but like the eſchar formed by a cauſtic, which cna ſcarcely be cut by a knife. This appearance is not to be met with in any other diſeaſe. In many there are mortifications of various parts of the body, but all theſe are ſoft, and ſeemingly corruptions of the fleſh. When a perſon dies of any ordinary diſtemper, the fleſh ſoon corrupts and diſſolves, but there is no example of its turning to a hard eſchar like that made by a hot iron, or the cauſtic with which iſſues are made. This ſhews not merely a ceſſation of life, but the operation of ſome very active power in the body, like fire, tending to deſtroy the texture of it entirely, and to reduce it to a cinder. This power ſeems alſo to operate internally in the fleſhy parts; for when the bodies of thoſe were opened who died with the *tokens*, as they are called by Dr. Hodges, upon them, the mortification was always found much larger inwardly than it appeared to be on the outſide. The tokens themſelves are by Dr. Hodges called "minute diſtinct *blaſts*, "which had their origin from within, and roſe up in "little pyramidal protuberances, ſometimes as ſmall as "pins' heads, at others as large as a ſilver penny; having the peſtilential poiſon chiefly collected at their "baſes," &c.

That the plague was by the ancients reckoned a diſeaſe of a nature different from all others, appears from Galen, as quoted by Deuſingius. "What is called the "*peſtilence* is moſt properly remarked by Galen not to "be a *genus* of any known diſeaſe. For whatever diſ-"eaſes and ſymptoms are aſſociated with the plague, "truly and properly ſo called, the ſame are wont to be "called *peſtilential* diſeaſes; of which indeed there are "an innumerable multitude, and theſe not always nor "every where the ſame."*

In like manner Diemerbroeck, as quoted by Allen, gives his opinion, that "The plague is ſomething dif-"ferent

* Non eſſe certi morbi genus, id quod *peſtilens* vocatur, rectiſſime notatum a Galeno eſt (3 Epid. comm. 3. t. 20.) quicunque enim morbi ac ſymptomata conſociantur peſti, veræ proprieque dictæ, ijdem *morbi peſtilentes* apellari conſuevere, quorum equidem innumerabilis exiſtit cohors, ac non ſemper et ubivis eadem. (*Deuſing. de Peſte, Sect.* iii.)

" ferent from a fever, and a fever is only a ſymptom of " it, as I have *very often* obſerved; and therefore ſome " very ill define the plague by a fever, ſince a fever does " not eſſentially belong to it. . . . . A peſtilential fe- " ver, the *companion of the plague*, is not occaſioned by a " peſtilential venom, but by the mediation of putre- " faction; that is, it is not produced becauſe the hu- " mours are infected with the peſtilent venom, but be- " cauſe the heart, being irritated, overwhelmed and " much weakened by the peſtilent venom, can neither " duly digeſt and rarefy, nor govern and ſufficiently diſ- " charge the infected humours; which for this reaſon " putrefy and acquire a preternatural heat, and ſo excite " a fever; which by reaſon of the foreſaid ſecondary " cauſe, is different and diſtinct from the plague, and a " ſymptom of it. This is confirmed both by the max- " ims and authority of the ancients and moderns, as " well as by practice, and evident examples."

Thus it appears, both by fair reaſoning by induction from facts, and from the authority of the greateſt phyſicians, that the plague is certainly a diſeaſe by itſelf, and entirely diſtinct from all others. Hence it follows, that, though we could inveſtigate the cauſes of fever in their utmoſt extent, we might ſtill be ignorant of the true plague. That nothing, however, may be omitted, let us now conſider what phyſicians have advanced on this ſubject, and what progreſs they have made in aſcertaining the ſources from whence ſo many direful calamities are derived.

In an inquiry of this kind, or indeed concerning any cauſe whatever, it is plain that the nature of the effect muſt be firſt underſtood. Fever then being an *effect*, we muſt begin with inveſtigating its *nature*. But fever itſelf is only manifeſt by certain changes in the human body. Before we can inveſtigate the nature of fever, therefore, we muſt inveſtigate the human body, and that in a manner very different from what we did before. We muſt now conſider the ſources of life; in what manner the vital principle acts upon the body, and by what means its motions can be diſturbed, or how they may be rectified when once diſordered, &c. &c.

The

The ſyſtems of medicine before the time of Boerhaave are now ſo generally exploded, that it is needleſs to take any notice of them; and the reputation of Boerhaave himſelf in this way ſeems to be almoſt expiring. His doctrines, nevertheleſs, merit ſome attention, becauſe he takes into account a principle overlooked by ſucceeding theoriſts, viz. the *coheſion* of the parts of the body. That he did ſo is evident, from his having written upon the diſeaſes of a *weak and lax* fibre, and the diſeaſes of a *ſtrong and rigid* fibre. In other reſpects he followed in a great meaſure the mechanical phyſicians of the former century. He therefore took but little notice of the nervous ſyſtem, as being leſs ſubject, or indeed to appearance not at all ſubject, to the known laws of mechanics. The blood was more manageable. The microſcopical diſcoveries of Lewenhoeck furniſhed an excellent foundation for his ſyſtem. This celebrated obſerver had diſcovered, or fancied he had diſcovered, that the red part of the blood is compoſed of globules. Inaccurate indeed theſe globules muſt have been, ſince each of them was compoſed of ſix; four touching one another in the middle, with one above, and one below, thus ⁂. The ſerum was ſaid to be compoſed of ſingle globules, and by this attenuation it was ſuppoſed that the fluid, inſtead of red, appeared of a *yellow* colour. Still, however, this was inſufficient. Each of the yellow globules was *diſcovered* (either by fancied obſervations or by conjecture, it matters not which) to be compoſed of ſix others, which, ſingly taken, might conſtitute the lymph or ſome other fluid; and thus, like the number of the Beaſt, we might go on by ſixes to the end of the chapter, and ſolve all the phenomena of nature. In juſtice to the microſcopiſts, however, it muſt be obſerved, that ſome of them have given a much leſs fanciful account of the ſtructure of the blood than Lewenhoeck. Mr. Hewſon found it compoſed of veſicles, or ſmall bladder-like ſubſtances, with a black ſpot in the middle. Theſe veſicles diſſolved in pure water, but kept their original form, which he ſays was as flat as a ſhilling, when a ſmall portion of neutral ſalt was added to the fluid. The ſolid particles he ſuppoſed to be produced by

by the lymphatic ſyſtem; the black particles by the ſpleen.

The ſuppoſed obſervations of Lewenhoeck were of conſiderable uſe to Boerhaave in the forming of his ſyſtem of medicine, though they ſeem not to have accorded very well with his doctrine of lentor or viſcidity in the blood. But, let this be as it willl, having laid it down as the foundation of his theory, that the diſeaſes of the body proceeded from too great a laxity of the fibres, or from too great a rigidity of them, and a great many from this *lentor*, his practice was accordingly directed to ſuch medicines as he imagined would remove theſe ſuppoſed cauſes of diſeaſe. As the lentor of the blood was one of his favourite ſuppoſitions, he was therefore perpetually at war with this imaginary enemy, and dealt very much in ſaponaceous medicines with a view to break it down. But here it is evident that this great man was miſtaken, even though we ſhould allow the exiſtence of lentor as much as he pleaſed. The viſcidity, *lentor*, or any other ſtate of the blood, is an *effect* of ſomething. It is part of that ſtate into which the body is brought by the diſeaſe. The efforts of the phyſician therefore ought to be againſt that which produces the lentor; for, unleſs this be done, the cauſe of the diſeaſe muſt perpetually counteract the medicines by producing new lentor as faſt as they deſtroy it; and beſides, muſt have greatly the advantage of the phyſician, by being already in poſſeſſion of the whole maſs of blood, while the medicines can only enter it very gradually, and that by the ſtomach and lacteals, inſtead of being inſtantly mixed with it, and exerting their power immediately upon the fluid itſelf.

But beſides this miſtake, which is common to other ſyſtems, Boerhaave's lentor has been denied, and that upon ſuch ſtrong grounds that it is now univerſally exploded. Another ſyſtem quickly ſucceeded, in which every thing was managed by the nerves. This was introduced by Hoffman, adopted, and perhaps improved, by Dr. Cullen, under whoſe auſpices it acquired ſuch a degree of celebrity, that for a long time it was danger-

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ous to write or ſpeak againſt it; and the perſon who had the audacity to do ſo underwent a kind of medical proſcription from the Edinburgh College and all its ſtudents. According to this celebrated theoriſt, the brain is that part of the body firſt formed in the embryo; it may be ſeen with nerves proceeding from it long before the heart or any blood-veſſel belonging to it is viſible. Hence we are to conclude that this part is neceſſary to the exiſtence of every other part of the body, though it doth not appear that they are eſſentially neceſſary to its exiſtence. The ſuperiority of the nerves to all other parts being thus eſtabliſhed, the Doctor undertook to prove that all other parts of the body were formed from them; that the body is nouriſhed immediately from them, and in ſhort that the whole body is in ſuch ſubjection to the nervous ſyſtem, that, except for the mere purpoſe of diſtending the veſſels, we can ſcarcely know for what end the blood exiſts; ſince the nerves can alter its conſiſtence, or that of any of the fluids ſecreted from it, by a mere affection of that ſyſtem, without any thing either added to or taken from the vital fluid.

Thus we were compelled to believe that all diſeaſes at their firſt origin are affections of the nervous ſyſtem, from whence they are propagated through the whole body. The Cullenian practice in acute diſeaſes, of which the plague is the moſt violent, was built upon a maxim of Hoffman: "Atonia gignit ſpaſmos:" *Atony produces ſpaſms.* In explaining the nature of typhus fever, therefore, with which he claſſes the plague, the Doctor ſuppoſed that the contagion acted firſt upon the nervous ſyſtem, by producing therein a debility. The immediate effect of this debility is a *ſpaſm*, or preternatural contraction of the capillary veſſels, or extremely ſmall arteries. Hence the blood finds ſome difficulty in circulating, and the patient is ſeized with ſhivering, and has a ſenſe of cold. When this has continued for ſome time the ſyſtem begins to *re-act* againſt its enemy; the ſpaſm is reſolved, and, the reaction of the ſyſtem continuing, the action of the heart and arteries is augmented, and the body becomes warmer. Thus

Thus the coldneſs, ſhivering, and conſequent heat, which conſtitute the firſt attack of fever, are very plauſibly explained; but in the mode of cure this learned phyſician fell into the ſame miſtake with Dr. Boerhaave; for though ſpaſm is undoubtedly, even according to himſelf, an *effect*, he directs his medicines entirely againſt it, as if it were a *cauſe*. Thus, forgetting what he had juſt before advanced, that the ſpaſm is occaſioned by debility, he recommended the moſt debilitating medicines and regimen to cure people already too much debilitated; and to ſuch practice his enemies alledged that many fell victims. The theory and practice, however, ſtill kept its ground; and as great numbers of ſtudents were every year bred up in the belief of it at Edinburgh College, who carried the principles of their teacher to all parts of the world, it bade fair for becoming univerſal. But, in the midſt of this eclat, the whole ſyſtem received ſuch a rude ſhock from the doctrines of *John Brown*, though at that time not even M. D. as it hath not yet recovered.

Though the author of the new ſyſtem contended, as much as Dr. Cullen, for the ſupremacy of the nerves, he did not upon that foundation attempt to eſtabliſh his practice. He conſidered the living body as one machine, the *whole* of which might be acted upon, and always was acted upon by certain powers. It poſſeſſes a certain inexplicable property called *excitability*, capable of being augmented or diminiſhed. Every power which augments the *excitability* he called a *ſtimulus*; the oppoſite would have been a *ſedative*; but according to this ſyſtem there is not any ſedative, nor can there be one in nature. The reaſon is, that excitability itſelf has no exiſtence but in conſequence of the action of certain powers called *ſtimulants*. The total ſubduction of theſe reduces the excitability to nothing; of conſequence no power can act againſt it in a ſtate of non-exiſtence. What other phyſicians call *ſedatives*, therefore, according to the new ſyſtem, are only weak *ſtimulants*. The fallacy of ſuch reaſoning is obvious; but as it does not affect the practice, we ſhall not ſpend any time in conſidering it further.

On

On the principles juſt now laid down, the Brunonian ſyſtem divides all diſeaſes to which the human body is liable into two great claſſes; the one produced by too much excitement, the other by too little. The former contains thoſe diſeaſes by other phyſicians called inflammatory; the latter ſuch as are called nervous, putrid, or all in which the powers of life are too weak, and require to be ſupported. This laſt is ſuppoſed to be much more numerous than the former; and in the cure of theſe it was that the founder of the ſyſtem appeared to greateſt advantage. A moſt violent altercation took place between Dr. Brown and the Edinburgh College; yet, notwithſtanding all the influence of the profeſſors, and their unanimous oppoſition to the new doctrines, they found themſelves ultimately unable to reſiſt a ſingle man unſupported either by wealth or reputation. The plauſibility of his ſyſtem, and its being obvious to every capacity, overcame every obſtacle; ſo that even the practice of the Cullenians themſelves underwent conſiderable alterations. It is not, however, to be denied that the ſyſtem hath been conſiderably improved, or at leaſt altered, by ſome of Dr. Brown's pupils, who have had the advantage of extenſive practice, and of viſiting many different countries; which the Doctor himſelf never had. His materia medica was beſides exceedingly confined; the only medicines he had any great opinion of, being laudanum and ardent ſpirits. The Peruvian bark he held in very little eſtimation, as being a weak ſtimulus. He ſeems to have been unacquainted with the virtues of mercury, except in the venereal diſeaſe, and moſt probably would have given laudanum in thoſe caſes of fever where mercury is found by others to be ſo efficacious. But this deficiency hath been abundantly ſupplied by ſome of his followers. In a work entitled "The Science of Life," publiſhed by Dr. Yates and Mr. M'Lean, practitioners in the Eaſt Indies, we find mercury exhibited in prodigious doſes. As a ſpecimen we ſhall ſelect their third caſe, which was a dyſentery. On the firſt of September the patient took two grains of calomel and as much opium every two hours. This was continued

tinued for two days. On the third, the doſe was given every hour; beſides which, he had half an ounce of mercurial ointment with a drachm of calomel rubbed into his body. Next day the pills were continued, and the quantity of ointment tripled by thrice rubbing in. This was continued for three days, at which time, an eruption on the ſkin appearing, it was feared he could not be ſalivated; this eruption being a ſign that no ſalivation could be produced. The ſame mode of treatment, however, was perſiſted in. September 7th the calomel in the pills was augmented to four grains; the warm bath was uſed, and the ointment continued; but at night twenty grains of calomel and ſix of opium were given every two hours. At the ſame time two ounces of ointment, with four of calomel, were ordered to be rubbed in. Next day, though his pulſe was almoſt imperceptible, and his extremities cold, "the medicines were continued as far as circumſtances would admit;" with what view it is not ſaid, nor indeed is it eaſy to be diſcovered. At one in the morning, however, the patient died; an event not at all ſurpriſing. Our authors excuſe themſelves for this failure by ſaying that the viſcera of the patient were diſeaſed, as was evinced by the impoſſibility of exciting a ſalivation; and "that when a patient is evidently incurable by the common practice, it becomes the duty of the practitioner to depart from it."

No doubt we may readily aſſent to both theſe aſſertions; but though a patient be evidently incurable by the common practice, or by any other, there is no neceſſity for killing him, or for perſevering in a courſe of violent medicines that evidently make him worſe. The whole of this caſe indeed ſtrongly militates againſt the doctrine of excitement; for if mercury be ſuch a powerful ſtimulus to the powers of life in general, how comes it to paſs that in the preſent caſe the unhappy patient, inſtead of being in the ſmalleſt degree excited, was prodigiouſly debilitated, and that from the very firſt time of taking the medicines. This will appear from the following table, exhibiting the ſymptoms of the diſeaſe as they kept pace with the medicines taken.

Days of the Month.	Medicines taken.	Symptoms.
Auguſt 29 *& preceding.*	Ordinary doſes of mercury and opium.	Pain of bowels, and frequent ſtools, growing worſe.
Sept. 1 & 2.	Opium and mercury, two grains each, every two hours; beſides opiate draughts.	Still increaſing.
3d	The opium and mercury as before, but now given every hour; half an ounce of mercurial ointment, with 60 grains calomel.	Stools very frequent, with violent pain in the bowels; extreme thirſt, tongue furred, and no ſleep.
4th	Pills as uſual. Ointmt. thrice rubbed in, once with 120 grains of mercury.	Vomiting during the night. Tongue brown and furred.
5th	Medicines as before.	Violent pain in bowels.
6th	Medicines as before.	Extreme pain on preſſing the arch of the colon; frequent ſtools, profuſe ſweats, great dejection of ſpirits.
7th	Pills as before, with four grains of calomel. Mercury in the ointment increaſed to half an ounce. Warm bath. At night an ounce of mercurial ointment, with two ounces calomel.	As yeſterday. An eruption on the ſkin. At night inceſſant ſtools, with violent pain in the belly; profuſe ſweat.

8th Pills,

8th	Pills, ointment & calomel as before. Warm bath thrice. At night two ounces ointment, with four of calomel.	Inceſſant ſtools, with violent pain; at night with blood. Extreme debility.
9th	Medicines of the ſame kind, as many as could be taken.	Stools innumerable; extremities cold, pulſe ſcarce to be felt.
10th		Death at one in the morning.

From a conſideration of this patient's ſymptoms, in compariſon with the quantity of mercury taken, it moſt evidently appears, that it acted in no other way than as an irritating poiſon; affecting, with extreme violence, the already diſeaſed inteſtines, and, inſtead of exciting the vital powers of the whole ſyſtem, manifeſtly deſtroying them. Let it not be imagined, however, that this caſe is ſelected from the reſt merely becauſe it was fatal, or becauſe it affords an opportunity of finding fault with the practice recommended in the book. It is the only one in which the mercury had a fair trial; and even here it was not very fair, as being conjoined with a great quantity of opium. In the other caſes, which terminated favourably, the mercury was overpowered by ſuch horrible doſes of opium, that we cannot tell which medicine had the greateſt ſhare in the cure; beſides, that in other caſes the patients were allowed the free uſe of wine, which we all know to be a powerful ſtimulant and cordial; but it is not ſaid that the poor man, whoſe caſe is above related, had a ſingle drop of wine, or any thing elſe, except opium, to ſupport him againſt the action of ſuch a violent medicine.

On this caſe it is of importance ſtill to remark, that it affords, in the ſtrongeſt manner, an argument againſt what our authors ſay, p. 86, that "mercury acts by "ſupporting the excitement of the whole body, it in-"vigorates each particular part; and thus occaſions, to "a certain

"a certain extent, the regeneration of thoſe organs "which may have been injured by diſeaſe." In the inſtance adduced, there is no evidence of a ſtimulus upon any other part of the ſyſtem than the bowels, which were already debilitated or diſeaſed in ſuch a manner that they could not bear it. The ſyſtem in general, inſtead of being excited, was ſunk and debelitated from the very firſt moment, until at laſt the excitement terminated entirely by the patient's death. But further: There is very little probability that mercury or any other medicine whatever can prove a general ſtimulus, and that for the following reaſons.

1. No medicine can aſſimilate with the ſubſtance of the body. Medicines properly ſo called are here alluded to. Food or drink of any kind taken for the ſupport of the body while in health, however they may act medicinally upon occaſions, are excepted.

2. The body is compoſed of many various ſubſtances, each differing in its nature from the other. The nature of the medicine, whatever it may be, is uniform, and cannot act upon ſubſtances of different kinds in an uniform manner; and without this there can neither be an univerſal ſtimulant, nor an univerſal debilitant.

3. All medicines, being incapable of aſſimilation with the body, muſt be conſidered, when taken into it, as foreign matter; and the introduction of them at any rate is in fact the creating of a diſeaſe. This is evident from multitudes of inſtances where people by quacking with themſelves, and taking medicines unneceſſarily, have deſtroyed their health.

4. As every medicine has one peculiar nature, and one mode of action in conſequence of that nature, it muſt, when introduced into the body, where there are fluids of various natures, act upon one of them more than the reſt; and this may be called the *chemical* action of that medicine upon the body.

5. In conſequence of the chemical action of the medicine, the mode by which it is expelled out of the body will be different; for, as all medicines are extraneous ſubſtances, they muſt be ſent out of the body as faſt

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as poſſible; and it is their action upon one particular part which promotes their expulſion. Thus, if from the nature of the medicine it acts in a certain way upon the ſtomach and bowels, it will vomit or purge, or perhaps both; and by this action it is expelled from the body, along with whatever other matters happen to be in the ſtomach or inteſtines; and thus medicines do good only accidentally; for mere vomiting or purging are moſt certainly diſeaſes; but where noxious matters exiſt in the bowels, and do not naturally excite theſe operations, an emetic or purgative is unqueſtionably uſeful. Here the authors of the Science of Life reaſon differently; and it is worth while to refute their argument, as being the foundation of ſuch *tremendous* practice as nobody of common ſenſe would chooſe to be the ſubject of. Of tartar emetic they ſpeak in the following terms. "That tartar emetic is a ſtimulant of "very high power, is evident from the ſmall quantity of "it which produces the ſtate of indirect debility that "occaſions vomiting. It ſhould be given in ſuch a "manner as to increaſe and to ſupport the excitement. "But this will be found difficult, as the duration of "its action ſeems to be even ſhorter than that of opium. "If its action does not continue more than a quarter "of an hour, might it not be repeated at ſuch ſhort "intervals, and the doſes ſo reduced as to allow the "eſtabliſhment of the indirect debility?" This is arguing in a circle. They firſt ſuppoſe that vomiting is occaſioned by indirect debility, that is, the weakneſs produced by an exceſſive ſtimulus to the whole ſyſtem, as in caſes of drunkenneſs; and then, from the exiſtence of vomiting, they prove that a general ſtimulus had pre-exiſted. The caſes, however, are widely different. In caſes of drunkenneſs, the perſon feels himſelf at firſt exhilarated, alert and active, which ſhows the exiſtence of a general ſtimulus. But who has ever found himſelf exhilarated by taking a doſe of tartar emetic? Yet in a general excitement it is abſolutely neceſſary that this exhilaration ſhould take place, becauſe it is an inſeparable conſequence of an addition of vital power, let it come

come in what way it will. Thus we know that if a perſon happens to be much exhauſted by fatigue and abſtinence, he will be exhilarated and his ſtrength augmented by a ſingle mouthful of meat, as well as by a glaſs of wine. This ſhows that both theſe are general ſtimulants to the ſyſtem; but what medicine have we that will produce ſimilar effects? Perhaps opium comes the neareſt in the whole materia medica; but the uneaſineſs it occaſions in the ſtomach manifeſts a greater action upon it than the other parts; for if the whole body were equally excited, the withdrawing of the ſtimulus, or its naturally loſing its force, could only have the ſame effect with faſting or fatigue; but the debility of the ſtomach, the confuſion of the head, and other effects which attend a doſe of opium, demonſtrate that it acts partially. and not equally over the whole body. The Science of Life indeed ſays that theſe effects are owing to the improper omiſſion of the medicine, or not repeating the doſes in due time. This may be; but no improper exhibition of food, or want of due repetition, will produce ſuch ſymptoms; which undoubtedly is a proof that food ſtimulates the ſyſtem in one way, and opium in another.

6. If any medicine could be found that acted as an univerſal ſtimulus or exciter of the whole ſyſtem, it could not like others be expelled by any particular evacuation; but, by deſtroying the balance between the force of the acting powers and the ſubject on which they act, would moſt certainly kill, unleſs very powerful means were uſed to counteract its effect. The only ſtimulant we are acquainted with which acts equally on the whole ſyſtem, and which can be readily exhibited as a medicine, is that pure kind of air called by Dr. Prieſtley *dephlogiſticated*, by Scheele *empyreau*, and by the French chemiſts and their followers *oxygen*. The exciting powers of this air, when breathed inſtead of the ordinary atmoſphere, are aſtoniſhing. It not only augments the appetite, but the power of the muſcles, and the inclination to uſe them; ſo that without any intoxication or delirium the perſon cannot refrain from action; and

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it not only exhilarates the ſpirits in an extraordinary manner, but beautifies the face. Did the cure of diſeaſes therefore, or any ſet of them, depend on mere excitation, no other medicine but *oxygen* would be neceſſary. What effects it may have in diſeaſes of debility is not yet aſcertained; but to perſons in health it certainly proves fatal: their bodies are unable to bear its powerful action, and of conſequence they waſte, and would die of conſumptions, if its effects were not counteracted. Nor is this at all an eaſy matter; for Dr. Beddoes informs us that, by breathing this air for a ſhort time each day, only for three weeks, he found himſelf in great danger of a conſumption, and was obliged to uſe much butter and fat meat in his diet, beſides giving up the uſe of the air altogether, in order to get clear of its miſchievous effects.

Another mode of ſtimulating or exciting the whole ſyſtem is, by putting into it a larger quantity of blood than it naturally contains. This is entirely ſimilar to the breathing of *oxygen*; eſpecially if arterial blood be uſed, which has already imbibed its ſpiritous part from the atmoſphere. In the laſt century the transfuſion of blood was propoſed not only as a mode of curing diſeaſes, but of reſtoring old people to youth; and Dr. M'Kenzie, in his Treatiſe on Health, quotes from the memoirs of the Academy of Sciences ſeveral inſtances of the blood of brute animals being infuſed into human veins, without any inconvenience. It ſeems, however, not only a bold but an unnatural attempt to uſe the blood of beaſts for ſuch a purpoſe; and, however laviſh mankind may be of their blood upon certain occaſions, it is to be feared that there are few who would be willing to ſpare any to relieve another from ſickneſs; but indeed little can be ſaid about the practice; as, on account of ſome bad conſequences, or failures, it was forbidden by the king of France, and by the pope's mandate in Italy, and has now fallen into diſuſe. In a paragraph at the end of Heiſter's ſurgery (4to edition) it is aſſerted that the transfuſion of blood was productive of madneſs. Dr. Darwin, however, in his Zoonomia, ſtill propoſes the

the transfuſion of blood as a remedy, and even deſcribes a convenient apparatus for performing the operation. In one part of his work he ſays, "Might not the transfuſion of blood, ſuppoſe of four ounces daily, from a ſtrong man, or other healthful animal, as a ſheep or an aſs, be uſed in the early ſtate of nervous or putrid fevers?" In another place he mentions his having propoſed it to a gentleman whoſe throat was entirely cloſed up by an incurable ſwelling, ſo that he could ſwallow nothing. This is a diſeaſe not very rare, and which always muſt be fatal; becauſe the patients, though not affected by any ſickneſs, die of hunger; and, to relieve them from this miſerable ſituation, extraordinary attempts are not only allowable but laudable. The Doctor propoſed to his patient, "to ſupply him daily with a few "ounces of blood taken from an *aſs*, or from the *hu-* "*man animal*, who is *ſtill more patient and tractable*, in "the following manner: To fix a ſilver pipe, about an "inch long, to each extremity of a chicken's gut, the "part between the two ſilver ends to be meaſured by "filling it with warm water; to put one end into the "perſon hired for that purpoſe, ſo as to receive the "blood returning from the extremity; and when the "gut was quite full, and the blood running through the "other ſilver end, to introduce that end into the vein "of the patient, upwards towards the heart, ſo as to "admit no air along with the blood. And, laſtly, "to ſupport the gut and ſilver ends on a water plate "filled with water of 98 degrees of heat; and, to mea- "ſure how many ounces of blood were taken away, to "compreſs the gut from the receiving pipe to the deli- "vering pipe." The gentleman deſired a day to conſider of this propoſal, and then another; after which he totally refuſed it, ſaying that he was now too old to have much enjoyment of life, and that, being ſo far advanced in a journey which he muſt certainly accompliſh ſooner or later, he thought it better to proceed than return. The Doctor informs us that he died a few days afterwards, ſeemingly very eaſy, and careleſs about the matter. One experiment of this kind I have been witneſs to;

to; not indeed on a human creature, but on a calf. This creature received into one of its jugular veins a conſiderable quantity of blood from the carotid artery of another, nearly of the ſame age (about a month, or little more.) It was impoſſible to ſay any thing about how much was transfuſed; only the bleeding was continued till the animal which loſt the blood began to ſhew ſigns of faintneſs. The artery was then tied up, and the orifice in the jugular vein cloſed. The calf which had loſt the blood appeared very languid and faint, but lived a few days in a drooping ſtate; when it either died of itſelf, or was killed, as being ſuppoſed paſt recovery. The other, which had received the blood, appeared to be in every reſpect highly excited. It became playful, even in the room where the operation was performed, its eyes aſſumed a bright and ſhining appearance, and its appetite was greatly increaſed. Thus it continued for about a fortnight; appearing all the time to be in high health, and eating much more than uſual; but at laſt died ſuddenly in the night. From theſe effects on healthy ſubjects, however, we cannot infer what would happen in ſuch as are diſeaſed; but it is plain that if the cure of diſeaſes were to depend upon mere *excitation*, the means are in our power, without any local irritation, which always muſt take place in ſome degree by the uſe of ordinary medicines. This path is not abſolutely untrodden: the pneumatic practitioners of the preſent day have tried oxygen in conſumptions, and found it pernicious; and Dr. M'Kenzie informs us that the transfuſion of blood was tried ineffectually in the ſame.

7. As all the medicines uſually preſcribed at preſent are only to be accounted partially ſtimulant, or as acting upon particular parts of the ſyſtem, we ſee that ſome may promote one evacuation, and ſome another; while all produce ſome change in the organization, which may prove uſeful or detrimental, may increaſe the diſeaſe or cure it, or may produce another, according to the judicious or injudicious application. But for a knowledge of all this we muſt be indebted to experience: there is not a theory on earth that can lead us a ſingle ſtep.

Before we diſmiſs the conſideration of medical theories, however, it will ſtill be neceſſary to give ſome account of the new ſyſtem as it hath branched out in various ways: for though the fundamental principle is now received by a great number of phyſicians, yet the ſuperſtructure is exceedingly different from what Dr. Brown himſelf erected; and, indeed, from the very ſame principles we find concluſions made as directly oppoſite to one another as can be expreſſed in words. Drs. Yates and M'Lean, for inſtance, at Calcutta in the Eaſt Indies, have concluded that the plague "is a diſeaſe of a very high degree of exhauſtion;" which Dr. Brown would have called debility. Dr. Ruſh at Philadelphia, proceeding alſo upon the Brunonian principles, determines it to be the moſt inflammatory of all diſeaſes,* and which Dr. Brown would have called a diſeaſe of excitement. Theſe two doctrines are, in every ſenſe of the word, as diſtant from one another as eaſt from weſt. Let us then conſider both, if any conſideration can avail us on the ſubject.

By the ancients it was ſuppoſed that diſeaſes were occaſioned by ſomething either bred in the body or received into it, and that the power of nature produced, during the courſe of the diſeaſe, a certain change in this matter, called *coction*, or *concoction*; which, if we pleaſe, we may expreſs by the Engliſh word *cooking*. The matter of the diſeaſe, called alſo *morbific* matter, thus *cooked*, was in a ſtate proper for expulſion, and was therefore thrown out by ſweat, vomit, ſtool, &c. or it might be expelled artificially, which could not have been attempted with ſafety before. Modern ſyſtems deny the exiſtence of morbific matter, and reſolve all into an affection of the nerves, according to Dr. Cullen by certain ſedative cauſes, but according to Dr. Brown by an accumulation in ſome caſes, and an exhauſtion in others, of the excitability or excitement of the body. The Science of Life commences with ſtating what they ſuppoſe to be an improvement of the Brunonian principles, and from which the following account of the origin

* See above, p. 102.

gin of diſeaſes is extracted. "Upon the different ſtates of "*excitability* depend all the phenomena of health and diſ- "eaſe. There are three ſtates of the excitability. 1. The "ſtate of accumulation; when a portion of the uſual "ſtimuli is withheld. . . . . When a portion of the "uſual ſtimuli is withheld, the excitability accumulates, "and the body becomes ſuſceptible of impreſſion in the "direct ratio of the ſubduction. This ſtate conſtitutes "diſeaſes of accumulation, or of direct debility. 2. The "middle ſtate; when the excitability is ſuch that the ap- "plication of the accuſtomed degree of exciting powers "produces *tone* or *health*. 3. The ſtate of exhauſtion. "When the application of ſtimuli has been greater than "that which produces healthy action, the excitability is "exhauſted, and the body becomes leſs ſuſceptible of "impreſſion in the direct ratio of the exceſs. This ſtate "conſtitutes diſeaſes of exhauſtion, or of indirect debility. "The ſtates of accumulation and exhauſtion of the ex- "citability, in their different degrees, conſtitute all the "diſeaſes to which living bodies are ſubject."

Here the chime runs on the word *excitability*, which is not defined. If we call this property *life*, then we are only informed, that, as life is more or leſs vigorous, the body enjoys a greater or ſmaller degree of health; which we know without any medical inſtructor. If, inſtead of the accumulation and exhauſtion of excitability, we take the original doctrine of excitement and debility laid down by Dr. Brown himſelf, we are nothing better. The whole theory is loſt for want of the definition of a ſingle word. As long as *excitability* remains an unknown property, we can explain nothing by it. We may indeed vary our terms. We may call it *nervous influence* with Dr. Cullen, or *ſenſorial power* with Dr. Darwin; but we ſhall ſtill be as much in the dark as ever; and all that can be made out of our theories, when our language is *decyphered*, muſt be, that ſometimes people are well, and ſometimes they are ſick!

Dr. Ruſh, in his Treatiſe on the Proximate Cauſe of Fever, adopts in part Dr. Brown's ſyſtem pretty nearly as the author himſelf laid it down. "Fevers of all "kinds

" kinds (ſays he) are preceded by general debility. This " debility is of two kinds, viz. direct and indirect. The " former depends upon an abſtraction of uſual and " natural ſtimuli; the latter upon an increaſe of natural, " or upon the action of preternatural, ſtimuli upon the " body. . . . . Debility is always ſucceeded by increaſed " excitability, or a greater aptitude to be acted upon by " ſtimuli. . . . . The diminution or abſtraction of one " ſtimulus is always followed by the increaſed action of " others." Here it is evident we are as much in want of definitions as ever. We know neither what *excitability* is, nor what *debility* is, and yet they are both held out as the *cauſes*, and *proximate* or *immediate* cauſes, too, of ſymptoms produced by things quite obvious to our ſenſes. Thus cold and heat, with which we are daily converſant, are only called the *prediſpoſing* cauſes of fever; while *debility* and *excitement*, words to which we have no meaning, are ſaid to be the *proximate* cauſe. It would certainly be better to throw away ſuch words altogether, and ſay that cold, heat, &c. cauſe fevers, without troubling ourſelves farther about the matter.

It remains now to take into conſideration the pneumatic theories, founded upon the diſcoveries made by Dr. Black, Dr. Prieſtley, Lavoiſier, and others, concerning various kinds of aerial fluids, or *gaſes*,* as they are alſo called. Some of theſe, particularly that afterwards called fixed air, were diſcovered by Van Helmont. Conſiderable advances were made by a German chemiſt, named *Mayow*, in the laſt century; but his book had fallen into ſuch oblivion that his name was ſcarce ever mentioned, until his diſcoveries were repeated, and ſtill greater advances made by others. Dr. Hales obtained air from a great many different ſubſtances, but was unable to aſcertain any thing concerning its nature. Dr. Black of Edinburgh laid the foundation of pneumatic chemiſtry, by diſcovering that a certain ſpecies of air is capable of being abſorbed by earths of different kinds, and that many very heavy ſubſtances owe at leaſt one half

* *Gas* is a German word, or derived from one, ſignifying *ſpirit*. The word *gboſt* comes from the ſame original.

half of their weight to this condenſed air. The diſcovery was accidental. Wiſhing to obtain a very pure and white lime, he had recourſe to the fine white earth called *magneſia alba*. Some of this he diſtilled with a heat ſufficient to make the veſſel red hot. Only a very ſmall quantity of water came over, but the magneſia had loſt almoſt two thirds of its weight. This immenſe loſs was found to ariſe from an emiſſion of air during the operation; and by other experiments it was likewiſe found that the air might be transferred from one portion of magneſia to another from which it had been previouſly expelled; that the exiſtence of this ſpecies of air in certain bodies was the cauſe of that fermentation which takes place when any acid is poured upon them, as vinegar upon chalk or potaſh. Hence if any of theſe ſubſtances be deprived of its air, it will not any longer ferment in this manner. It muſt not be forgot, however, that when air thus unites itſelf with any terreſtrial ſubſtance it no longer has its former properties. It is reduced exceedingly in bulk, and in proportion to this reduction only the body is increaſed in weight; and therefore though we ſay that the *air* is abſorbed, we muſt ſtill remember that only *one part* of it is ſo, and that by far the leaſt conſiderable in bulk. A violent fire will always expel the air again, and reſtore it to its former bulk; and again the condenſation or abſorption of the air is always attended with the production of heat. This laſt property was not much attended to by Dr. Black, but others have obſerved it; and the late Dr. Charles Webſter of Edinburgh publiſhed a theory in which he maintained that condenſation was in *all* caſes the cauſe of of heat. But, however true it may be that condenſation of any kind is followed or accompanied by heat, it is evidently neceſſary to know the cauſe of the *condenſation* alſo, otherwiſe we make no advance in ſolid theory.

The aerial fluid, diſcovered by Dr. Black, was one of thoſe moſt commonly met with. He called it *fixed air*, from its property of adhering or fixing itſelf to different bodies. It was found to be the ſame with that which had been diſcovered by Van Helmont, and by him

him named *gas ſylveſtre* (ſpirit of wood)* or the ſume of charcoal; it was found to be the ſame with the ſteam of fermenting liquor, and with that very frequent and dangerous vapour, met with in coal mines, called in Scotland the *choke-damp*. Like other diſcoveries, this was quickly puſhed beyond its proper bounds, and applied to the ſolution of phenomena which it could not ſolve. Dr. M'Bride, particularly, ſuppoſed it to be the bond of union between the particles of matter, or in other words the principle of coheſion itſelf. It was alſo ſuppoſed to be the ſubſtance of thoſe ſcorching winds, called *famiel*, met with in Aſia and Africa, and which ſometimes prove fatal to travellers. The pernicious vapours called *moſetes*, which ſometimes iſſue from the old lavas of Veſuvius in Italy, were likewiſe ſuppoſed to be the ſame;† but of this, particularly with regard to the famiel, there ſeems to be no ſufficient evidence. The

* This muſt be underſtood only of its general properties and effects; for, though the ſume of charcoal poſſeſſes many of the apparent properties of pure fixed air, it contains alſo a very conſiderable quantity of another kind of gas.

† Many fabulous ſtories have been related concerning the famiel. Even ſo late a traveller as Mr. Ives has adopted ſome of thoſe exaggerated accounts which have been diſcredited by thoſe who have long reſided in the countries where this wind is commonly met with. It is not peculiar to the deſerts of Arabia, but is met with in all hot countries which are deſtitute of water. In the African deſerts therefore it is common; and Mr. Bruce deſcribes it by the name of *ſimoom*. It was preceded by whirlwinds of a very extraordinary kind. "In that vaſt expanſe of deſert (ſays he) from W. "and to N. W. of us, we ſaw a number of prodigious pillars of ſand at dif- "ferent diſtances, at times moving with great celerity, at others walking on "with a majeſtic ſlowneſs. At intervals we thought they were coming in a "very few minutes to overwhelm us; and ſmall quantities of ſand did actu- "ally more than once reach us. Again they would retreat ſo as to be almoſt out "of ſight; their tops reaching to the very clouds.* There the tops often ſe- "parated from the bodies; and theſe, once disjoined, diſperſed in the air, "and did not appear more. Sometimes they were broken near the middle, "as if ſtruck with a large cannon ſhot. About noon they began to advance "with conſiderable ſwiftneſs upon us, the wind being very ſtrong at north. "Eleven of them ranged along ſide of us at about the diſtance of three "miles. The largeſt of them appeared to me at that diſtance to be about "ten feet diameter. . . . . It was in vain to think of flying; the ſwifteſt "horſe or the faſted ſailing ſhip could be of no uſe to carry us out of this "danger; and the full perſuaſion of this rivetted me as if to the ſpot where "I ſtood." At another time he ſaw them in much greater number, but of ſmaller ſize. They began immediately after ſunriſe, like a thick wood, and almoſt darkened the ſun. His rays darting through them gave them the appearance of pillars of fire. They now approached to the diſtance of two miles from our travellers. At another time they appeared beautifully ſpangled

N. B. In theſe ſandy deſerts, where it never rains, there are no clouds.

The induſtry of other experimenters did not long leave theoriſts without abundance of materials upon which they might exerciſe their talents. It is impoſſible in this place to aſſign to each his proper rank in the way of diſcovery, or indeed to mention their names. Dr. Prieſtley has diſtinguiſhed himſelf far above the reſt. He not only repeated and improved Dr. Black's experiments on *fixed air*, but likewiſe found out a number of other kinds; particularly that from animal ſubſtances in a ſtate of putrefaction, which is ſo pernicious to living creatures, inſects excepted; for theſe laſt will thrive amazingly in air that would prove certain death to a man. He alſo diſcovered that this kind of air, and ſome others, were abſorbed by vegetables, and thence inferred the uſe of vegetables in purifying the atmoſphere. He even analyſed the atmoſphere itſelf, and found that it

ſpangled with ſtars. In Darwin's Botanic Garden we find a reaſon aſſigned for the appearance of theſe whirlwinds; viz. the impulſe of the wind on a long ledge of broken rocks which bound the deſert. By theſe the currents of air which ſtruck their ſides were bent, and were thus like eddies in a ſtream of water which falls againſt oblique obſtacles. In the ſame work we have the following poetical deſcription of them:

"Now o'er their heads the whizzing whirlwinds breathe,
And the live deſert pants and heaves beneath;
Ting'd by the crimſon ſun, vaſt columns riſe
Of eddying ſands, and war amid the ſkies,
In red arcades the billowy plains ſurround,
And whirling turrets ſtalk along the ground."

Whether the ſimoom is always preceded by theſe whirlwinds we know not; but Mr. Bruce mentions an extreme redneſs of the air, pointed out by his attendant Idris, as the ſure preſage. His advice was, that all of them, upon the approach of the pernicious blaſt, ſhould fall upon their faces, with their mouths on the earth, and hold their breath as long as poſſible, ſo that they might not inhale the deadly vapour. They ſoon had occaſion to follow this advice; for next day Idris called out to them to fall upon their faces, for the ſimoom was coming. "I ſaw (ſays Mr. Bruce) from the S. E. a haze coming, in colour like the purple part of the rainbow, but not ſo compreſſed or thick. It did not occupy twenty yards in breadth, and was about twelve feet high from the ground. It was a kind of bluſh upon the air, and it moved very rapidly; for I could ſcarce turn to fall upon the ground, with my face to the northward, when I felt the heat of its current plainly upon my face. We all lay flat on the ground, as if dead, till Idris told us it was blown over. The meteor, or purple haze, which I ſaw, was indeed paſſed; but the light air that ſtill blew was of heat ſufficient to threaten ſuffocation. For my part, I felt diſtinctly in my breaſt that I had imbibed a part of it; nor was I free of an aſthmatic ſenſation till I had been ſome months in Italy, at the baths of Poretta, near two years afterwards." It continued to blow for ſome time, and in ſuch a manner as entirely to exhauſt them, though ſcarcely ſufficient to raiſe a leaf from the ground.

The account given by Mr. Ives is, that it blows over the deſert (of Syria) in the months of July and Auguſt, from the northweſt quarter, and ſometimes continues

it conſiſted of two different kinds of fluids, one of which he called *dephlogiſticated*, the other *phlogiſticated* air. The former was found to ſupport animal life for a time, the latter to deſtroy it inſtantly. Their effects upon fire were the ſame; the former exciting the moſt vehement heat and bright flame, the latter extinguiſhing a fire at once.

The fame of Dr. Prieſtley's diſcoveries quickly reached the continent of Europe; the French chemiſts repeated his experiments with improvements, as they thought; and indeed certainly made many curious diſcoveries. Lavoiſier was particularly remarkable for his numerous and accurate experiments; but, by his changing entirely the language of former chemiſts, and ſubſtituting a ſet of new terms of his own invention, he certainly entailed the greateſt curſe upon the ſcience it ever met with. It belongs not to this treatiſe to give an account of his ſyſtem farther than to ſay, that, from the immenſe proportion

continues with all its violence to the very gates of Bagdad, but never affects any body within its walls. Some years it does not blow at all, and in others it comes ſix, eight, or ten times, but ſeldom continues more than a few minutes at a time. It often paſſes with the apparent quickneſs of lightning. The ſign of its approach is a thick haze, which appears like a cloud of duſt riſing out of the horizon, on which they throw themſelves with their faces on the ground, as already mentioned. Camels are ſaid, inſtinctively, to bury their noſes in the ſand. As for the ſtories of its diſſolving the coheſion of the body in ſuch a manner that a leg or an arm may be pulled away from thoſe who are killed by it, or that their bodies are reduced to a gelatinous ſubſtance, we cannot by any means give credit to them. From its extreme quickneſs, and luminous appearance, it would ſeem to be an electrical phenomenon immediately preceding thoſe vehement hot winds which all travellers agree in likening to the vapour iſſuing from a large oven when the bread is newly taken out. Its electrical nature will be more probable from the account given by Mr. Ives, that the Arabians ſay it always leaves behind it a very ſulphureous ſmell. Theſe particulars do not at all accord with the ſuppoſition of its conſiſting of fixed air. I have indeed been aſſured by a gentleman long in the ſervice of the Engliſh Eaſt India Company, that the ſamiel cannot paſs over a river. Hence probably it has been ſuppoſed to be a blaſt of fixed air, becauſe this ſpecies of gas is readily abſorbed by water; but we know that the ſame thing would alſo take place with any quantity of electric matter; for water takes up this alſo much more completely than it does fixed air.

The *moſetes* are inviſible, and kill in an inſtant. They riſe from old volcanic lavas, and, as it were, creep on the ground, and enter into houſes, ſo that they are very dangerous; but, though they may probably conſiſt of fixed air, we have not as yet any direct proof of it. It is not indeed eaſy to imagine why any lava ſhould ſuddenly emit a great quantity of fixed air, and then as ſuddenly ceaſe; nor in what manner the air thus emitted ſhould continue unmixed with the atmoſphere; for fixed air will very readily mix in this manner, inſomuch that a large quantity of it being let looſe in a room has been found to vaniſh entirely in leſs than half an hour. Sir William Hamilton mentions a moſete having got into the palace of the king of Naples.

proportion of condenſed aerial matter found in moſt terreſtrial ſubſtances, he and his followers were led to conclude, that different ſpecies of air conſtitute almoſt the *whole* of the terraqueous globe. Water particularly they have abſolutely and moſt poſitively determined to be a compoſition of two airs condenſed, viz. the dephlogiſticated and inflammable, which they call *oxygen* and *hydrogen*. However, this doctrine is ſtill oppoſed by Dr. Prieſtley and ſome others.

In the midſt of ſo much theory, and ſo many new and ſurpriſing diſcoveries, it would have been wonderful indeed if the ſcience of medicine had kept free from innovation. It did not: the new chemiſtry, with all its formidable apparatus of hard words, was introduced, and thus the ſtudy of the ſcience, already very difficult, was rendered ſtill more ſo. In paſſing this cenſure upon the modern *nomenclature*, as it is called, I am ſenſible that I muſt rank with the minority; nevertheleſs, I have the ſatisfaction of finding that I am not altogether ſingular. Dr. Ferriar, in the preface to his ſecond volume, complains, "that, with every attempt towards the for-"mation of a ſyſtem, new applications of words are in-"troduced, which, though deſirable in the art of po-"etry, are very inconvenient in pathological books, eſpe-"cially when this is done to give an air of novelty to "old theories and obſervations. For, between the an-"cient language, which practitioners cannot entirely "reject, and the new dialect, which they cannot wholly "adopt, the ſtyle of medical books is reduced to a kind "of jargon, that the author himſelf may poſſibly under-"ſtand, but which his readers find it very difficult to "unriddle. Hence reſults a neglect of medical litera-"ture, and hence the pernicious habit of regarding as "new whatever has not appeared in the publications of "the laſt half century." To the ſame or a ſimilar purpoſe, in the preface to his firſt volume, he cites Quintilian. *"Some have ſuch a multitude of vain words, that, while they are afraid of ſpeaking like other people, by

* Eſt etiam in quibuſdam turba inanium verborum, qui dum communem loquendi morem reformidant, ducti ſpecie nitoris, circumeunt omnia, copioſa loquacitate, quæ dicere volunt.

by a kind of affected elegance, they confound every thing they have to say with their immense loquacity."

The pneumatic system naturally arose from a consideration of the composition of the atmosphere we breathe. Finding this fluid to be composed of two others, the one of which would preserve life for some time at least, and the other instantly destroy it, it became natural to think that diseases might be produced by any considerable variation in the proportion of these ingredients. An instrument was soon invented by which any considerable variation in this respect might be discovered; but upon trial this was found to be of very little use. Dr. Priestley himself tried, by means of this instrument, some very offensive air which had been brought from a manufactory, and could find no remarkable difference between it and that which was accounted pure. Still, however, it was evident that by increasing very much the proportion of one of the ingredients, some considerable alteration might be produced, which could not but be perceptible in the human body; and this led to the application of aerial chemistry to disorders of the lungs. The mixture chosen for this purpose was pure dephlogisticated *(oxygen)* with inflammable air *(hydrogen;)* and, though this has not been known to effect a radical cure, it certainly has given relief in many cases. In fevers also the application of fixed air (carbonic acid) hath been found advantageous; but with regard to oxygen and some others we have not yet a decided instance of their good effects in any case. Dr. Beddoes indeed is of opinion that it would be of service in the sea-scurvy; but in this (whether his conjecture be right or wrong) the theory is certainly erroneous, as shall presently be evinced.

In considering the pneumatic system it is evident that modern chemists have fallen into the same error with their predecessors, viz. of supposing that every thing which by the force of fire or otherwise they could produce, from any substance, previously existed in it. Hence, as from a piece of bone for instance, a chemist can produce water, salt, oil and earth, it was supposed that

that theſe four were the principles or elements of the bone. But this was falſe reaſoning; for if theſe were really the chemical principles, they ought to have been able to produce ſome kind of bony ſubſtance by mixing them together after they had been diſtilled. But no ſuch thing could be done; and though we ſhould add to the mixture the whole quantity of air emitted during the diſtillation, and which eſcaped the notice of ancient chemiſts, our ſucceſs would be no better. In like manner, becauſe in certain circumſtances oxygen is obtained from the fleſh of animals, it has been concluded that it neceſſarily exiſts as an ingredient in their bodies while living; and that, if this kind of air happens to predominate, the animal will be affected in one way, or if hydrogen prevail, in another. But though we have already quoted Dr. Girtanner with approbation as having obtained oxygen gas from freſh meat, yet this does not by any means prove to us that it exiſts in fleſh as one of its component parts. Even in the Doctor's experiment it was neceſſary to expoſe the fleſh to the atmoſphere in order to procure the gas by diſtillation; which undoubtedly muſt excite a ſtrong ſuſpicion that the air in queſtion comes from the atmoſphere itſelf; and, if this is the caſe, it is not reaſonable to ſuppoſe that a diſeaſe could be cured by any addition of oxygen to the ſolid parts; becauſe, though ſound fleſh may have an inclination to abſorb this kind of air, we do not know whether it would have ſuch a property of abſorption in a diſeaſed ſtate. Indeed in the ſcurvy, which Dr. Beddoes chooſes as an example, experiment ſeems to determine in favour of *fixed air* rather than any other. But let us hear Dr. Girtanner himſelf, who has at large diſcuſſed this ſubject in two memoirs; one upon the laws of irritability, and another on the principle of irritatibility.

In theſe memoirs we find the Brunonian doctrine ſet forth with ſuch ſilence in regard to Dr. Brown himſelf, that ſome have not ſcrupled to charge Dr. Girtanner with literary *theft*; but this is a matter which belongs not to us to conſider: the theory may be very good, whether ſtolen or not. He changes the word *excitability*,

lity, uſed by Dr. Brown, for *irritability*; but hath the misfortune of not being able to tell us what he means by it. He goes on, however, to diſtinguiſh the three ſtates of *tone* or health, *accumulation*, and *exhauſtion*, as other Brunonians do. Health, he ſays, in a fibre "conſiſts in a certain quantity of the irritable principle "neceſſary for its preſervation. To maintain this ſtate, "the action of the ſtimulus muſt be ſtrong enough to "carry off from the fibre the ſurplus of this irritable prin-"ciple, which the lungs and the circulation of the "fluids are continually ſupplying. For this a certain "equilibrium is neceſſary between the ſtimuli applied "and the irritability of the fibre, in fine that the ſum of "all the ſtimuli acting upon it may be always nearly "equal; powerful enough to carry off from the fibre "the exceſs of its irritability, and not ſo ſtrong as to "carry off more than this exceſs. . . . . When the "ſum of the ſtimuli acting upon the fibre is not great "enough to carry off all its exceſs of irritability, the "irritable principle accumulates in the fibre, and then "it is found in that ſtate which I call the *ſtate of accu-*"*mulation*; the irritable principle accumulates in the "fibre, its irritability is augmented, and the ſtimuli pro-"duce much ſtronger contractions than when the fibre "only retains its tone. . . . . When the ſum of the "ſtimuli acting upon the fibre is too great, the fibre "is deprived not only of the exceſs of its irritability, but "alſo of ſome portion of the irritable principle neceſſary "for the tone of the fibre; or, more properly ſpeaking, "the fibre loſes more irritability than it receives, and, "of courſe, in a ſhort time finds itſelf in a ſtate of *ex-*"*hauſtion*; and this exhauſtion will be either *temporary*, "or *irreparable*."

Here it is evident that we have nothing but Dr. Brown's ſyſtem, without the leaſt explanation to render it more intelligible. A definition is ſtill wanting. This inviſible and incomprehenſible property of *irritability* ruins our whole fabric; nor can the deficiency be ſupplied by human art or ſkill: of conſequence we muſt abandon this part of the ſyſtem entirely, and come to

ſomething

ſomething more cognizable by our ſenſes. It is impoſſible, however, to paſs over in ſilence the amazing inattention of the author, in imagining that on ſuch unintelligible principles he could explain other phenomena. "In the ſtate of *temporary exhauſtion* (ſays he) the fibre "loſes its tone, and fails for want of irritability. The "application of a ſtimulus while it is in this ſtate will "not make it contract. Provided the ſtimulus be not "very ſtrong, it will produce no effect at all, but in a "ſhort time the irritable principle will accumulate afreſh "in the fibre, and then it will again contract. It is "only by little and little that the fibre recovers its irri-"tability. This truth, I dare venture to ſay, is as new "as it is ſtriking. It unfolds a vaſt number of phe-"nomena hitherto inexplicable." Here we have nothing but the pompous declaration of a fact already well known; viz. that not only a *fibre*, but the whole body, may be in a ſtate of temporary inſenſibility, and yet recover either of itſelf or by the uſe of external means. How many people have fallen into a *ſyncope*, and yet recovered! How many limbs have become paralytic, and in time recovered their ſenſe and motion! Yet this is all that we are informed of with ſo much parade and aſſumption of novelty. We know that when a perſon is in a faint he is inſenſible to ordinary ſtimuli, though very ſtrong ones will rouſe him; but what can we infer from this? Nothing: only we ſee it is ſo. Does it avail us any thing to be told that during the time of fainting the *irritability* is exhauſted, and "in a ſhort time the irritable principle will accumulate afreſh;" in which caſe the patient will no doubt recover, unleſs he happens to be dead, which is the true meaning of an *irreparable exhauſtion* of the irritability.

In ſpeaking of the principle of irritability he expreſſes himſelf in the following manner. "I think that the "oxygen is abſorbed by the blood, and that the venous "blood is oxygenated in the lungs during reſpiration. "The moſt celebrated naturaliſts and chemiſts are of a "different opinion: they think that the oxygen does "not combine with the venous blood. According to

"them,

" them, this laſt loſes carbon and hydrogen, and re-
" covers the bright colour natural to it, without abſorb-
" ing any thing from the atmoſphere. . . . . After hav-
" ing a long time attended the phenomena of reſpira-
" tion, and made many experiments upon this ſubject,
" I think it may be concluded that one part of the
" oxygen of the vital air combines with the venous
" blood, of which it changes the black colour, and
" makes it vermilion;* the ſecond part of the oxygen
" unites with the carbon contained in the carbonic-hy-
" drogen gas, which exhales from the venous blood, and
" forms carbonic acid air; a third part unites with the
" carbon of the mucus, contained in great quantities in
" the lungs, and which is continually decompoſing; this
" part alſo forms carbonic acid air; a fourth part of the
" oxygen combines with the hydrogen of the blood to
" form water."

On this theory I ſhall only obſerve, that though I lay claim to the former part, I allow the Doctor all the latter part to himſelf; particularly where he ſpeaks of the *formation* of water to be exhaled during reſpiration. The air in queſtion conſiſts of two parts, like *fixed air* already mentioned. One of theſe is capable of being attracted, condenſed, or united with certain ſubſtances; the other vaniſhes, leaving no other traces of its having ever exiſted, but heat, greater or leſs according to circumſtances. When the air is taken into the blood, one part of it undoubtedly combines with ſomething thrown out by the lungs, and forms *fixed air*, of which our breath contains a conſiderable quantity. We know certainly that the condenſable part of fixed air is formed out of the condenſable part of the oxygen, with certain additions. As therefore great part of this condenſable oxygen is thrown out in fixed air at every expiration, it is natural to ſuppoſe that all of it is ſo: at leaſt we cannot know the

* Here Dr. Beddoes, from whoſe publication this account of Girtanner's memoir is taken, has the following note: " Dr. Goodwyn had proved this before. Could Dr. Girtanner be ignorant of his experiments?" In juſtice to myſelf, however, I muſt obſerve that this very doctrine had been publiſhed in the ENCYCLOPÆDIA BRITANNICA long before either Dr. Goodwyn or Dr. Girtanner had made any experiments on the ſubject. It may ſtill be ſeen under the article BLOOD, and reaſons are there given for ſuppoſing that only *one* part of the oxygen, viz, the elaſtic part, can be abſorbed.

the contrary without a ſeries of very difficult and tedious experiments, which have never been made by Dr. Girtanner or any body elſe. But if the whole of this condenſable part be thrown out, none can enter the blood by the breath; and conſequently whatever true oxygen may afterwards be expelled from that fluid, muſt be a factitious ſubſtance, formed either during the artificial proceſs, uſed for diſtilling it, or by a natural proceſs in the body itſelf. It is not therefore at all probable that the oxygen which fleſh emits in diſtillation can be derived from the air by reſpiration.

Another and more probable ſource is the food and drink we take; all of which are more or leſs impregnated with air of different kinds, particularly fixed air. This, we know, very readily condenſes, and certainly will do ſo when taken into the body. In this ſtate it not only may, but certainly will, paſs into the blood, and through all the different parts of the body, until, having accompliſhed its purpoſe, whatever that may be, it is thrown out by inſenſible perſpiration, as has been already explained.

The concluſions drawn by Dr. Girtanner from his experiments are, 1. That the change of colour which the blood undergoes during the circulation is not owing to its combination with hydrogen air.* 2. The deep colour

* Here it is neceſſary to obſerve, for the ſake of accuracy and perſpicuity, that, in the new chemiſtry, the terms of which are now very generally adopted, the words *oxygen* and *hydrogen* when mentioned by themſelves are not underſtood to ſignify any kind of air, but what I have called the condenſable part of the air. If the word *air* is added, then the whole ſubſtance of the fluid is underſtood. But though this is the ſtrict orthodox language of the new chemiſtry, it is impoſſible to ſay whether every one who adopts the terms be ſufficiently careful in this reſpect. Indeed this is one out of many inconveniences that might be pointed out which have ariſen from this nomenclature; for thus the mere omiſſion of a monoſyllable, which may happen in numberleſs inſtances, totally perverts the meaning of the author, and may of courſe ſubject him to unmerited cenſure. Beſides, it is not to be known, unleſs the author tells us ſo, that he deſigns to obſerve this ſtrictneſs, and of conſequence we muſt in multitudes of caſes be uncertain of the meaning of what we read. Thus, in the preſent inſtance, when Dr. Girtanner ſpeaks of *oxygen*, we know not certainly whether he means the air in ſubſtance, or only one of its component parts. Probably he means the condenſable or ſolid part. If he does ſo, there muſt be a very material difference between his theory and that laid down in the Encyclopædia, and which is ſupported throughout this treatiſe. In the latter it is maintained that the condenſable part is thrown out by the breath, being previouſly converted into fixed air, while the elaſtic part enters the vital fluid, communicating to it not only the red colour, but heat, and the principles of life and ſenſation, as will be more fully explained in the ſequel.

colour of the blood in the veins is owing to the *carbon* it contains. 3. That the vermilion colour of the arterial blood proceeds from the oxygen with which the blood is conjoined during its paſſage through the lungs. 4. That reſpiration is a proceſs exactly analogous to the combuſtion and oxydation of metals; that theſe phenomena are the ſame, and to be explained in the ſame manner. 5. That, during circulation, the blood loſes its oxygen, and charges itſelf with *carbonic hydrogen* air, by means of a double affinity. 6. That, during the diſtribution of the oxygen through the ſyſtem, the heat which was united with this oxygen eſcapes; hence the animal heat. 7. That the great capacity of arterial blood for heat is owing to the oxygen with which it is united in the lungs.

On theſe propoſitions, which conſtitute in a great meaſure the fundamental principles of the doctrine of *oxygenation* of the human body, we may remark,

1. Nobody can reaſonably ſuppoſe that hydrogen air is the cauſe of the dark colour of the blood in the veins, becauſe there is no ſource from which it can be derived; and, beſides, it is certain that no kind of air can exiſt in its elaſtic ſtate in the blood, without deſtroying the life of the animal. Some experiments proving this are given by Dr. Girtanner himſelf. It is true that an aerial vapour, of the nature of *fixed air*, exhales from the body by inſenſible perſpiration; but there can be no doubt that this receives its elaſticity only at the ſurface of the body, and is expelled the moment it is formed. It has indeed been proved, by undeniable experiment, that no air of any kind exiſts in the larger veins; becauſe a portion of a vein, included between two ligatures, being cut out, and put under the receiver of an air-pump, does not ſwell in the leaſt when the air is exhauſted, which yet muſt be the caſe, did the ſmalleſt quantity of elaſtic air exiſt in it.* 2. When

* *Hydrogen* air is the ſame with that by Dr. Prieſtley called *inflammable* air. He alſo diſcovered the true compoſition of it. Having included a few grains of charcoal in the receiver of an air-pump, and exhauſted the air, he heated it in vacuo by means of a large burning glaſs. The charcoal was entirely volatilized and converted into this kind of air. He found, however, that without ſome ſmall portion of moiſture this volatilization did not take place.

2. When the Doctor aſſerts that the dark colour of the venous blood is owing to the carbon it contains, he is in the firſt place chargeable with the error of former chemiſts, who ſuppoſed that every thing which could be extracted from any ſubſtance by fire, exiſted previouſly in it, in thatvery form in which it is extracted by the fire; and in the ſecond place he ſpeaks entirely at random, without even a ſhadow of proof. Nay, he himſelf tells us, that he has repeated two of Dr. Prieſtley's experiments, which in the cleareſt manner demonſtrate, that neither the addition nor the abſtraction of carbon, or any thing elſe, give this dark colour to the venous blood. "A ſmall glaſs tube (ſays he) filled with arterial blood, of a bright vermilion, was ſealed hermetically,* and expoſed to the light. The blood changed its colour by degrees, and in ſix days became black as venous blood. The ſame experiment was repeated, with this difference only, that the tube was expoſed to heat, and not to the light. The blood became black in a ſhorter time." In theſe experiments it is plain, that if the blood contained oxygen at firſt, it did ſo at the laſt; the ſame with regard to carbon. How came it then to paſs, that without either evaporation of the former, or addition of the latter, the change ſhould be produced? If the oxygen imbibed by the blood in the lungs was ſufficient to produce the red colour, why did it not preſerve it? The caſe here is preciſely ſimilar to what happens with the calx of ſilver. When that metal is diſſolved in aqua fortis, and again reduced to a ſolid form, it appears as a white powder, and will preſerve its colour if carefully kept from the light; but if a vial be filled with it, and expoſed to the ſun, that ſide on which the light falls will in a ſhort time become black, and this though the vial has been ever ſo carefully ſealed.† Formerly, chemiſts had a method

* A glaſs tube is ſealed hermetically, by heating the open end or ends, till they become ſoft, and then cloſing them with a pair of pincers.

† Thus letters, or other characters, may be curiouſly marked upon the calx within the vial, by cutting them out in paper, and then paſting them on the ſide to be expoſed to the light. We may have them in this manner either dark upon a white ground, or white upon a dark ground.

thod of accounting for this appearance, as well as that of the venous blood, by what they called the *evolution of phlogiſton:* but now that the very exiſtence of phlogiſton is denied, we are deprived of this reſource. But, whatever words we may uſe, it is plain that in neither caſe have we any ideas affixed to them which can make the matter at all more intelligible than it was before. But with regard to the blood, we are at a conſiderable loſs to underſtand what the natural colour of it is; and indeed the queſtion can only be determined by examining the blood of a fœtus which has never breathed. If the arterial blood of ſuch a fœtus be of a dark colour, reſembling that in the veins of a grown perſon, we muſt look upon this to be *natural* to it, and we may as well inquire why a roſe is red, or an iris blue, as why the blood is of a dark, and not of a bright red. But, if we find this dark red change to a bright ſcarlet in the arteries, as ſoon as the child has breathed, we have as much reaſon to conclude that the air occaſions this ſuperior redneſs, as that an acid is the cauſe of a red colour in the ſyrup of violets, or an alkali of a green colour in the ſame. Experiments are yet wanting to determine this matter. Mr. Hunter has obſerved that "in ſuch fœ-"tuſes as convert animal matter into nouriſhment, they "moſt probably have it (the colour of the blood) influ-"enced by the air, ſuch as the chick in the egg, al-"though not by means of the lungs of the chick, we "find the blood, in the veins of their temporary lungs, "of a florid colour, while it is dark in the arteries."—The probability therefore is, that the blood is naturally dark; by the elaſtic principle of the oxygen that it is rendered brighter; and that, this elaſtic principle being expended in the courſe of circulation, the fluid reaſſumes its original colour.

3. Though enough has already been ſaid to evince that the ſuperior redneſs of the arterial blood is derived from oxygen gas, we ſhall ſtill quote two inſtances from Mr. Hunter's Treatiſe on the Blood, which ſet this forth in the cleareſt manner; and theſe inſtances are the more remarkable, becauſe they demonſtrate the phenomena

mena not of the *dead*, but of the *living* body. 1. A gentleman in an apoplexy, who ſeemed to breathe with great difficulty, was bled in the temporal artery. The blood flowed very ſlowly, and for a long time. It was as dark as venous blood. He was relieved by the operation; but, on opening the ſame orifice in two hours, the blood flowed of the uſual florid colour. 2. A lady in an apoplexy was treated in the ſame manner, and Mr. Hunter obſerved, that when ſhe breathed freely, the blood from the temporal artery aſſumed a bright red colour; but when her breathing was become difficult, or when ſhe ſeemed ſcarce to breathe at all, it reſumed its dark colour, and this ſeveral times during the operation.

4. Reſpiration is not, as Dr. Girtanner ſays, a proceſs ſimilar to the combuſtion and oxydation (the calcination) of metals. Some of theſe by calcination, and *all* of them in the opinion of Dr. Girtanner, unite with the condenſable part of the oxygen contained in the air, while the elaſtic part is diſſipated in flame or heat. The reverſe of this takes place in breathing; for here the elaſtic part of the oxygen unites with the blood, and makes it warm, while the condenſable part, uniting with certain particles to be thrown off from the body, paſſes away in fixed air. Thus the proceſs of reſpiration does not reſemble the calcination of a metal (at leaſt acccording to our author's opinion of that operation) but rather the inflammation of ſome combuſtible ſubſtance; for in both caſes a certain quantity of carbon is found to be united with the baſis of oxygen in the atmoſphere, and thrown off from the place of combuſtion; and thus a quantity of fixed air is produced from every burning ſubſtance. Juſt ſo is it with reſpiration. If the condenſable part of the oxygen combined with the blood, then no fixed air could be produced; or if any part of the oxygenous baſe was abſorbed, it muſt certainly be known by a proportional deficiency in the quantity of fixed air produced. But there are no experiments made with accuracy ſufficient to determine this point. It is true that many very able phyſiologiſts, as Borelli, Jurin,

&c.

&c. have been of opinion, that part of the air is abſorbed in reſpiration; but when we come to particulars nothing can be determined. Dr. Hales by experiment found the quantity abſorbed to be a *ſixty-eighth* part of the whole quantity inſpired; but, on account of ſuppoſed errors, he ſtates it only at *an hundred and thirty-ſixth* part. Between theſe two the difference is ſo enormous, that we know not how to draw any concluſion from them. The French chemiſts are more deciſive, and agree pretty well with one another. Chaptal calculates it at *three hundred and fifty-three*, and La Metherie at *three hundred and ſixty*, cubic inches in an hour. Allowing theſe experiments to be juſt, the next queſtion is, what part of the air is abſorbed. Lavoiſier ſays, that it is the oxygenous baſe, or the ſame with that which is abſorbed in the calcination of mercury. But how comes he to know this? Surely not in the ſame way that he determines the abſorption of it by mercury. In the latter caſe he takes a certain quantity of mercury, includes it in another known quantity of oxygen air, and heats the metal by means of a burning-glaſs or otherwiſe: the conſequence is, that the air is abſorbed, the mercury loſes its fluidity, and is increaſed in weight. The metal gains the *whole* weight of the air abſorbed; and, by another proceſs, *all* the air and *all* the metal, or very nearly ſo, may be obtained in their original form. This experiment is ſo deciſive, that nothing can be ſaid againſt it with any ſhadow of reaſon; but who *hath* made, or who *can* make, ſimilar experiments with the blood of a living man? Such experiments indeed might be made, if *inſenſible perſpiration* did not ſtand in our way. Common atmoſpherical air is about *eight hundred* times lighter than water. A cubic inch of diſtilled water, according to Dr. Kirwan, weighs *two hundred and fifty-three grains and a quarter*. Oxygen air is ſomewhat lighter than common air: we ſhall therefore ſuppoſe that ſix hundred inches of it are equal to an inch of water. If then the blood abſorb three hundred and ſixty inches of air in one hour, it will in twenty-four hours have abſorbed eight thouſand ſix hundred and forty inches, equal in weight to fourteen

inches

inches of water and two fifths, which according to Dr. Kirwan's eſtimate is between ſeven and eight ounces. But the quantity of matter inſenſibly perſpired in that time is ſo much greater, that no calculation can be made. Here is one mode of determining the quantity of oxygen inſpired totally impracticable in the human body, though quite eaſy and practicable in the caſe of mercury. The other mode of determining it by the expulſion of oxygen from the blood is equally impracticable. Dr. Girtanner indeed has expelled oxygen from fleſh; but we know not in what proportion, nor can we determine whence it came. With regard to this laſt, indeed, there are two ſources allowed by Drs. Beddoes and Girtanner themſelves; viz. the abſorption of oxygen by the lungs, and the quantity taken in with the aliment. A third ſource was alſo manifeſt from Dr. Girtanner's experiments; viz. abſorption from the atmoſphere; for, by expoſure to the atmoſphere, fleſh, which had once parted with its oxygen, became again impregnated with it. In this caſe therefore we muſt acknowledge that the uncertainty of the abſorption by the lungs muſt be extremely great. A certain quantity of oxygen is undoubtedly thrown out in fixed air. How are we to determine this quantity? Certainly not by the firſt reverie that happens to occupy our imagination. It is a problem, the ſolution of which muſt be attended with the utmoſt difficulty. We muſt know, in the firſt place, how much oxygen was contained in the air *inſpired*. In the ſecond place we muſt know the quantity of fixed air *expired*. In the third place we muſt exactly know the proportion of oxygen contained in the fixed air thrown out by the breath. In the fourth place we muſt determine whether, by the converſion of oxygen into fixed air, any change is made in its bulk. For, if this ſhall be found to be the caſe, we ſhould be led to ſuppoſe an abſorption or augmentation of air when no ſuch thing took place. This point therefore ought to be determined with the utmoſt accuracy. In the fifth place we muſt exactly know how much *azote*, *ſepton*, *phlogiſticated air* is contained in the atmoſphere inſpired, and

and likewiſe in that expired. In the ſixth place, we muſt be aſſured that there are no other fluids in the atmoſphere capable of being abſorbed by the lungs, excepting oxygen and azote. Whether there are any others or not, hath not been determined. From an expreſſion of Dr. Fordyce, he would ſeem to be ſkeptical on the ſubject. "The atmoſphere (ſays he) is found "to conſiſt of various vapours, of which air, or, as it "has been called, pure air, or reſpirable air, (oxygen air) "forms at preſent about a fourth. Gas (probably fixed "air) forms ſome part;† but the greateſt part conſiſts "of one or more vapours, which, *without any poſitive "quality, but from that indolence which makes mankind "in their reſearches attempt to find a reſting place, have "been conſidered by many chemiſts as one individual ſpecies, "under the names of phlogiſticated air*," &c. In the ſeventh place we ought to know what quantity of *pure oxygen*, unconverted into fixed air, or whether any ſuch, is thrown out by the breath. That a quantity of this kind of air is really thrown out, is probable, becauſe we can blow up a fire with our breath, and by a blow-pipe excite a moſt intenſe heat, capable of melting the moſt refractory metals, platina excepted. It is true that the eolipile, by the mere converſion of water into ſteam, will blow up a fire alſo; though, if the acceſs of external air be denied, the blaſt of the eolipile will put the fire out. Probably the breath would do the ſame; but even this cannot be accounted a deciſive proof of the oxygen being totally exhauſted; for the moiſt vapour with which the breath abounds may extinguiſh the fire, even though ſome ſmall quantity of oxygen ſhould remain in it. It is not, however, our buſineſs at preſent to enter minutely into ſuch diſcuſſions. From what has been already ſaid, it

† It is now acknowledged that common atmoſpherical air contains a portion of what Dr. Black and Dr. Prieſtley have called fixed air; but this portion is ſo ſmall (not more than one fiftieth part, according to Dr. Anthony Fothergill's Prize Diſſertation, and *none at all*, according to Dr. Beddoes) I ſay, this proportion is ſo ſmall, that we cannot ſuppoſe it to conſtitute the quantity of fixed air thrown out by the breath, which is very conſiderable. Beſides, fixed air, of all others, is the moſt readily abſorbed; and, indeed, if we could admit of abſorption of any baſis of air in the preſent caſe, it certainly ought to be that of fixed air; but where ſuch a quantity is thrown out, we cannot well admit of any abſorption.

it is evident, that the abſorption of oxygen by the blood, inſtead of being indubitably eſtabliſhed, is of all things the moſt uncertain; the requiſites for determining it being abſolutely beyond the inveſtigation of any perſon, however accurate. We may indeed, with great labour and trouble, determine that ſome part of the air is abſorbed in breathing; but what that part is, we are unable to diſcover from any chemical inveſtigation. The opinion of the ſimplicity of metals, and their being reduced to a calx by the adheſion of oxygen, has been ſo implicitly, and in a manner univerſally, received, that it has given a new turn to phyſiology, ſo that, by a kind of analogical reaſoning, the human body has been reduced to a mere chemical apparatus, the operations of which may be calculated as we can do the event of experiments in a laboratory. But, after a very long and tedious conteſt, Dr. Prieſtley ſeems at laſt to have overthrown this doctrine of oxygenation, even in the inanimate parts of the creation; ſo that we can much leſs apply it to the doctrines of life and animation. His experiments are publiſhed in the third number of the Medical Repoſitory, volume II, and fully demonſtrate, that, though mercury abſorbs oxygen during calcination, this is not the caſe with all metals; that in many caſes the oxygen will unite with other ſubſtances in preference to the metal, which laſt is nevertheleſs reduced to a calx as though it had united with the oxygen; that in many caſes the addition of weight gained by the calx is owing to mere water, &c. He has likewiſe ſhown that phlogiſticated air (azote) is not a ſimple ſubſtance, as has been taught by the new chemiſts, but conſiſts, as well as fixed air, of an union of oxygen with carbon, or at leaſt with the black matter of burnt bones, with which he made the experiment. Theſe aerial fluids therefore being ſo eaſily convertible into one another, and the uncertainty of the changes in bulk which may occur in conſequence of theſe converſions ſo great, it is impoſſible to ſay whether a portion of the atmoſphere in ſubſtance, i. e. both oxygen and azote, is abſorbed, as phyſicians formerly ſuppoſed; or whether

whether a portion of oxygen air alone be abſorbed, as Dr. Beddoes ſuppoſes; or whether only the elaſtic principle itſelf is abſorbed, and the diminution in bulk made in conſequence of the converſion of oxygen into fixed air; I ſay, theſe matters depend on circumſtances ſo much beyond the reach of our ſenſes, that if we come to any probable concluſion upon the ſubject, it muſt be by analogical reaſoning from other known facts, not from experiments made directly upon the living body; which, in their own nature, muſt, lways be extremely vague and uncertain.

5. That, during the circulation, the blood charges itſelf with carbonic hydrogen air, is an aſſertion which cannot be eaſily admitted. It has already been obſerved, that, by the air-pump, venous blood does not appear to contain any elaſtic fluid whatever; and it is alſo certain, that animals cannot bear any quantity of air injected into their veins. Dr. Girtanner himſelf tried ſeveral kinds, and all of them proved fatal. Having injected a conſiderable quantity of oxygen air into the jugular vein of a dog, the animal raiſed moſt terrible outcries, breathed very quickly, and with the utmoſt difficulty; by little and little his limbs became ſtiff, he fell aſleep, and died in leſs than three minutes. On injecting into the vein of another dog a ſmall quantity of phlogiſticated air, the animal died in twenty ſeconds. With carbonic acid gas (fixed air) a third dog died in a quarter of an hour. A fourth was killed in ſix minutes by nitrous air.* From theſe experiments, had no others ever been made on the ſubject, it ſeems very probable, that no ſpecies of air can be ſafely admitted into the blood in its elaſtic ſtate. If any ſuch therefore ſhould naturally be produced in the body, it muſt either be inſtantly thrown out, or diſeaſe muſt enſue. Such objections to the Doctor's theory are ſo natural, that we might have thought he would have foreſeen and provided againſt them. Inſtead of this he grounds the whole upon ſuch ſlender evidence as could not be admitted in the moſt trifling matter. "An in-

"ciſion

* Nitrous air is that ſuffocating vapour which ariſes when aqua fortis is poured upon metals. When taken into the lungs it deſtroys animal life more quickly than any other ſpecies.

" ciſion (ſays he) was made in the jugular vein of a ſheep, " and the blood which came from it was received into a " bottle filled with nitrous air. When the bottle was " half filled, it was cloſed. The blood coagulated im- " mediately, and a ſeparation of a great quantity of black- " iſh ſerum took place. The day after, on opening the " bottle, a very ſtrong ſmell of nitrous ether (dulcified " ſpirit of nitre) was perceived, the nitrous air having " been changed in part into nitrous ether by the car- " bonic hydrogen gas of the blood. This experiment " proves, beyond a doubt, that the venous blood contains " carbonic hydrogen air; and that this air is not very in- " timately mixed with it, but may be expelled with the " greateſt eaſe."

On reading the Doctor's account of this experiment, it muſt be very obvious, that, however decidedly he may be of opinion that it proves *beyond a doubt* the exiſtence of hydrogen air in the venous blood, yet there is not one ſolid reaſon, from what he ſays, for ſuppoſing any ſuch thing. How can any man determine from the mere *ſmell* of *ſheep's* blood taken out of the body of the animal, and mixed with a poiſonous vapour, what is the compoſition of *human* blood in the living body? In the caſe of any ſubſtance ſuſpected to contain elaſtic air, the air-pump will always afford an *experimentum crucis*. But we know that venous blood does not yield any elaſtic vapour by the pump: if inſtead of blood, however, we ſhould fill a portion of vein with beer, cyder, or other fermented liquor, it would inſtantly diſcover, by its ſwelling up, that it really contained air in an elaſtic ſtate. If then from the tumefaction of the vein when filled with fermented liquor we conclude that the latter contains fixed air, why ſhould we not, from the non-tumefaction of it when filled with blood, conclude that the vital fluid contains no air? If Dr. Girtanner was ſo well aſſured that the venous blood contains hydrogen air, he ought to have expelled ſome of it from a portion of the blood, noted the difference between the blood which had loſt its air, and that which had not, and then, by adding the air to it again, reſtored the blood to its former ſtate.

Nothing leſs then recompoſition can prove the truth of a chemical analyſis; as diviſion can only be proved by multiplication, or multiplication by diviſion.

From all that has been ſaid, we may fairly conclude, that no proof can be brought ſufficient to prove the exiſtence either of oxygen air or any other ſpecies of aerial fluid, in its elaſtic ſtate, in the blood. Neither can we prove that any part of the condenſable part of oxygen air is received by the breath in the lungs. It is, however, probable that this condenſable part may be received into the ſtomach with our food; that having paſſed through the various channels of circulation, and arrived at laſt at the ſurface, it there reſumes its aerial nature by combining with the ſuperfluous heat of the body, and is evaporated through the pores of the ſkin by inſenſible perſpiration. The aerial vapour which paſſes off by theſe pores indeed has been diſcovered to partake of the nature of *fixed air*; but we know that this ſpecies of gas always contains the baſis of oxygen, being indeed compoſed of it; and whether the oxygen be taken into the body in its pure ſtate or not, the reſult would undoubtedly be the ſame; for an union would be formed between it and the carbonic particles to be thrown off from the body. But thus we can never ſuppoſe the baſis of oxygen or any other air to be a permanent part of the compoſition of our bodies; nor can the quantity of it be augmented by breathing any kind of air. The readieſt way to increaſe the quantity ſeems to be by drinking fermented liquors. Thus, if the body is too hot, the ſuperfluous heat will have a proper ſubject to act upon, viz. the condenſable part of the fixed air; and hence we may perhaps account for the very grateful and cooling ſenſation produced by drinking theſe liquors in ſome diſeaſes. With reſpect to the exiſtence of *carbon*, *charcoal* or *hydrogen* in the blood, it is probable that it exiſts in equal quantity at all times, being indeed the fundemental material of the whole body, and probably only a modification of that *duſt* from whence man was originally taken.*

When

* In one of Dr. Prieſtley's papers above quoted he ſays, that *charcoal* is entirely of *vegetable* origin; but the converſion of vegetable into animal matter,

When the blood therefore grows very black, when the teeth are covered with a black ſordes, the hands become foul, &c. we may ſay, indeed we too ſurely *feel*, that, in ſuch caſes, there is a propenſity in the body to return to its original ſtate of diſſolution; but there is not one ſolid reaſon for ſuppoſing the proportion of its materials to be varied; that there is a collection of *oxygen* in one part, *hydrogen* in another, or in ſhort that nature can admit of any ſuch diſproportion taking place.

6. We muſt now conſider Dr. Girtanner's account of the origin of animal heat, which is, that, "during "the diſtribution of the oxygen through the ſyſtem, "the heat which was united with this oxygen eſcapes; "hence the animal heat;" and, "that the great *capa-* "*city* of the arterial blood for heat is owing to the oxygen "with which it is united in the lungs."—This leads us to conſider in a more particular manner the doctrine of heat, a ſubject hitherto much leſs inveſtigated than the importance of the ſubject requires. What little we do know of this matter ſeems to be almoſt entirely owing to Dr. Black, who hath diſcovered ſome very remarkable phenomena unknown to former philoſophers. His diſcovery here, as in that of fixed air, was accidental. Making experiments on the water of different temperatures, he found that the mixture would always be an arithmetical mean betwixt the two quantities mixed. Thus, on

ter, which we daily ſee, is an undoubted proof that there cannot be any eſſential difference between them. Even the bones are undoubtedly produced from vegetables in ſuch animals as feed upon vegetable ſubſtances; ſo that even the calcareous earth they contain is plainly of vegetable origin. We may ſay indeed that the calcareous particles had a previous exiſtence in the vegetables uſed by the animal as food; but we may ſay the ſame of the particles of the blood, fleſh, horns, &c. Beſides, Dr. Prieſtley has ſhown that *every* particle of charcoal may be volatilized into inflammable air, with as great accuracy as any human experiment can be made; ſo that in this caſe the calcareous particles, if any ſuch there were, ſhowed themſelves to be as much charcoal as the reſt. In the 74th volume of the Philoſophical Tranſactions, Mr. Watt has ſhown, that dephlogiſticated ſpirit of nitre may be changed into the ſmoking and phlogiſticated kind by means of red-lead or magneſia alba, as well as by charcoal; of conſequence there can be no eſſential difference even there. In ſhort, ſo wonderful and multifarious are the transforming or metamorphoſing powers of nature, that every attempt to find out a ſubſtance upon which theſe powers cannot act, will be found altogether vain, and our beſt conducted and moſt plauſible experiments, made with a view to diſcover the ultimate compoſition or what we call the elements of bodies, will be found mere inaccuracy, bungling and blunder.

on mixing water at 50 degrees with an equal quantity at 100, the temperature of the mixture would be 75 degrees; but if inſtead of uſing water only he took ſnow or ice for one of the quantities, the mixture was no longer an arithmetical mean betwixt the two temperatures, but greatly below it; ſo that a quantity of heat ſeemed to be totally loſt and in a manner annihilated. His attention was engaged by this unexpected phenomenon, and, proſecuting his experiments, he found that, when water was converted into ice, it really became warmer than it was before; and, by keeping the fluid perfectly ſtill during the time that cold was applied, he was able to cool it to 27 degrees of Fahrenheit's thermometer, which is five degrees below the freezing point; but on ſhaking this water ſo cooled, it was inſtantly converted into ice, and the thermometer roſe to 32. On reverſing the experiment he found that mere fluidity in water is not ſufficient to melt ice. A conſiderable degree of heat is neceſſary; and even when this is previouſly given to the water, the whole becomes as cold as ice by the time that the ice is melted. The reſult of his experiments in ſhort was this: Water, when frozen, abſorbs an hundred and thirty-five degrees of heat before its fluidity can be reſtored: that is, ſuppoſing a pound of ice at the temperature of 32 to be mixed with a pound of water at the temperature of 32, by adding 135 degrees, ſo that the temperature of the water is augmented to 167, the ice will indeed be melted, but the temperature of the whole quantity of liquid will be reduced to 32. In this caſe therefore the heat manifeſtly aſſumes two different modes of action; one in which it acts internally upon the ſubſtance of the body, without being ſenſible to the touch, while in its other ſtate it hath no effect upon the internal parts, but affects bodies on the outſide. The former ſtate therefore the Doctor diſtinguiſhed by the name of *latent*, the latter by that of *ſenſible* heat.

The ſame theory was applied to explain the doctrine of evaporation, and that in the moſt deciſive and ſatisfactory manner. The Doctor found, that, in the diſtillation

diſtillation of water, much more heat was communicated to that in the worm-tub of the ſtill, than could be ſuppoſed neceſſary to raiſe the water diſtilled to 212 degrees, which is the utmoſt that water can bear. In proſecuting the experiment he found the quantity of heat abſorbed by the water, when raiſed into vapour, truly ſurpriſing; no leſs than *a thouſand* degrees; an heat more than ſufficient to have made the whole quantity of fluid that came over red hot. Some objections, however, were made to this theory, even by the Doctor's friends. Mr. Watt, particularly, though he could not deny the theory derived from Dr. Black's experiments, yet ſuggeſted one, which, had it proved ſucceſsful, would have overthrown the whole. It was this: Let water be diſtilled *in vacuo*, where it boils with a heat of 97 degrees, and the operation muſt be carried on with much leſs fuel, and with much greater eaſe, than in the common mode. It was ſaid that, in this experiment, Dr. Black was equally concerned with Mr. Watt; but, in a perſonal converſation with the Doctor himſelf, he aſſured me that he had no farther concern than foretelling that the experiment would not ſucceed, which it ſeems did not. The event was as follows: Mr. Watt, determining at all events to try the experiment, cauſed to be made a copper retort and receiver, joined together in one piece. In the receiver he pierced a ſmall hole, and, heating both retort and receiver, plunged the latter into cold water. The conſequence was, that a conſiderable quantity of water entered the veſſel, and was eaſily poured back into the retort, as a ſubject for diſtillation. A fire being now applied, the water was ſoon raiſed into ſteam, which filled both retort and receiver, and in a great meaſure expelled the external air. The ſmall orifice in the receiver being now cloſed, and the receiver itſelf plunged into cold water, the diſtillation went on *in vacuo*; for, as ſoon as any of the ſteam was condenſed, the ſpace which it had occupied (according to Dr. Black *one thouſand and ſixty-ſix* times more than the original water) was become abſolutely empty, and more ſteam, rarefied, not by any quantity of ſenſible heat, but

but merely by that which it contained in a *latent* ſtate, would occupy the place of the former. The event of the experiment ſhowed the truth of Dr. Black's theory. The water boiled, and ſteam was raiſed as well as if acceſs had been given to the air; but with this difference, that the upper part of the diſtilling veſſel was never heated above what the hand could eaſily bear. With the water in the cooler it was quite otherwiſe. It became hot as uſual, and, by the quantity of heat it received, plainly demonſtrated that the vapour, though deſtitute of moſt of its *ſenſible* heat, yet contained an immenſe quantity in a *latent* ſtate. The ſaving of fuel therefore in the practice of diſtillation, which was Mr. Watt's object in making the experiment, was quite trifling, and not equal to the trouble of filling the retort with liquid.

The doctrine of latent heat thus eſtabliſhed, furniſhed a ſolution of many phenomena which could not formerly be explained in a ſatisfactory manner. Thus the melting of all kinds of ſubſtances was found to be owing to an abſorption of heat, while their condenſation was attended with the contrary. Fluidity in all caſes was explained on the ſame principle; and the more heat that was abſorbed, the more fluid the matter became. Thus water, when in a condenſed or ſolid ſtate, abſorbs 135 degrees of heat before it becomes fluid. A thouſand degrees more convert it into vapour, and at laſt, by paſſing through the intenſe heat of a glaſs-houſe furnace, it is converted into a brilliant flame, and augments the heat of the furnace to a great degree. Hence the practice in glaſs-houſes of throwing water into the aſh-hole, the vapour of which, by paſſing through the burning fuel, makes the furnace much hotter than it was. In a ſimilar manner were explained the phenomana of cryſtallization, the ductility of metals, the heat produced by hammering them, and the hardneſs produced by the operation, as well as the operation of annealing, &c. One other phenomenon, a very curious one, ſhall be noticed, on account of its being connected with the ſubject of this treatiſe. It is this: Let a ſmall veſſel filled with vitriolic ether be put into a larger one of water, and both included

included in the receiver of an air-pump. On exhauſting the air, the ether boils, and is converted into vapour, while the water freezes. This ſhows that heat does not always act equally upon ſurrounding bodies, but has a tendency to enter ſome in preference to others; and from other experiments it appears, that this property has a conſiderable connexion with the denſity of the bodies concerned.

Thus one ſtep was gained, and it was univerſally admitted that heat, in ſome caſes, entered bodies, and in others was thrown out of them; but now the queſtion aroſe, What is heat; and by what laws is it regulated, or from what ſource is it derived? Here Dr. Black himſelf was at a loſs; for, as he ſuppoſed *cold* to be a mere non-entity, and only to conſiſt in a comparatively ſmaller degree of heat, ſome phenomena occurred which would not eaſily admit of ſolution upon ſuch an hypotheſis. With theſe Dr. Black did not meddle much, but others were bolder. Dr. Irving, Profeſſor of Chemiſtry at Glaſgow, undertook to explain the whole myſtery of latent heat upon the ſingle principle of attraction. One of the moſt puzzling phenomena in the way of Dr. Black's theory had been, that in ſome caſes heat and cold ſeemed to repel each other, and a very remarkable inſtance of this was, that, in the morning, a little before ſunriſe, when the rays of light paſs through the atmoſphere, a little above the ſurface of the earth, the air then becomes manifeſtly colder than even at midnight. Dr. Irving's explanation of this was, that that the ſun's rays *attracted heat from the atmoſphere*, and thus rendered it colder. Such at leaſt was the explanation given in an inaugural diſſertation by Dr. Cleghorn, one of Dr. Irving's ſcholars; for the Doctor himſelf delivered his opinions only to them. In other caſes he ſuppoſed that different ſubſtances had different *capacities* for receiving heat; and, of conſequence, ſhould the *form*, or rather the *internal conſtitution*, of the body be changed, the *capacity* of it for receiving heat muſt alſo be changed; and as an attraction ſubſiſts, or is ſuppoſed to ſubſiſt, between heat and all other ſubſtances, it is plain that while this attraction

attraction ſubſiſts, if the capacity of any ſubſtance for receiving heat be augmented, it will imbibe much more than it would have done had its former conſtitution remained. Thus *water* in its liquid ſtate contains a certain quantity of heat; we may therefore ſay that water has a capacity for receiving heat equal to one to ten, or what we pleaſe. Vapour has a capacity for containing heat ten times greater than water. Water therefore, when converted into vapour, will imbibe ten times the quantity of heat that the water contains; and, again, on being re-converted into water, the *capacity* becoming what it was before, the ſuperfluous quantity muſt be thrown out, as in Dr. Black's experiments. In like manner, when a metal is melted by the fire, the capacity of it for receiving heat is changed: of conſequence a great quantity is imbibed, and again expelled by the change of *capacity* which takes place on its becoming ſolid; and thus, from the change of capacity, in different ſubſtances, every phenomenon was ſolved.

This doctrine of *capacities* did not give general ſatisfaction. Dr. Black himſelf ſaid of it, that it was neither *probable* nor *ingenious*;* notwithſtanding which, it continued to be received, and even very generally adopted. Dr. Crawford, ſo well known for his writings on this ſubject, has adopted the idea, and Dr. Girtanner, in the paſſage above quoted from him, appears to be of the ſame opinion. The doctrine, however, had ſeveral opponents, among whom were the Monthly Reviewers. In their account of Nicholſon's Firſt Principles of Chemiſtry, they expreſs themſelves in the following manner "We only wiſh, that, in the doctrine of heat, he had "avoided, which he might eaſily have done, Dr. Craw-"ford's idea of bodies having different *capacities* for "heat. In the melting of ice, for inſtance, a quan-"tity of heat is abſorbed, without any increaſe of the "temperature, that is, without making the water ſenſi-"bly warmer than the ice before its liquefaction; which "is

* Theſe words are to be found in the M. S. Copies of his lectures circulated at Edinburgh. Dr. Black himſelf never publiſhed any thing to the world upon the ſubject.

" is ſaid to be owing to the water having a greater *ca-*
" *pacity* for heat, or being able to *hold more* of it, than
" the ice; and, in like manner, when converted into
" vapour, its capacity is further increaſed, or it can hold
" more ſtill. This appears to us a very unchemical, and
" a very inadequate idea of the matter: for, admitting
" water to have a greater capacity than ice, how is the
" change from one ſtate to the other to be effected?
" Can the properties which a body is found to poſſeſs,
" after a change has taken place, be aſſigned as a cauſe
" of the change itſelf? Or will it be ſaid, that the heat
" firſt enlarges the capacity, and then hides itſelf in that
" capacity ſo enlarged? We ſhould think it much bet-
" ter to ſay, conſonantly with the phenomena of other
" combinations in chemiſtry, that a certain quantity of
" heat, uniting with the ice, firſt *liquefies* it, as a certain
" quantity of acid only neutralizes an alkali; that if
" any ſurplus quantity muſt be introduced, that ſurplus,
" remianing free and uncombined, muſt act and be ſen-
" ſible as heat in the one caſe, and acid other; and that
" different bodies require different quantities of heat or
" acid to be combined with them, for producing the
" changes in queſtion."*

Thus the Reviewers, as well as others, reaſoned *a priori*, and ſeveral facts were adduced to prove that no ſuch changes in capacity could take place. But however ſtrong the arguments adduced, or however plain the experiments might be, little or no notice was taken of them, and the enlargement or diminution of *capacities* has been repeated, ſeemingly by rote, from one author to another, without the leaſt inquiry or inveſtigation. Dr. Girtanner indeed ſays that " the oxygen united with the arterial blood in the lungs" is the cauſe of the *great capacity* of the arterial blood for heat. But this is aſſigning a very doubtful cauſe for a very doubtful effect. He ought to have proved in the firſt place that arterial blood really has this capacity; for its being *hotter* than the blood of the veins, only ſhews that it parts with more heat to ſurrounding bodies than venous blood does;

* Monthly Review, for 1790, p. 165.

which is a proof that it contains *leſs* heat, if there be any difference, than that of the veins. But the truth is, that the *capacity* for containing heat depends neither on the oxygenation nor hydrogenation of a fluid, but upon its denſity. The more fluid and the more eaſily expanſible into vapour that any ſubſtance is, the greater quantity of heat it is capable of containing, and *vice verſa*. This has been fully aſcertained by Mr. William Jones, an Engliſh clergyman, whoſe obſervations on the generally received ſyſtem of philoſophy contain many particulars worthy of attention. From his experiments it appears that a piece of red-hot iron, thrown into water, imparts much leſs *ſenſible* heat to it, and is itſelf much more effectually quenched, than by throwing it into an equal quantity of quick-ſilver of the ſame temperature with the water. As the quick-ſilver therefore becomes much hotter to the touch than water does upon throwing a piece of red-hot iron into it, and as the iron itſelf is much more imperfectly quenched by the metal than by the water, it follows that the latter is capable of containing much more heat than the former. But ſuch experiments are not applicable to the blood. Though that of the arteries may be ſomewhat hotter than the venous blood, yet the reaſon is obvious. The heat is communicated directly to the arterial blood in the lungs; but during the circulation a part of it evaporates, and the farther diſtant any part is from the lungs, the more cool will the vital fluid be, without regard to any alteration of *capacity*, which indeed never can be ſhown to exiſt.

But the moſt deciſive experiments againſt any ſuppoſed alteration in the capacities of bodies for containing heat are thoſe lately tried by Count Rumford, and related in the Philoſophical Tranſactions for 1798. His attention to this ſubject was engaged by obſerving the great degree of heat acquired by a braſs gun during the time of boring it,* and ſtill more by the intenſe heat (much greater than that of boiling water) of the metallic chips ſeparated from it by the borer. From a conſi-

deration

* Count Rumford was ſuperintendant of boring the cannon in the workſhops of the military hoſpital at Munich.

deration of these things he was naturally led to the following inquiries. "Whence comes the heat actually "produced in this mechanical operation? Is it furnish-"ed by the metallic chips which are separated by the "borer from the solid mass of metal? If this were the "case, then, according to the modern doctrine of caloric, "the *capacity for heat* of the parts of the metal so reduced to chips, ought not only to be changed, but the "change undergone by them be sufficiently great to account for *all* the heat produced. But no such change "had taken place; for I found, that by taking equal "quantities by weight of these chips, and of thin slips of "the same block of metal, separated by means of a fine "saw, and putting them at the same temperature, that "of boiling water, and putting them into equal quanti-"ties of cold water (that is to say, at $59\frac{1}{2}$ of Fahrenheit) "the portion of water into which the chips were put, "was not, to all appearance, heated either less or more "than the other portion in which the slips were put."

From this experiment, several times repeated with the same result, Count Rumford inferred, that the heat could not possibly have been furnished at the expense of the latent heat of the metallic chips. He then proceeded to ascertain "how much heat was actually generated "by friction, when a blunt steel borer being so forcibly "shoved (by means of a strong screw) against the bottom "of the bore of the cylinder, [of the machine in use] "that the pressure against it was equal to the weight of "about ten thousand lb. avoirdupois, the cylinder "being turned round on its axis (by the power of hors-"es) at the rate of about thirty-two times in a minute." In this experiment the metallic dust or scaly matter detached from the cylinder by the borer weighed only 837 grains troy; but, says the author, "Is it possible that "the very considerable quantity of heat produced in this "experiment (a quantity which actually raised the "temperature of above 113 lb. of gun-metal at least 70 "degrees of Fahrenheit's thermometer, and which of "course would have been capable of melting $6\frac{1}{2}$ lbs. of "ice, or making near five pounds of ice-cold water to "boil)

" boil) could have been furniſhed by ſo inconſiderable a " quantity of metallic duſt, and this merely in conſe- " quence of a *change* of its capacity for heat? As the " weight of this metallic duſt (837 grains troy) amoun- " ted to no more than one 948th part of that of the " cylinder, it muſt have loſt no leſs than 948 degrees of " heat to have been able to raiſe the temperature of the " cylinder one degree; and conſequently it muſt have " given off more than *ſixty-ſix thouſand, three hundred and* " *ſixty* degrees of heat to have produced the effects which " were actually found to have been produced in this " experiment."

It was next conſidered whether the air did not contribute to the generation of this heat; and our author determined that this could not be the caſe; becauſe the quantity of heat generated was not ſenſibly diminiſhed when the free acceſs of air was prevented. From another experiment it appeared that the generation of the heat was neither prevented nor retarded by keeping the apparatus immerſed in water. Here the friction generated ſo much heat, that in one hour the temperature of the water ſurounding the cylinder was raiſed from 60 to 107 degrees of Fahrenheit. In half an hour more it was raiſed to 142; at the end of two hours to 178; at two hours 20 minutes to 200; and in two hours and a half it boiled.* On the whole, Count Rumford concludes, that " the quantity of heat, produced equably by the " friction of the blunt borer againſt the bottom of the " hollow metallic cylinder, was *greater* than that produced " equably in the combuſtion of *nine wax candles*, each " three quarters of an inch diameter, all burning at the " ſame time with a clear, bright flame." From all theſe experiments, however, our author does not draw any certain concluſion. " What is heat? (ſays he.) Is there " any ſuch thing as an *igneous fluid?* Is there any " thing that can with propriety be called *caloric?* The " heat produced, in the author's experiments, by the " friction of two metallic ſurfaces, was not furniſhed by " ſmall particles of metal, detached from the larger ſolid " on

*The quantity was two gallons and a quart, wine meaſure.

" on their being rubbed together. It was not ſupplied " by the air, becauſe the machinery in three experiments " was kept under water, and the acceſs of atmoſpherical " air completely prevented. It was not furniſhed by the " water which ſurrounded the machinery, becauſe this " water was continually receiving heat from the machi- " nery and could not at the ſame time be giving to and " receiving heat from the ſame body; and becauſe " there was no chemical decompoſition of any part of " this water." At laſt he obſerves, that the ſource of this heat, whatever it is, muſt evidently be inexhauſtible, adding, that "any thing, which any *inſulated* body, " or ſyſtem of bodies, can continue to furniſh *without li-* " *mitation*, cannot poſſibly be a *material ſubſtance*; and " it appears to me to be extremely difficult, if not quite " impoſſible, to form any diſtinct idea of any thing ca- " pable of being excited and communicated, in the man- " ner the heat was excited and communicated in theſe " experiments, except it be MOTION."

On this laſt paragraph, however, it is obvious to remark, that the whole force of the argument reſts upon an *inſinuation*, that the cylinder and borer were *inſulated*, or cut off from all communication with any other material ſubſtance. Had this been the caſe, then no doubt it would follow that an *endleſs* ſupply of any thing *material* could not be furniſhed by them; but if, as Dr. Boerhaave and many other learned and intelligent perſons have ſuppoſed, fire be an element univerſally preſent, and which becomes ſenſible to the touch only in conſequence of a particular mode of action, it will follow, that no ſubſtance in nature can be *inſulated* with reſpect to it; but, in whatever place, and for whatever length of time, any ſubſtance ſhall be affected in ſuch a manner as to agitate this fluid, there we ſhall perceive a production of heat *without limitation*, even though heat itſelf be no more than the action of a fluid eſſentially *material*, though inviſible to us.

Conſiderations of this kind occurred long ago to the writer of this treatiſe, when by the nature of his employment it was neceſſary for him to ſpeculate upon theſe

ſubjects.

ſubjects. It could not then but appear to him that the theory of Dr. Black was far ſuperior to any that had been publiſhed. The opinion of thoſe who ſuppoſed fire to conſiſt in the vibratory motion of the paticles of ſolid bodies, ſeemed altogether untenable. It is impoſſible to explain the phenomena of heat upon ordinary mechanical principles, becauſe, with reſpect to all terreſtrial ſubſtances, heat conſtantly appears as an *agent*, while they are merely *paſſive*; and no man can explain the nature of a cauſe from its effect. Thus one of the moſt obvious effects of heat is *expanſion*, or enlargement of bulk, in ſuch bodies as are heated. But if from this fact we infer that the parts of elementary fire are repulſive of one another, our reaſoning is certainly erroneous. In like manner, when we are not ſenſible of heat, we are not authoriſed to conclude that it is not preſent; for Dr. Black has demonſtrated that it may be preſent in very great quantity, though indiſcoverable either by our ſenſes or by a thermometer.

But, with regard to the theory publiſhed by Dr. Black himſelf, it is evident that, though one part of it reſts on the ſolid baſis of experiment, the other is founded entirely upon hypotheſis, and that too an hypotheſis which cannot admit of being proved by any experiment, viz. that *cold* is a mere negative, and hath no real exiſtence in nature. Among many phenomena which militate againſt this opinion, the following experiment of M. Geoffrey ſeems to be the moſt remarkable. He took a ſmall baſon filled with water, and ſet it on a ſupport in the middle of a large tub of water, in ſuch a manner that the temperature of the water in the tub might communicate itſelf to that in the baſon. This being aſcertained by a thermometer placed in the baſon, he threw a quantity of burning coals into the tub. The effect of this, on the ſuppoſition that cold is a mere privation of heat, ought to have been, that the heat of the coals, communicated to the water in the large tub, would in a ſhort time pervade the ſmall baſon, and affect the thermometer there. The latter would therefore riſe; but inſtead of this it fell ſeveral degrees

degrees before it began to riſe; for which it doth not appear that any other reaſon can be aſſigned than that the cold is partly repelled by the heat of the coals, and therefore, entering into the ſmall baſon of water, it cauſes the thermometer to ſink previous to its riſing. To the ſame purpoſe we may urge the phenomenon already taken notice of, viz. that the ſun's rays, when paſſing at ſome diſtance above the ſurface of the earth, cool the lower part of the atmoſphere. The natural ſolution is, that the heat of the ſun partly repels the cold downwards; and as for the doctrine of *attracting* heat from the atmoſphere, Count Rumford has ſhown that this does not happen in a caſe where we might with much more probability expect it; not to mention the violence done to the common perceptions of mankind by ſuppoſing the ſun's rays, which are moſt evidently the ſource of heat, to have any occaſion to *attract* heat from the atmoſphere or any thing elſe.

Laſtly, with regard to the *capacities* of bodies for containing heat, the doctrine appears to involve a radical error, of ſuch enormous magnitude, that it is impoſſible to make any thing of it. This is no leſs than confounding the heat which flows out from bodies with that which they contain as an eſſential part of their compoſition, and which they cannot emit without being changed into ſome other form. Thus the capacity of aqueous vapour for containing heat, according to Dr. Black, is 1000 degrees; yet without decompoſing the vapour it would have been impoſſible to have known this; for vapour is often extremely cold to the touch, and a thermometer immerſed in it will ſink greatly. In ſhort, all that we can know about the capacity of bodies for retaining heat is, that they either continue to abſorb it, or we may continue to force it into them, till they be reduced to vapour. It is doubtful whether they can receive more; for from the experiment with Papin's digeſter, formerly mentioned, it appears that the additional quantity of heat, which the water was made to receive, very quickly left it as ſoon as the ſteam had room to expand.

But,

But, to come to a concluſion upon this ſubject: If we will inveſtigate the nature of heat, we muſt do it as in other caſes, viz. by making the *igneous fluid, caloric*, or what we pleaſe to call it, the object of our ſenſes; for we cannot reaſon fairly, or indeed come to any rational concluſion at all, by doing otherwiſe. In this inveſtigation it is neceſſary to attend to the particulars mentioned by Count Rumford. The fluid muſt be omnipreſent in its nature, infinite in its quantity, and equable, uniform and inceſſant in its action; as far as theſe epithets can be applied to any material being. There are only two fluids which we know that can anſwer to theſe characteriſtics. The one is the light of the ſun, which pervades all the celeſtial ſpaces; the other the electric fluid, which penetrates every terreſtial ſubſtance. Both of theſe produce heat, unlimited in quantity, as well as in duration, provided their action be continually kept up. The mode in which both produce heat is exactly the ſame, viz. by converging into a focus; and the greater the quantity, the greater is the heat, and that without any limitation either as to intenſity or duration. With regard to the ſolar rays, it has long been known that by concentration they would produce heat; nevertheleſs it was unaccountably doubted whether the rays themſelves were the matter of heat. One objection to this was, that on the tops of high mountains the air is exceedingly cold, though the ſun ſhines very bright. But this objection was founded upon an erroneous notion that, wherever the matter of heat exiſts, there we muſt feel it; which doth not follow any more than that wherever air exiſts there we muſt feel a wind blowing upon us. *Wind* is air in motion, and *heat* is a more ſubtile fluid in motion. One demonſtration of this is, that, on the tops of the higheſt mountains, a burning lens or mirror will ſet fire to combuſtible bodies as readily as in the vallies at the foot of them. Neither has heat, properly ſo called, and thing to do with air. The focus of a burning-glaſs will heat bodies *in vacuo* as well as in the open air; and Sir Iſaac Newton has obſerved, that if a thermometer be included in the vacuum of an air-pump,

air-pump, it will acquire the temperature of the room nearly in the ſame time that another will when included in a ſimilar glaſs without any exhauſtion.

The ſcience of electricity is but of late date; and moſt violent and hypothetical diſputes have taken place concerning the nature of the fluid. Its luminous and burning properties naturally led a number of people to ſuppoſe that it was elementary fire; but this was oppoſed by others with as much violence as if there had been ſomething criminal in the ſuppoſition. The oppoſition, however, was founded upon the ſame error with that about the ſolar light. It was imagined that wherever elementary fire exiſted, there heat muſt be felt; and it was eſpecially urged, that electricity, though it produced light, did not produce any heat, except when it exploded with ſuch violence as to penetrate the internal ſubſtance of bodies, agitating their particles, and by this agitation producing heat. It has now, however, been found, that the electric *aura*, as it is called, when made to converge in great quantity to the point of a needle, will heat it to ſuch a degree as to ſet fire to gun-powder. This ſhows that heat is occaſioned by the convergence of this fluid to a focus, and to its divergence from it. In the focal point, heat will always take place. From the experiments of Haukſbee, Beccaria and Prieſtley, it likewiſe appears, that electricity will render tranſparent the moſt opaque bodies, ſuch as ſealing-wax, pitch, &c. which even the moſt intenſe light of the ſun cannot do. As to the intenſity of the heat produced by it, experiments have ſhown, that it cannot be exceeded even by that of the moſt powerful mirror. Globules of gold have been vitrified, platina melted, and the moſt infuſible ſubſtances reduced to glaſs, by means of the electric ſhock. From ſo many evidences, therefore, it appears to me impoſſible to conclude otherwiſe than that the light of the ſun and the electric fluid are the ſame thing; and, according to the different modes in which they act, they produce the phenomena of heat and light in all their varieties, beſides a multitude of other effects of which we cannot have any perception.

We may indeed, if we pleaſe, ſuppoſe that ſome other thing exiſts which is heat itſelf, and that the light or electric fluid ſets in motion, attracts, repels, or acts otherwiſe upon this unknown ſomething; juſt as it comes into our heads to fabricate our ſyſtem. But, until our ſenſes can diſcover in ſome way or other this hidden ſubſtance, *reaſon* will always ſuggeſt that it has no exiſtence. We may ſay that without ſuch a ſuppoſition we cannot ſolve the phenomena of heat. But do we ever expect to ſolve theſe phenomena; or do we know all that the ſolar light and electric fluid can perform? If we do not know what they *can* do, neither do we know what they *cannot*; and the invention of other fluids muſt be accounted not only chimerical but uſeleſs.

But, to be more particular: on the ſubject of heat people have embarraſſed themſelves more with philoſophical reveries than by any real difficulty, and rendered the matter more obſcure than nature has made it. We have already obſerved, that by the convergence of light, or of electricity, heat is always produced. Here we can ſee the mode in which the fluid acts, viz. firſt by *converging*, and then *diverging*. When the light falls upon a ſolid body, it is evident, that if it be allowed to flow out as eaſily as it flows in, no internal agitation of the parts, or of any fluid contained in them, can take place. Tranſparent bodies therefore are never heated. Again, if the light be not allowed to enter the ſubſtance of a body, but is entirely reflected, the body cannot be heated; and hence it is very difficult to melt a poliſhed metal even by a ſtrong burning-glaſs. M. Macquer's burning mirror, which vitrified flints, could not melt ſilver. But, when the light falls upon a body capable of allowing it to enter its ſubſtance, at the ſame time that it cannot get out without difficulty, it is plain that the force of the fluid will be exerted in order to overcome that difficulty; the body will be expanded in all directions; the fluid will be thrown out in the ſame manner, and the more that the internal action of the light prevails over that power by which the parts of the body cohere, the more will the phenomena of heat be perceptible.

Again,

Again, let us ſuppoſe that the etherial fluid enters the ſubſtance of any body capable of being dilated to a great degree, it is equally plain that the action of the fluid muſt for ſome time be directed only upon the internal parts, and conſequently will be imperceptible on the outſide. This then is called *latent* heat; and where the preſſure on the outſide balances that on the inſide no heat will be perceptible to the touch. But by whatever means this balance is broken, heat will inſtantly be perceptible; and experiments ſhow that the balance may be broken either by an increaſe of cold or heat. Thus, in the caſe of water, the internal preſſure remains equal to the external, until the fluid is cooled to a few degrees below 32. The balance is then broken, and the internal action prevails; a quantity of what is called *ſenſible* heat eſcapes, and the water is converted into ice. Again, at the temperature of 32, little or none of the water evaporates; but by the addition of heat, by which the internal action of the ſubtile fluid we ſpeak of becomes greater than the external, the water is converted into vapour; and it is remarkable that the ſame effect takes place on greatly augmenting the degree of cold; for the evaporation from ice, even in froſty weather, is found to be very conſiderable.

On the whole, from innumerable experiments it appears, that there exiſts in nature a certain inviſible fluid, by the action of which, when diverging from a centre, heat is produced in the central point. By a certain other power this diverging force is limited, ſo that in ſome caſes it is not perceptible beyond the ſurface of the body in which it acts, and then it is called *latent* heat. In other caſes it is perceptible in a certain degree, and the degree in which it is perceptible hath been called the *temperature* or *ſenſible heat* of the body. On mixing different ſubſtances together it is found, that very often the proportions between the external and internal actions are varied. This has been already obſerved, when giving an account of Dr. Black's diſcovery of *latent* heat, viz. that when ſnow and warm water are mixed together the temperature of the mixture differs very conſiderably from

from the arithmetical mean between the temperatures of the two ſubſtances employed. Dr. Crawford proſecuted the experiment further, and found that there were few ſubſtances which, on being mixed, did not ſhew a temperature different from that of the arithmetical mean between the temperatures of the two originally employed. This difference he unfortunately uſed as the foundation of a rule for determinining the *capacities* of different ſubſtances for containing heat, and upon this erroneous principle has raiſed a ſuperſtructure, which upon no occaſion can be of ſervice to ſcience, but muſt always produce obſcurity and confuſion wherever it is introduced.

With regard to the power which ſets bounds to the expanſion of the fluid acting as heat, it is natural to think that it can be no other than the ſame fluid acting in a contrary direction, or from a circumference towards a centre; and thus we ſhall always find that the ſame fluid, by limiting its own operations, may produce thoſe phenomena which have been hitherto deemed ſo difficult of explanation. In what manner this limitation is in all caſes effected, or indeed in any caſe, we cannot pretend to explain. It is ſufficient to obſerve, that wherever there is a perpetual *efflux* of any thing, there muſt be alſo a perpetual *influx* at the ſame time, and in proportion to the one the other will be. Theſe two are directly contrary to one another, and, as we ſuppoſe the fluid to be univerſal, it is evident, that if any part of it be put in motion in a particular direction, the reſt will preſs towards that part where the motion is, in order to keep up the equilibrium. Hence we may eaſily account for the heat produced by percuſſion or by friction. By hammering a piece of iron, as Dr. Black juſtly obſerves, the fluid is forced out from between the parts of the metal. The emiſſion of this fluid in all directions is heat itſelf; and no ſooner is one quantity thrown out than another ſupplies its place with great rapidity, and ſo on, until the preſſure of the reſt in ſome way or other counteracts the emiſſion of any more, and the heat ceaſes. Juſt ſo with friction. The heat produced by it is always in proportion to the preſſure employed. By this

preſſure

preſſure the parts of the two ſubſtances are forced into ſuch cloſe contact, that an agitation and emiſſion of the fluid pervading their ſubſtance takes place. This agitation, as we have already noticed, is heat itſelf, and, as long as the friction is continued, more and more heat will be produced, without any limitation, as Count Rumford has obſerved.

Some bodies have a greater diſpoſition than others to emit this ſubtile fluid; and theſe we ſay are naturally of a warmer temperature than others. The *temperature* is nothing elſe than the efflux of the fluid from them, continually kept up by the action of the ſurrounding fluid. By mixture with different ſubſtances the temperatures of various bodies may be changed; by ſome the influx, and by others the efflux, may be augmented. In the former caſe we ſay the body becomes colder, in the latter hotter, than before; and in not a few caſes the agitation of the fluid becomes ſo great that the matter actually takes fire. In all theſe caſes, however, we can diſcover nothing more than the bare fact, that ſo and ſo is the caſe. We know that the bodies do grow hot by the convergence of the etherial fluid towards them, and its emiſſion from them; but why it ſhould converge or diverge we know not.

Thus much with regard to heat in general. We muſt next conſider another fluid which has very generally been accounted the ſource and fountain of heat, viz. *air*. This is indeed ſo much the ſource of heat in all our operations, that it was natural to think it the only one; but experiments have now determined that air itſelf is a mere creature of heat and light;* for, by employing theſe in a proper manner, airs or gaſes of all kinds have been produced. Thus, by expoſing water in a glaſs veſſel for ſome time to the rays of the ſun, a quantity of very pure oxygen air may be obtained; by concentrating the ſun's rays upon charcoal, inflammable air may be had; and by diſtilling, with a ſtrong heat, ſubſtances of various kinds, we may obtain a great variety of aerial vapours. From all this we may reaſonably

* Dr. Prieſtley thinks water is an *eſſential* in the compoſition of air.

bly conclude that heat, attached to ſome other ſubſtance, diſſolved in it in ſuch a manner as to become inviſible, forms the ſubſtance of air. Heat therefore being the agent in the compoſition of air, it is reaſonable to ſuppoſe that it is the agent in its decompoſition alſo, or in its transformation from one ſpecies to another, of which the converſion of oxygen into fixed air by combuſtion is an inſtance. When air is taken into the lungs the blood is warmed by the action of that inviſible fluid, which has already given elaſticity to the air. In conſequence of a conſiderable quantity of this fluid being then converted from a latent into a ſenſible ſtate, part of the elaſtic principle muſt be loſt, and the air diminiſhed in bulk. The reaſon why this muſt conſtantly take place is, that part of the heat evaporates from the ſurface of the body, during the courſe of circulation. Were it not ſo, the quantity thrown out by the lungs would be exactly equal to that which the blood received, and conſequently there could be no diminution between the bulk of the air expired and that which was inſpired; but, on account of the waſte juſt mentioned, the blood muſt always receive ſomewhat more than it gives out by the breath. Thus, while the air we breathe continues the ſame, and the organization of the body is not changed, the natural operations will go on ſmoothly, and health will continue; but, as we have formerly obſerved, by an alteration of either of theſe, diſeaſe muſt enſue; and we muſt now endeavour, from the principles laid down, to examine the mode in which epidemic diſeaſes, and particularly the plague, may be produced.

The air is ſo evidently connected with human life, that it has been from the earlieſt ages accounted the ſource of peſtilential diſeaſes, though, as none of the more obvious qualities of it, ſuch as heat, cold, moiſture, or dryneſs, appeared to be connected with them, they were generally ſuppoſed to proceed from the action of ſome unknown natural cauſe, or from that of the Deity himſelf. Some, however, have alſo been of opinion that plagues might originate from the obvious qualities of

the

the air in conjunction with certain effluvia from putrid vegetable or animal bodies. Thus, in ſeveral plagues mentioned in ancient hiſtory, we find ſwarms of dead locuſts, graſshoppers, the carcaſes of thoſe ſlain in battle, crowded houſes, and filth of all kinds, aſſigned as cauſes. This opinion was adopted by Dr. Mead, and he gives the following account of the origin of the plague in Egypt. "Grand Cairo is crowded with inhabitants, who for the moſt part live very poorly and naſtily; the ſtreets are narrow and cloſe; it is ſituate in a ſandy plain, at the foot of a mountain, which, by keeping off the winds that would refreſh the air, makes the heats very ſtifling. Through the midſt of the city paſſes a great canal, which is filled with water at the overflowing of the Nile; and, after the river decreaſes, is gradually dried up: into this canal the people throw all manner of carrion, filth, &c. ſo that the ſtench which ariſes from this and the mud together is inſufferably offenſive. In this poſture of things, the plague every year preys upon the inhabitants, and is only ſtopped when the Nile, by overflowing, waſhes away this load of filth; the cold winds, which ſet in at the ſame time, lending their aſſiſtance by purifying the air." He then proceeds to account for the plagues in Ethiopia in the manner above related, viz. by the prodigious ſwarms of locuſts, which ſometimes occaſion a famine by devouring the fruits of the earth, and, when they happen to be caſt by the winds into the ſea, occaſion a peſtilence; the putrefaction being heightened by the intemperance of the climate, which here is ſo great that it is infeſted with violent rains for three or four months together; and it is particularly obſerved of this country, that the plague uſually invades it whenever rains fall during the ſultry heats of July and Auguſt. He next takes notice of what the Arabians ſay of the origin of the plague in Ethiopia, viz. that it is brought on by unſeaſonable moiſtures, heats, and want of winds. But, whatever truth may be in the account given of the Ethiopic plagues, the teſtimonies already produced in this treatiſe are ſufficient to render it very doubtful,

doubtful, at leaſt, whether the plague ever does originate in Cairo, or any other place in Egypt. Beſides, if we once admit the exiſtence of any thing as a cauſe adequate to the production of a certain effect, wherever that cauſe exiſts the effect ought certainly to follow, unleſs where we plainly perceive ſomething which prevents its action. It is not fair reaſoning to ſay that the action of the cauſe is prevented by ſomething unknown, for we might as well ſay that this unknown ſomething is the cauſe originally, and acts only upon certain occaſions, or when it thinks proper. Now, if the filth of the canal of Cairo be the cauſe of the plague in that city, it ought to recur annually at the ſeaſon when that filth exiſts in greateſt quantity, and in the moſt putrid ſtate. Nevertheleſs we have the expreſs teſtimony of Mr. Eyles Irwin, that at the time he was in Cairo there had not been any plague for ſeven years. The account he gives of it is a kind of contraſt to that above quoted from Dr. Mead. "*Miſir al Kaira*, ſays he, or the *City of Anguiſh*, ſo called "from the frequent viſits which it has received from the "plague, but commonly called *Grand Cairo* by us, is ſitu- "ated in lat. 30 degrees 3 minutes N. on an artificial "branch of the Nile. Old Cairo nearly faces the river; "but the new city is removed above a mile from it, and "approaches to the range of mountains which runs "through Upper Egypt, and abruptly breaks off here. "It is undoubtedly one of the fineſt cities in the eaſt; "which, from the preſent ſtyle of architecture that reigns "among the orientals, is but a faint commendation. "The houſes are in general built of ſtone, and, being "elevated to ſeveral ſtories, would make a grand ap- "pearance, notwithſtanding the inelegance of their "ſtructure, were not the effect deſtroyed by the exceſ- "ſive narrowneſs of the ſtreets. This is one of the "cauſes to which the ingenious Dr. Mead aſcribes the "birth of the plague in this capital; but experience "evinces that it ariſes from *foreign and adventitious* cauſes. "*There has not been a plague here theſe ſeven years*; which "is rendered more remarkable by the commencement "of the Ruſſian war at the date of its ceſſation. No

"one

" one can account for this; though a year ſeldom paſ-
" ſed by before without a viſit from it."*

From this it plainly appears, that, however theſe putrid effluvia may concur with other circumſtances in producing the plague, they are by no means the *only* cauſe; otherwiſe not a ſingle year could have paſſed in Cairo without a peſtilence; and the very ſame thing we ſhall find to hold good in every other, let us chooſe for a cauſe what we will. In order to inveſtigate this matter fully, we muſt now conſider what cauſes have been aſſigned by phyſicians for other epidemical diſeaſes; and here, to avoid prolixity, we ſhall chiefly confine ourſelves to thoſe enumerated by Dr. Fordyce as the cauſes of fever; a gentleman whoſe very extenſive experience muſt give the greateſt weight to his teſtimony.† The principal cauſes aſſigned by him are,

1. *Infection*, or " a peculiar matter generated in the
" body of a man in fever, which is carried by the at-
" moſphere, and applied to ſome part of the body of a
" perſon in health, and which cauſes fever to take place
" in him." That ſuch a cauſe exiſts, he proves from obſerving that " of any number of men, one half of whom
" go near a perſon ill of a fever, and the other half do not,
" a greater number of the former will be infected, in a
" ſhort period afterwards, than in thoſe who do not." He ſays he has known, in ſuch circumſtances, ſeven out of nine infected with the diſeaſe. This infection is not diſcoverable by ſmell or any other organ of ſenſe; neither can the greateſt attention to cleanlineſs diſarm it of its malignity. Of this the Doctor ſays that he has known inſtances; nay, of a perſon going into a room where a feveriſh patient was, and bringing with him the infection, which was communicated to others in the room to which he came. He owns, however, that by allowing the air to ſtagnate in which feveriſh patients are, the infection will

* Irwin's Voyage up the Red Sea, p. 335.

† At the time of writing his treatiſe Dr. Fordyce informs us, that he had been "for upwards of twenty years one of the three phyſicians of St. " Thomas's Hoſpital (in London) whoſe walls have contained nearly four " thouſand patients every year, where the proportion of fevers to other diſ-" eaſes is much greater than the general proportion."

will become extremely violent and fatal. This may naturally be ſuppoſed, even without having recourſe to putrid effluvia; becauſe, independent of theſe, the imperceptible infectious matter itſelf will undoubtedly be accumulated in the atmoſphere of the room, and act more powerfully than it could have done had it been partly carried off and diluted by attention to cleanlineſs and ventilation. He alſo ſays, that "when a number "of perſons live in a ſmall ſpace, ſuppoſing even that they "are kept as clean as poſſible, it happens frequently that "fever ariſes in ſome, often in many of them. It has "been in this caſe ſuppoſed, and is extremely probable, "that ſome peculiar ſpecies of matter is *produced*, capa-"ble of producing fever, on being applied to the body."

2. *Effluvia from putrid animal or vegetable matters.* Of this our author ſeems to be leſs fully aſcertained than of the former, as he does not ſay that he has obſerved any inſtances of fevers ariſing from this cauſe; and he concludes by obſerving that "either the cauſe of fever, "conſiſting of matter produced in the body of a perſon "affected with this diſeaſe, ſeems probably different from "that produced by putrefaction, or might be generated "without any putrefaction taking place."

3. *Cold.* Our author "is not diſpoſed to allow that "ſudden expoſure to cold occaſions fever to take place, "unleſs ſome ſymptom of the diſeaſe follows immediately. "If a man had been ſuddenly expoſed to cold, and con-"tinued in perfect health for *twenty-four* hours, the au-"thor would never allow that fever, or any other diſeaſe, "was occaſioned by it. In this caſe (expoſure to cold) "the evidence is much ſtronger than in that of infec-"tion; for the author (Dr. Fordyce) has ſeen many "inſtances where, from expoſure to cold, the commence-"ment of the attack was inſtantaneous; and many are "to be found in the records of medicine."

4. *Moiſture.* On this ſubject the Doctor obſerves, that the application of water to the body is not a cauſe of fever, unleſs the air has particles of water floating in it; in which caſe fever has enſued more frequently than in other caſes. Water may exiſt in the atmoſphere in three

three ſtates. 1. In ſmall drops ſuſpended in it like duſt in water. 2. In vapour. In this caſe the tranſparency of the air is not impaired, and a *chemical* combination, as it is called, between the air and water takes place. If the atmoſphere be hot or denſe, it is capable of combining chemically with a larger proportion of water. If therefore the atmoſphere ſhould in this manner be ſaturated with water, at any particular degree of heat or denſity, by diminiſhing either of theſe the vapour will be condenſed, and the water reduced to the former ſtate of ſuſpenſion in ſmall particles. 3. Water, heated to the boiling point, emits a ſteam, which combines chemically with the atmoſphere, till the latter be ſaturated, after which it aſſumes the form of ſmall particles; and *this laſt is the only ſtate* which has been found to produce fever.

Moiſture will alſo produce fever when applied to the body by wearing wet clothes. Thoſe which imbibe or part with heat moſt ſlowly, are leaſt apt to produce fevers on being heated. The warmer the atmoſphere, the more liable people are to fevers from moiſture.

It has been obſerved, that moiſture from marſhes, ſtagnating canals, or where the water runs very ſlowly, is more apt to produce fevers than what proceeds from the ſea, lakes or rapid rivers. "This (ſays the Doctor) "has given occaſion to ſuppoſe that ſome other vapours "proceed from ſuch marſhes beſide water, and produce "the diſeaſe. It certainly often happens, that a conſi- "derable degree of putrefaction takes place in marſhy "grounds, and more eſpecially in warm climates; but "it is by no means to be concluded that moiſture in the "atmoſphere always produces fever in conſequence of "putrefaction. Putrefaction can only take place in ve- "getable or animal ſubſtances. If water therefore, not "impregnated with either, ſhould be in ſuch a ſituation "as to produce moiſture in the atmoſphere, no putre- "faction can take place; therefore, if fevers enſue, they "are certainly in conſequence of moiſture, not putrefac- "tion. Many inſtances of this may be brought, as in "the war which took place in Flanders, between the "tenth and eleventh year of the preſent century, an ar-

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" my encamped upon ſandy ground, in which water was " found in digging leſs than a foot deep, and occaſioned " a great moiſture in the air, which produced in a few " days numbers of fevers, although the army was per- " fectly healthy before, and no more fevers were produ- " ced on ſhifting their ground. There are a vaſt many " other inſtances of the ſame thing having taken place. " Beſides, fever has often ariſen immediately in perſons " ſitting in rooms, the floors of which had been juſt " moiſtened with pure water."

5. *Certain kinds of food.* On this Dr. Fordyce obſerves, that, though food of difficult digeſtion undoubtedly produces a number of diſeaſes, he has never ſeen it productive of fever excepting once. Dr. Girtanner relates, that the emperor of Germany, having forced a number of his ſubjects to ſerve as ſoldiers, and ſent them into an unwholſome part of Walachia, where he fed them with a kind of paſte made of bread and water inſtead of meat, many of them died of the ſcurvy. The Doctor, however, does not aſcribe this to any poſitive cauſe, but to three *negatives*, viz. the abſtraction of the ſtimulus of *nutriment*, by feeding on the paſte juſt mentioned; of the ſtimulus of *oxygen* in the corrupted atmoſphere of Walachia; and laſtly of the *nervous ſtimulus*, the moſt powerful of all; the greateſt part being engaged by force againſt their will. This corroborates what Dr. Fordyce has ſaid, that bad food is very ſeldom the cauſe of fever; for among ſo many, who uſed the *imperial* paſte juſt mentioned, ſome would certainly have been affected by fevers, had it been capable of producing them; but, as it did not, it is moſt evident that the deficiency of *ſtimuli* is not the cauſe of fever.

6. *Paſſions of the mind.* Theſe are looked upon by Dr. Fordyce to be among the leſs frequent cauſes of fever, though it is certain that they have been productive of multitudes of diſeaſes, and even of ſudden deaths; and Dr. Falconer, in his Prize Diſſertation, aſcribes to the paſſions very conſiderable effects in fevers, and even in the plague itſelf. " Contagious fe- " vers (ſays he) afford ſtrong inſtances of the influence

" of

" of mental affections, both as prophylactics and reme-
" dies. The plague is a remarkable example, and the
" ſame reaſoning extends to other diſorders of a febrile,
" contagious nature. Fear, it is well obſerved by Dr.
" Cullen, by weakening the body, and thereby increaſ-
" ing its irritability, is one of the cauſes which, concur-
" ring with contagion, render it more certainly active,
" which he aſcribes to its weakening effect on the body,
" by which its irritability is increaſed. Againſt this
" therefore he directs the mind to be particularly forti-
" fied, which is beſt done by giving people a favourable
" idea of the power of preſervative means, and by de-
" ſtroying the opinion of the incurable nature of the
" diſorder, by occupying the mind with buſineſs or la-
" bour, and by avoiding all objects of fear, as funerals,
" paſſing-bells, and any notice of the death of particular
" friends. Even charms might be uſed with good effect,
" could we promote a ſtrong prepoſſeſſion of their effi-
" cacy, either by the confidence they inſpire, or by their
" engroſſing the attention of the mind. It is no leſs
" certain, that a ſtudious regard to promote hope and
" confidence in recovery, is equally neceſſary for the
" cure as for the prevention of ſuch diſorders. We
" know that contagious fevers have a peculiar tendency
" to diminiſh the energy of the brain, and of courſe to
" debilitate the whole ſyſtem; and that this is eſpecially
" the caſe with the plague, which produces the moſt con-
" ſiderable effects in weakening the nervous* ſyſtem or
" moving powers, and in diſpoſing the fluids to a general
" putreſcency; and Dr. Cullen is of opinion that to theſe
" circumſtances, as the proximate cauſes of the plague,
" regard ſhould chiefly be had, both for the prevention
" and cure of this diſorder. It muſt therefore be highly
" neceſſary, during the courſe of this diſeaſe, to attend
" to the ſupport of the ſpirits, as on theſe the vital prin-
" ciples greatly depend; and they can by no means be
" ſo effectually kept up as by inſpiring a confidence of
" recovery."

Dr.

* " An intenſe head-ach, uncommon giddineſs, and a ſudden loſs of ſtrength, were the firſt complaints of thoſe who were ſeized with this diſtemper."
(Ruſſel on the Plague at Aleppo, p. 230)

Dr. Zimmerman preſents us with a great number of examples of the influence of the paſſions in producing diſeaſes, or death itſelf; ſome of the moſt remarkable of which follow. "All the paſſions (ſays he) when carried "to exceſs, bring on very formidable diſeaſes. Some- "times they occaſion death, or bring us at leaſt into "imminent danger. The moſt reputable phyſicians a- "gree in opinion that terror may occaſion apoplexy, and "death; and indeed they conſider apoplexy as the moſt "common effect of violent paſſion. Without being "carried to exceſs, a paſſion will ſometimes occaſion a "difficulty of breathing, together with a ſenſe of ſtric- "ture in the breaſt, and an heſitation to ſpeak; the "tongue remaining as it were immoveably fixed on the "palate. Hyſterical and hypocondriacal affections are "ſometimes the effects of grief in the moſt healthy peo- "ple. Joy is much more dangerous to life than ſudden "grief. Sophocles died through joy at being crowned "on account of a tragedy he had compoſed in his old "age. The famous Fouquet died on being told that "Louis XIV had reſtored him to liberty. The niece of "the celebrated Leibnitz, not ſuſpecting that a philo- "ſopher would hoard up treaſure, died ſuddenly on "finding under her uncle's bed a box containing ſixty "thouſand ducats. Violent anger has ſometimes pro- "duced hæmorrhages and ſubcutaneous extravaſations; "or, ſome veſſel of the brain being ruptured by theſe "tranſports, a fatal apoplexy has taken place. There "have been inſtances of exceſſive anger being ſucceeded "by epilepſy, colic, or a violent degree of fever. Some- "times it has occaſioned an increaſed flow of bile. In "ſome this produces vomiting; in others it goes off "downwards, and cauſes diarrhœa; or being retained, "from a ſtricture of the gall-ducts, will perhaps be ab- "ſorbed, and occaſion jaundice. In caſes where anger "has been ſucceeded by extreme grief, obſtructions have "taken place in the liver. The effects of terror are "ſimilar to thoſe of anger, but in general more violent. "Sometimes exceſſive terror ſeems to give to men a preter- "natural ſtrength, as is the caſe with madmen and drown-

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" ing perſons. In ſome caſes it has not only excited im-
" mediate convulſions, but cauſed them to return peri-
" odically. Fear has been ſaid to make the hair ſtand
" upright, and to contract the pores from which the hairs
" iſſue in the ſame manner as cold does. There are in-
" ſtances in authors even of the colour of the hair be-
" ing changed by exceſſive fright. Philip V died
" ſuddenly on being told that the Spaniards had been
" defeated, and, on opening him, his heart was found
" ruptured. Timid people are more liable than others
" to fall ſick. A firmneſs of mind is one of the beſt
" preſervations againſt contagion. Willis has very well
" obſerved, that they who fear the ſmall-pox the moſt
" are generally the firſt to be attacked with it. Cheyne
" aſſures us that fear is extremely prejudicial in all epi-
" demical diſeaſes. Dr. Rogers remarks, that fear con-
" ſtantly increaſes the ravages of a contagious diſeaſe.
" Rivinus attributed the propagation of the plague at
" Leipſic wholly to fear. The French phyſicians, who
" wrote on the plague at Marſeilles, went ſo far as to
" deny its being contagious, and aſcribed its propaga-
" tion chiefly to fear."

As for the cauſe of the plague itſelf, Dr. Fordyce ſuppoſes it to be produced by an infection of a particular kind. That which takes place in Syria and Egypt, he ſays, has only been clearly deſcribed by Dr. Ruſſel; and it cannot be gathered from the accounts whether this may be originally produced without having been propagated as the firſt claſs of infections above mentioned are. " That diſeaſe (ſays he) called the plague, which ravaged
" this country (England) on conſidering the hiſtories of
" the diſeaſe, ſeems to have been a *fever*,* produced by
" infections of the firſt claſs which have been enume-
" rated." Dr. Moore has given an account of the origin of a plague, which, if it could be depended upon, would decide the queſtion concerning the origin of this dreadful diſtemper without previous infection. This paſſage is extracted from the Hiſtory of the Royal Medical

* This is expreſsly denied by Dr. Hodges, who had innumerable opportunities of ſeeing the diſtemper.

Medical Society for the years 1777 and 1778. "Dr. "Mitchell, phyſician to the hoſpital at Smyrna, ap- "pears, according to a memoir of which he is the au- "thor, ſent by M. le Baron de Tott to the Medical "Society to believe in the ſpontaneity of the plague "(or that it ariſes of itſelf without any prediſpoſing "cauſe in the body) for proof of which he cites the "following circumſtance: A ſolitary ſhepherd, having "no communication with any body, fell ſick while he "was tending his flocks; he went into an inhabited "part, where he communicated the plague with which he "found that he was attacked. This circumſtance would "prove much, if it was certain that the ſhepherd had "no communication with others; if it were known how "long, and with what precaution, he had been ſecluded "from company: but the proofs of theſe are too diffi- "cult to be eſtabliſhed to allow of any concluſion to be "draw from the fact. We are obliged therefore to ac- "knowledge [it to be a doubtful matter] whether it is "in fact a country that is the cradle of the plague; "what country this is, ſuppoſing that ſuch an one ex- "iſts; or, finally, whether it ſometimes appears ſpon- "taneouſly, and whether the firſt whom it attacks be- "comes the focus from whence it emanates."

Dr. Fordyce, in treating of the origin of fever, ſeems inclined to think that it may ariſe without any prediſ- poſing cauſe; and after having enumerated the various cauſes already mentioned, and fully conſidered them, gives it as his opinion, that "there muſt undoubtedly be other cauſes than thoſe which give occaſion to the diſeaſe, but which are at preſent *totally unknown*." In like manner Dr. Moore, ſpeaking of the nervous fever, ſums up what may be known concerning the cauſe of it in the following words. "Upon the whole, "we know that people of delicate, exhauſted and ſickly "conſtitutions, and thoſe whoſe minds are ſaddened by "depreſſing paſſions, are greatly prediſpoſed to this diſ- "eaſe, the immediate ſeeds of which, we alſo know, "may be generated in places where human effluvia are "collected and confined. And this is the moſt eſſential

"part

" part of our knowledge reſpecting the cauſe of this " diſeaſe; and even this little is diſturbed with uncer- " tainty: for we ſometimes meet with inſtances of peo- " ple of *robuſt conſtitutions*, who are ſeized with the diſ- " eaſe in all its malignity, when they are under no *de- " preſſing paſſion*, when the diſeaſe is *not epidemic*, to " whom we cannot trace it from any place where the " human effluvia could be confined in any uncommon " degree, or from any perſon in the diſeaſe, of which " perhaps there is no other perſon ill in the neighbour- " hood for ſeveral miles round; and, in ſhort, when we " cannot connect it with any of the cauſes ſuppoſed to " be the ſources of the diſtemper. On extraordinary " occaſions of this kind we have nothing for it but to " ſuppoſe that, notwithſtanding the apparent vigour of " the patient, his body has been peculiarly prediſpoſed " to catch the infection, and that ſome contagion, not " forcible enough to infect any other perſon, has by ſome " means, unobſerved, been conveyed to him; or, if ſo " many ſuppoſitions diſpleaſe, we may ſuppoſe at once " that there is in ſome caſes a ſource of this fever which " has not been ſuſpected. For, although the numerous " obſervations that have been made give us the ſtrongeſt " reaſon to think that human effluvia produce this diſ- " eaſe, we have no right to infer that it cannot ariſe alſo " from ſome other ſource."

To the ſame purpoſe I ſubjoin the very reſpectable opinion and teſtimony of Dr. Patrick Ruſſel. " In ſome " epidemical diſtempers, the ſudden alternations of the " air have conſtant and manifeſt influence; in others, " though the influence of the air muſt be equally ad- " mitted, it ſeems not to depend on ſenſible alteration " or ſucceſſion in the common properties of the at- " moſphere, but on ſome *inexplicable* combination, ſome " *occult*, *new*, *unknown* quality. Amongſt epidemics of " this laſt kind muſt be reckoned the plague. . . . . " Should ever that ſtate of the air, without the concur- " rence of which the contagion of the peſtilence never " ſpreads, or ceaſes to act, be diſcovered, and aſcer- " tained by unequivocal marks, the dread of the plague,

" univerſally prevalent, would be greatly diminiſhed; " more effectual means of preſervation would be found " out, and the application of them might ſafely be li- " mited to certain ſeaſons.

" Experience in Turky, where, generally, no precau- " tions are taken in the times of peſtilence, clearly evin- " ces, that, in a certain ſtate of the air, a communication " with infected places may ſubſiſt without any material " conſequence. The return of the plague at Aleppo " happens at irregular periods; the intervals are of con- " ſiderable, but unequal, length; and in thoſe the com- " merce with Egypt, Conſtantinople and Smyrna re- " mains uninterrupted. In the intervals between 1744 " 1760, and from 1762 to 1780, the plague raged ſe- " veral times in the places now mentioned, without affect- " ing Aleppo; and even in two or three years ſubſe- " quent to 1762, though it was at Maraſh, as well as " other places not far diſtant, with which Aleppo has " continual intercourſe, no inſtances were diſcovered of " communicated infection: if ſuch happened, they muſt " have eſcaped my utmoſt vigilance; and the daily " exerciſe of my profeſſion led me to be very much " among the natives of all ranks. At the ſame time I " have reaſon to ſuſpect that infected families from ſome " of thoſe places took refuge in Aleppo; and I know, " with certainty, that not only ſome merchants of that " city, who happened to be at Maraſh when the plague " broke out there, returned to their families in the ſum- " mer of 1763, but that caravans of various merchandiſe " arrived in the courſe of the ſame ſummer.

" I conſider it therefore as an eſtabliſhed fact in the " Levant, that commerce and intercourſe with infected " towns is ſometimes attended with no bad conſequence. " The ſame thing may perhaps by aſſerted, without " reſtriction, of all countries; but till the ſigns indicat- " ing a peſtilential conſtitution be aſcertained, no parti- " cular year can be declared exempt from danger. Pre- " dictions founded on *planetary conjunctions* have been " long exploded; and ſigns derived from the known " properties and alterations of the air, are almoſt equally

" fallacious.

" fallacious. The ſeaſons concomitant with plagues in " England, as well as elſewhere, have been very diſſimi- " lar ; and the ſame viſible concurrence, uſually deemed " peſtilential, has often, in the revolution of years, been " obſerved to return, in various countries, without pro- " ducing the dreaded conſequences. Upon the whole, " from all I have been able to collect, the peſtilential " conſtitution ſeems hitherto to be known only from its " effects ; *neither its approach nor its retreat can be predict-* " *ed* ; *and its nature remains wrapped up in* MYSTERIOUS " DARKNESS."

Having thus ſeen, that, of the cauſes commonly aſſigned for epidemical diſeaſes, not one can be accounted certain and determinate, it now remains to conſider one more, and that is

Contagion. Though this has been generally accounted the ſame with *infection*, yet by ſome it has been reckoned otherwiſe ; and indeed there ſeems to be a neceſſity for ſuch a diſtinction : for, though we ſhould prove, ever ſo clearly, that a diſeaſe once communicated to one perſon ſhould from that perſon be communicated to another, yet the difficulty is to know from whence the firſt perſon had it. This ſource, if any ſuch can be found, is what we may with the greateſt propriety diſtinguiſh by the name of *contagion*, and is the ſenſe in which it ſhall for the future be uſed in this treatiſe, the matter communicated from one perſon to another being always called *infection*. This indeed differs from what many celebrated phyſicians have ſaid upon the ſubject ; but the diſtinction certainly muſt exiſt. Dr. Cullen ſpeaks rather indiſtinctly upon the ſubject. " We have ſuppoſed that " *miaſmata* are the cauſe of intermittents, and *contagions* " the cauſe of continued fevers, ſtrictly ſo named ; but " we cannot with propriety employ theſe general terms. " The notion of *contagion* properly implies a matter ariſ- " ing from the body under diſeaſe, *miaſma*, a matter " ariſing from other ſubſtances. But, as the cauſe of " continued fevers may ariſe from other ſubſtances than " the human body, and may in ſuch caſes be called a " *miaſma*, and, as other miaſmata alſo may produce con-

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" tagious diſorders, it will be proper to diſtinguiſh the " cauſe of fevers by uſing the terms *marſh*, or *human* ef- " fluvia, rather than the general ones *miaſma*, or *conta-* " *gion*."

From this it is not very eaſy to determine what the Doctor means when he ſpeaks of *ſpecific contagion* as the cauſe of the plague. Dr. Ruſſel plainly aſcribes it to human effluvia. " The plague (ſays he) is a contagious " diſeaſe; that is, an *emanation from a body diſeaſed*, paſ- " ſing into one which is ſound, produces, in time, the " ſame diſeaſe," &c. There muſt, however, undoubtedly have been ſomething originally diſtinct from the human body which gave riſe at leaſt to the *firſt* plague that was in the world; and ſome plagues recorded in hiſtory are ſaid to have ariſen in this way. Thus, Ammianus Marcellinus ſays that the plague which broke out in the Roman army in the time of Marcus Aurelius aroſe from a peſtilential vapour confined in a golden coffer dedicated to Apollo. Upon opening this, the *contagion* diffuſed itſelf all around, and the *infection* ſpreading from one to another, produced an almoſt univerſal peſtilence. Ammianus indeed is the only hiſtorian who relates this; another account of its origin is given, p. 14, but whether we believe the account of Ammianus or not (which indeed does not appear probable) it is ſufficient to ſhow what were the received opinions at the time. In like manner every one has heard of peſtilential effluvia breaking out from the earth, from graves, &c. ſo that we certainly look upon this doctrine of *contagion* as the cauſe of diſeaſes to have been pretty generally received. We are alſo informed by Dr. Mead, from M. Villani, who wrote the hiſtory of thoſe times, that the great plague of 1346 began in China, where, according to the report of ſome Genoeſe ſailors, it was occaſioned by a great ball of fire that either burſt out of the earth, or fell down from heaven. This is thought incredible by Dr. Mead, and no doubt is ſo, but it ſhows the general opinion, that the original cauſe or *contagion* which produces a plague is diſtinct from the *infection* which is afterwards communicated from one to another. In the

French

French Encyclopedie, we have this account of the ball of fire, or fiery vapour, without any comment.

As to the opinion of peſtilential vapours ariſing out of the earth, though we are aſſured that people have been ſuddenly killed by exploſions, probably of the electrical kind, or by lightning iſſuing from under their feet, yet we are not furniſhed with any well authenticated accounts of a *plague* having ariſen from any ſuch cauſe. About 19 years ago a violent fever raged epidemically through a ſmall diſtrict in the north of Scotland, which was ſaid to have originated in the following manner. Some young men having heard that a certain place in their neighbourhood had, in the time of a plague been a burial ground, took into their heads to dig into it. They did ſo, and one of them immediately fell ſick, but recovered. The father of two of the young men, exceedingly diſpleaſed at the conduct of his ſons, and apprehenſive of the conſequences, filled up the hole they had dug in the ground, ſoon after which he fell ſick and died, and the fever continued to rage in the neighbourhood for ſome time. The mother of another of the parties concerned alſo died, and boils broke out on various parts of the bodies of the ſick. This was the account given in ſome of the newſ-papers of the time, and had the matter been thoroughly inveſtigated and atteſted, would have been deciſive in favour of peſtilential contagion being capable of taking up its reſidence in the earth. As it ſtands at preſent, it can only draw our attention to what may happen in another caſe, ſhould any ſimilar one occur.*

With

* Though the writer of this Treatiſe was not at that time on the ſpot where this event took place, yet he has as good evidence as any one can have of what has not fallen under his immediate inſpection, that theſe graves were opened, that the father of one of the young men died; and the mother of another, and one of the young men himſelf was taken ill, with the eruption of boils on ſome parts of his body; but whether there was any perſon previouſly affected with fever in the neighbourhood from whom it might have been derived, or any thing which might have ſtrongly predilpoſed thoſe people to it, is unknown. It is indeed no eaſy matter to diſcover who was the firſt perſon affected with an epidemic, as no body chooſes to own that either they, or any of their relatives were the authors of miſchief, however involuntary, to the community. M. Chaptal, however, in his Elements of Chemiſtry, has ſome curious, as well as uſeful obſervations on the propriety of burying bodies in a ſufficient ſpace and at a ſufficient depth; and on the accidents which may ariſe

With regard to epidemics occaſioned by the action of electricity, we cannot indeed produce any inſtance; but we have one of a diſtemper more dreadful than even the plague itlelf; and that is of a perſon ſuddenly ſtruck by an electric flaſh (generated either in his own body, or in the room where he was) and by this ſtroke reduced to a moſt deplorable condition, which ſoon ended in death. The account ſtands on the authority of Mr. Joſeph Battaglia, ſurgeon at Ponte Boſio, who tranſmitted it to Florence, and is as follows.

" Don G. Maria Bertholi, a prieſt reſiding at mount " Valere in the diſtrict of Livizzano, went to the fair " of Filetto, on account of ſome buſineſs which he had " to tranſact, and after ſpending the whole day in going " about through the neighbouring country, in order to " execute commiſſions, in the evening he walked to- " wards Fenille, and ſtopped at the houſe of one of his " brothers-in-law, who reſided there. No ſooner had he " arrived, than he deſired to be conducted to his apart- " ment, where he put a handkerchief between his ſhoul- " ders and his ſhirt, and, when every body retired, he " began to repeat his breviary. A few minutes after, a " loud noiſe was heard in Mr. Bertholi's chamber; and " his cries having alarmed the family, they haſtened to " the

ariſe from opening vaults and burying grounds. An inſtance of this he gives of the ground of a church in Paris being dug up, which emitted a nauſeous vapour, affecting ſeveral people in the neighbourhood.

From M. Chaptal's obſervations it appears, that bodies do not ſoon diſſolve in ſuch a manner as to emit no diſagreeable or noxious effluvia, when buried. M. Becher, he ſays, " had the courage to make obſervations during the courſe " of a year upon the decompoſition of a carcaſe in the open air. The firſt " vapour which riſes, he ſays, is ſubtle and nauſeous: ſome days after, it has " a certain ſour and penetrating ſmell. After the firſt weeks the ſkin be- " comes covered with a down, and appears yelloviſh; greeniſh ſpots are " formed in various places, which afterwards become livid and black; a thick " gloſey or mouldy ſubſtance then covers the greateſt part of the body: the " ſpots open and emit a ſanies." In ſuch as are buried the decompoſition is much more ſlow; our author thinks *four times* at leaſt. According to M. Petit, a body buried at the depth of four feet is not decompoſed in leſs than three years, and, at a greater depth the decompoſition is ſtill more ſlow. This decompoſition is favoured by the preſence of water, and likewiſe by ſome kinds of earth more than others. It has been proved by Lemery, Geoffroy, and others, that argillaceous earths have very little effect in this way: porous and light earths much more: the roots of vegetables alſo by abſorbing the putrid effluvia contribute greatly to the final decompoſition of bodies buried in places expoſed to the open air; but in churches and other covered places the caſe is vaſtly different. " Here, ſays our " author,

" the ſpot, where they found him extended on the floor, " and ſurrounded by a faint flame, which retired to a " greater diſtance in proportion as it was approached, " and at length diſappeared entirely. Having conveyed " him to bed, ſuch aſſiſtance as ſeemed neceſſary was " given him. Next morning I was called, and after " examining the patient carefully, I found that the tegu- " ments of the right arm were almoſt entirely detached " from the fleſh, and hanging looſe, as well as the ſkin " of the lower part of it. In the ſpace contained be- " tween the ſhoulders and the thigh, the teguments were " as much injured as thoſe of the right arm. The firſt " thing, therefore, to be done, was to take away thoſe " pieces of ſkin; and, perceiving that a mortification was " begun in that part of the right hand which had receiv- " ed the greateſt hurt I ſcarified it without loſs of time; " but notwithſtanding this precaution, I found it next " day, as I had ſuſpected the preceding evening, entirely " ſphacelous. On my third viſit, all the other wounded " parts appeared to be in the ſame condition. The pa- " tient complained of an ardent thirſt, and was agitated " with dreadful convulſions. He voided by ſtool bili- " ous putrid matter, and was diſtreſſed by a continual " vomiting.

" author, is neither water nor vegetation; and conſequently no cauſe which " can carry away, diſſolve or change the nature of the animal fluids: and " I cannot but applaud the wiſdom of government which has prohibited the " burying in churches; a practice which was once a ſubject of horror and in- " fection.

" The decompoſition of a body in the bowels of the earth can never be dan- " gerous, provided it be buried at a ſufficient depth, and that the grave be not " opened before its complete diſſolution. The depth of the grave ought to be " ſuch that the external air cannot penetrate it; that the juices with which " the earth is impregnated may not be conveyed to its ſurface; and that the " exhalations, vapours, or gaſes, which are developed or formed by decompo- " ſition, ſhould not be capable of forcing the earth covering which detains " them. The nature of the earth in which the grave is dug, influences all its " effects. If the ſtratum which covers the body be argillaceous, the depth of " the grave may be leſs, as this earth difficultly admits a paſſage to gas and " vapour; but, in general, it is admitted to be neceſſary that bodies ſhould be " buried at the depth of five feet to prevent all theſe unhappy accidents. It " is likewiſe neceſſary to attend to the circumſtance, that a grave ought not to " be opened before the complete decompoſition of the body. The term of de- " compoſition is various; according to M. Petit of three years in graves of " four feet, and four years in thoſe of ſix feet. The pernicious cuſtom which " allows a ſingle grave to families more or leſs numerous, ought therefore to " be ſuppreſſed; for, in this caſe the ſame gave may be opened before the " time preſcribed. It is likewiſe neceſſary, to prohibit burying in vaults, or " even in coffins."

" vomiting, accompanied with a violent fever and de-
" lirium. At length the fourth day after a comatoſe
" ſleep of two hours, he expired. During my laſt viſit,
" while he was ſunk in the lethargic ſleep of which I have
" ſpoken, I obſerved with aſtoniſhment, that putrefac-
" tion had already made ſo great progreſs, that his
" body exhaled an inſupportable ſmell. I ſaw the
" worms which iſſued from it crawling on the bed,
" and the nails of his fingers drop of themſelves; ſo
" that I thought it needleſs to attempt any thing farther,
" while he was in this deplorable condition. Having taken
" care to get every poſſible information from the patient
" himſelf, reſpecting what had happened to him, he told
" me, that he had felt a ſtroke, as if ſomebody had given
" him a blow over the right arm, with a large club, and
" that at the ſame time, he had ſeen a ſpark of fire attach
" itſelf to his ſhirt, which in a moment was reduced to
" aſhes, though the fire did not in the leaſt injure the wriſt-
" bands. The handkerchief which he had placed upon
" his ſhoulders, between his ſhirt and his ſkin, was per-
" fectly entire, without the leaſt appearance of burning,
" his drawers were untouched, but his night-cap was de-
" ſtroyed, though a ſingle hair of his head was not hurt.
" That this flame under the form of elementary fire,
" burnt the ſkin, reduced the ſhirt to aſhes, and entirely
" conſumed the night-cap, without in the leaſt touching
" the hair, is a fact which I affirm to be true: beſides,
" every ſymptom that appeared on the body of the de-
" ceaſed, announced ſevere burning. The night was
" calm, and the circumambient air very pure: no bitu-
" minous ſmell could be perceived in the chamber, nor
" was there the leaſt trace of fire or of ſmoke. A lamp,
" however, which had been full of oil, was found dry,
" and the wick almoſt in aſhes. We cannot reaſonably
" ſuppoſe this fatal accident to have been occaſioned by
" any external cauſe; and I have no doubt that if
" Maffei were ſtill alive he would take advantage of it
" to ſupport an opinion which he entertained, that light-
" ning is ſometimes kindled in the human body and
" deſtroys it."

Another

Another account, to the ſame purpoſe, is given in Mr. Battaglia's paper. "On the 21ſt of April, 1781, "the firſt battalion of the brigade of Savoy ſet out from "Tortona, in order to go to Arti, when the weather was "exceſſively hot. On the 22d, having made rather a "forced march, the ſoldiers ſuffered a great deal from "the ardour of the ſun, ſo that, at the village of Serre, "where they halted, one of them, named Bocquet, a "man of twenty-five years of age, whoſe ſkin being very "hard and thick had not perſpired, ſent forth a loud "cry, which ſeemed to announce ſome extraordinary "commotion, and inſtantly fell down. Mr. Bianet, "ſurgeon major to the regiment, found the patient in "convulſions. When he was carried to the hoſpital "the upper part of his body, to the thighs, appeared to "to be withered and black, and in a gangrenous ſtate. "Mr. Bianet employed ſcarifications, but without ef-"fect; it was impoſſible to make him ſwallow any "thing; and it was found neceſſary to abandon him to "his diſmal fate. His body ſoon exhaled a putrid "ſmell, and he died at the end of five hours. That his "diſorder might not be communicated to others, he "was interred together with his clothes. Upon in-"quiry, after his death, it was found that this man was "addicted to the conſtant uſe of ſpiritous liquors, and "that he had even drank of them to exceſs upon the "march."

Other inſtances there are, ſtill more terrible, of people actually taking fire and being conſumed to aſhes by ſome internal cauſe; but, as nobody was preſent either at the beginning or during the continuance of theſe extraordinary inflammations, nothing certain can be ſaid about them. That ſuch things, however, have happened, is certain, of which one of the moſt remarkable inſtances is that of Signora Corn. Zangari, an Italian lady. She retired to her chamber in the evening ſomewhat indiſpoſed, and in the morning was found in the middle of the room reduced to aſhes, all except her face, legs, ſkull and three fingers. The ſtockings and ſhoes ſhe had on were not burnt in the leaſt. The aſhes were

light, and on preſſing them between the fingers vaniſhed, leaving behind a groſs, ſtinking moiſture, with which the floor was ſmeared; the walls and furniture of the room being covered with a moiſt cineritious ſoot, which had not only ſtained the linen in the cheſts, but had penetrated into the cloſet, as well as into the room overhead, the walls of which were moiſtened with the ſame viſcous humour. This lady had been accuſtomed to uſe a bath of camphorated ſpirit of wine when indiſpoſed.

Dr. Zimmerman, from the 64th volume of the Philoſophical Tranſactions, relates the caſe of a poor woman who periſhed in this miſerable manner at Coventry in England in the year 1772. "She fell out of bed, "and was found next morning burnt to death, though "the fire in the grate had been ſmall, and the furniture "in the room had ſuffered but little. Except one "thigh and leg, there were not the leaſt remains of any "ſkin, veſſels or viſcera; and the greater part of the "bones were completely calcined, and covered with a "whitiſh efflorescence."

On theſe unfortunate people it has been obſerved that they were generally intemperate in the uſe of ſpiritous liquors. Of the poor woman at Coventry, whoſe caſe has been juſt now related, it is ſaid, that ſhe had been in the practice of drinking from half a pint to a quart of rum every day, and this ſhe continued, notwithſtanding her being affected with jaundice and other complaints. Mr. Wilmer, who communicated this caſe to the Royal Society, concludes it with theſe words: "That her "ſolids and fluids were rendered inflammable by the "immenſe quantity of ſpiritous liquors ſhe had drank, "and when ſhe was ſet fire to ſhe was probably ſoon "reduced to aſhes."

On other caſes of a ſimilar nature it has been remarked, that the miſerable ſufferers were "for the moſt "part advanced in years, remarkably fat, and had been "much addicted to the uſe of ſpiritous liquors, either "in their drink, or applied in friction to the body; "whence it has been concluded that theſe people pe-

"riſhed

" riſhed by their whole ſubſtance ſpontaneouſly taking " fire, the principal ſeat of which had been the entrails, " or the epigaſtric viſcera; and that the exciting cauſe " was naturally found in the phlogiſton of the hu- " mours, called forth by that of the ſpiritous liquors " combined with them."* But ſolutions of this kind cannot by any means be admitted. We have not the ſmalleſt reaſon to think that either the ſolid or fluid parts of the bodies of hard drinkers are more inflammable than thoſe of other people; neither is it credible that any perſon could live with his body in ſuch a ſtate. Beſides, the moſt inflammable bodies will not begin to burn unleſs fire actually be applied to them, while others much leſs inflammable to appearance, will yet take fire ſpontaneouſly. Thus, even ſpiritous liquors themſelves, though they flame violently when thrown into a fire, or when a burning body is applied to them, yet there is not an inſtance of ſuch liquors taking fire of themſelves; nay, they cannot even be ſet on fire by pouring them upon a red-hot iron, while, on the other hand, heaps of wet vegetables, which we ſhould think ſcarce at all inflammable, do yet very frequently take fire ſpontaneouſly. The author lately quoted, however, juſtly obſerves that M. Bartholi, the unfortunate prieſt above mentioned was plainly ſtruck firſt by electricity from without, a ſpark of fire attaching itſelf to his ſhirt, and a faint flame ſurrounding his body; ſo that the fire did not ſeem to have been generated in his body, but in the atmoſphere. There are inſtances of people being ſurrounded with theſe luminous appearances without being hurt; particularly of a woman at Milan, whoſe bed was ſurrounded with a light of this kind. Mr. Loammi Baldwin, of this country, was alſo ſurrounded by an electric light, while raiſing a kite in the time of a thunder ſtorm, and Dr. Prieſtley makes mention of a gentleman, who, after having worked an electric machine for a long time in a ſmall room, perceived, on leaving it, a luminous vapour following him. But the inſtances moſt to our preſent purpoſe are ſome recorded in the Philoſophical Tranſac-

. tions,

* American Muſeum, vol. xi, p. 148.

tions, of luminous vapours coming from the ſea, attaching themſelves to corn-ſtacks, and ſetting fire to them. One of this kind is particularly mentioned in Lowthorp's Abridgement of the Tranſactions, as having taken place in Ireland, coming repeatedly from the ſea, and ſetting fire to corn and hay, ſo that the people were greatly alarmed. At laſt they found that it might be driven off by making a great noiſe, and that it would avoid any ſharp-pointed iron inſtrument. Had ſuch a vapour attached itſelf to a human body, it is poſſible that it might have ſet fire to it as well as to the ſtack of corn or hay. Whether theſe accounts render the ſtory of the Genoeſe ſailors concerning the ball of fire occaſioning the plague of 1346 more credible, we leave the reader to judge. They certainly ſhow, however, that the electric fluid will ſometimes interfere with the human body in a very terrible manner, producing, where it does not kill inſtantaneouſly, ſymptoms equal to thoſe of the very worſt plague, as in the caſe of the prieſt and ſoldier above mentioned.

Another hypotheſis concerning the origin of peſtilential diſeaſes is that of ſwarms of little animals inviſibly exiſting in the atmoſphere; which, being taken into the body by the breath, are ſuppoſed to corrupt or otherwiſe vitiate the blood and other parts of the body, as we ſee in the plague and other epidemic diſorders. This hypotheſis, ſo generally exploded, and ſo apparently improbable, ſeems to receive ſome ſupport from a diſcovery of an inſect made by Mr. Henry Baker, F. R. S. and publiſhed in his work entitled "The Microſcope made Eaſy." He called it the inſect with net-like arms. "It "lives (ſays he) only in caſcades, where the water runs "very ſwift. Some of them being kept in a vial of water, "moſt died in two days, and the reſt, having ſpun themſelves tranſparent caſes, which were faſtened either to "the ſides of the glaſs, or to pieces of graſs put into it, "ſeemed to be changed into a kind of chryſalis; but "before they aſſumed this form, they altered their ſhape "(in a manner he repreſents by a figure.) None of them "lived above three days; and, though freſh water was "given

" given them two or three times a day, yet in a few hours " it would ſtink to a degree ſcarce conceivable, and that " too at ſeveral yards diſtance, though, in proportion to the " water, all the included inſects were not more than as " one to *one million, an hundred and fifty thouſand.* This " makes it probable that it is neceſſary for them to live " in a rapid ſtream, leſt they ſhould be poiſoned by the " effluvia iſſuing from their own bodies, as no doubt " they were in the vial."

From this account it is not difficult to conceive that animals, though exceedingly ſmall, may yet emit ſuch poiſonous effluvia as will deſtroy much larger ones in their neighbourhood. It will by no means be incredible that, had one or two ſuch offenſive animals been thrown into a jar containing gold-fiſhes,* the whole of theſe beautiful inhabitants would have periſhed at once. Let us ſuppoſe ſuch a thing to have actually happened; that a malicious perſon had put them in over night, and in the morning the proprietor of the fiſhes finds them all dead, and the water offenſive to the laſt degree. He ſends for a neighbouring philoſopher, who, happening to be ignorant of the exiſtence of ſuch animals, endeavours to account for the phenomenon upon ſome of the received principles of philoſophy. How much theory would here be waſted, and what endleſs diſputes might enſue without even a *poſſibility* of arriving at the truth! Juſt ſo it is with epidemic diſeaſes. The cauſe is inviſible, and, until it becomes diſcoverable by our ſenſes, it can never be known; for, as has already been obſerved, a cauſe never can be known merely by its effects, unleſs we have ſeen it, or ſomebody who has ſeen it gives us information. And this will certainly be found to hold good in every inſtance, even from the Supreme Cauſe himſelf to the diminutive inſect juſt mentioned.

Laſtly, I ſhall conſider another *poſſible* ſource of epidemics, which has been hinted at by others. Allowing that

* The gold-fiſh is a ſmall ſpecies of carp, brought originally from China. They are adorned with the moſt beautiful and reſplendent colours, and are frequently kept in jars for pleaſure. They ſubſiſt entirely on the water, without any other food. This is by Dr. Fordyce ſaid to be the caſe with all fiſhes, provided the water be impregnated with oxygen.

that infectious matter proceeds from the body of a diſeaſed perſon, as much muſt iſſue from a ſingle patient as is ſufficient to bring the diſeaſe upon thouſands, and with regard to the ſmall-pox and ſome other diſtempers we certainly know that it is ſo. This infection is diſſipated in the atmoſphere, and intimately combined with it, ſo that it becomes imperceptiple and harmleſs; but we have no reaſon to ſuppoſe that it is annihilated, or cannot be re-produced in its priſtine ſtate. Water, though perfectly diſſolved, and to appearance deprived of exiſtence in the air, may yet be precipitated from it, and pour down upon us in deluges. What happens in one caſe may happen in another. The infectious matter, diſſolved in the air, may by ſome natural cauſe be precipitated from it, overſhadowing whole regions, and, if it be not powerful enough to produce the epidemic of itſelf, may certainly *prediſpoſe* to it in ſuch a degree, that the ſlighteſt additional cauſe will bring it on.

Something indeed of this kind would ſeem really to be the caſe, otherwiſe we cannot well conceive why there ſhould be ſuch a diſtinction of diſeaſes. Thus the infection of the ſmall-pox is the ſame all over the world. The variolous matter will never produce the meaſles in any country, nor will the typhus produce a pleuriſy. The plague manifeſts itſelf to be the ſame diſtemper in all its various degrees of malignity, though even this dreadful diſeaſe is ſometimes ſo mild that it does not confine the patient to his bed. There muſt therefore be ſome certain conſtitution in the nature of the cauſe which produces ſuch and ſuch diſeaſes, as certainly as in the ſeed of particular vegetables, which gives to each its proper appearance and ſhape. The cauſe of the diſeaſe ſo modified we may call, with Dr. Cullen, its *ſpecific contagion.*

Having thus treated ſo largely upon contagion of different kinds, it now remains to conſider the objections that have been made to the doctrine altogether. It is indeed ſurpriſing that in ſo great a length of time, after the world hath ſo often and ſo dreadfully ſuffered from the violence of plagues, the ſimple fact, whether it be infectious

infectious or not, ſhould not have been determined: nay, that it ſhould ſtill be queſtioned by phyſicians of no mean reputation whether ſuch a thing as contagion or infection *can poſſibly exiſt*. Dr. Moſely in his treatiſe on tropical diſeaſes treats the whole doctrine of contagion with the utmoſt contempt; calling it "a field for "ſpeculation, which has long amuſed the pedantry of "the ſchools, and ſhould never be entered into by prac-"tical writers." Notwithſtanding this, however, he doth enter into it, and with ſuch bad ſucceſs, that in the very firſt paragraph he is obliged to derive the cauſe of diſeaſes from the ſtars! "There are ſome diſeaſes we "know, (ſays he) which follow the changes of the at-"moſphere; but there are others which make their "revolutions, and viſit the earth, at uncertain periods; "for which we can trace no cauſe, depending on com-"binations, in which, perhaps, the *influence of the planets* "may have ſome ſhare." Here we have a ſtill wider field for ſpeculation than even *the ſchools* have given us; for the Doctor ought to remember that the influence of a *planet*, producing a diſeaſe, is as truly contagion as the effluvia of a *dunghill*; and if we have a wide field to traverſe when tracing it through the earth, we have one infinitely more extenſive in purſuing it through the heavens. But we may be aſſured that planetary influence *does not* produce diſeaſes; for, if it did, they would in all times of peſtilence overſpread the face of the earth, as the influence of the planets, if they have any, certainly does.

The arguments uſed by this author againſt *terreſtrial* contagion are,

1. "It has often happened that hundreds of men in "a camp have been ſeized with the dyſentery, almoſt "at the ſame time, after one ſhower of rain, &c. Peo-"ple under ſimilar circumſtances muſt be ſubject to "ſimilar diſeaſes: and yet it often happens that dyſen-"tery begins with a few people, and ſpreads itſelf by "degrees until a multitude are affected."

This argument rather militates againſt himſelf; for, if dyſentery or any other diſeaſe was occaſioned by an

evident

evident general cauſe operating upon perſons in ſimilar circumſtances, all of them ought to be taken ill at once; but Dr. Moſely owns that they frequently are not. There muſt, of conſequence, be ſomething *leſs evident* which determines the diſeaſe to particular perſons, while the general cauſe operates equally upon all. This leſs evident cauſe we call *contagion*.

2. "It is incredible that the ſmelling a little human "blood, that had ſtood ſome months in a phial, gave "the man a dyſentery mentioned by Pringle; or that the "perſon Foreſtus ſpeaks of got the plague by only putting "his hand into an old trunk; or that the ſhaking an "old feather-bed, which had lain by ſeven years, raiſed "a plague at *Wratiſlau*, which deſtroyed five thouſand "perſons in twelve weeks, as related by Alexander Be-"nedictus, &c.—Such things *may be true*, but, when "probability is ſhaken, reaſon always inclines to ſkep-"ticiſm."

Here our author moſt evidently contradicts himſelf; for in the beginning of the paragraph he tells us that the things related are *incredible*, and in the end of it, that they *may be true*. The argument, if it may be ſo called, is mere aſſertion. It is *incredible* that the ſmell of putrid human blood in a vial ſhould produce the dyſentery. Why ſhould this be more incredible than that ſmelling to a charged vial ſhould enſure an electric ſhock to the perſon who did ſo? This is entirely a queſtion reſpecting a matter of fact, not of ſpeculation. The ſame is the caſe with the reſt. It is not more incredible that, if the infection of the *plague* was in a trunk, a man ſhould get the plague by putting his hand in it, than that he ſhould be burnt if he put his hand into a trunk full of hot aſhes. Before the Doctor decided in ſuch a poſitive manner, he ought to have proved that no infection could be contained in a trunk; but this, though the very point in queſtion, he takes for granted, firſt telling us that the contrary is incredible, and then that it may be true!

3. "We obſerve in camps and hoſpitals, that thoſe "people *whoſe dirty employments* ſubject them in a par-"ticular manner to a *depravation of their habits*, ſeldom "eſcape

" eſcape the preſent epidemic ; and this gives riſe to the " vulgar expreſſion, and very incorrect notion, of *catching* " the diſeaſe. And we obſerve that others from the " ſlighteſt deviation from regularity loſe the power by " which the body reſiſts diſeaſes, and they are alſo at- " tacked. But theſe attacks are not to be attributed to " infection : for thoſe people who keep the vital and " animal powers in uniform confederacy, by temperance " and calmneſs of mind (for fear, by lowering the vital " energy, ſubjects the body to diſeaſe) nouriſhing diet, " proper clothing and cleanlineſs, and keeping a free and " regular paſſage for all excretions, are proof againſt the " aſſaults of foul and peſtilential air. Such people ſel- " dom ſuffer even by the plague itſelf : while all around " them periſh."

The firſt ſentence of the above paragraph is ſo obſcurely worded, that it is difficult to know the author's meaning. I know not of any lawful employment ſo *dirty* that it neceſſarily ſubjects the perſon who practiſes it to a *depravation of habit*. The next aſcribes every thing to intemperance and fear ; from which, it ſeems, we are to infer that none but drunkards, cowards, and dirty, naked ragamuffins, are ever ſeized with epidemic diſeaſes. But of this we are able to bring a direct diſproof. I ſuppoſe Dr. Moſely will not ſay that the celebrated Prince Eugene of Savoy was either a coward or a drunkard ; that he had a *dirty employment*, wanted proper food or clothes, or was deficient in perſonal cleanlineſs ; yet, when in the marſhy parts of Hungary, he was in danger of death from an epidemic dyſentery, notwithſtanding that he was ſo careful in reſpect of diet, that he had pure water brought him every day, probably from a conſiderable diſtance. How came he to be affected by the diſtemper under ſuch circumſtances, while Count Boneval, though as an inferior officer he probably enjoyed fewer advantages, remained free from it, taking only a ſmall quantity of Peruvian bark daily ? It is uncertain whether the bark did really preſerve him or not ; but the caſe of Prince Eugene plainly ſhows that ſobriety, temperance, valour and cleanlineſs are not ſufficient to

ward off an epidemic diſeaſe, if people come in the way of infection.

4. " It ſhould follow, if contagion were ſupported by " infected bodies, that no perſon ſhould ever eſcape " infection (as at Oxford aſſizes in 1577*) who was " within the ſphere of its action; and that thoſe who " were entirely ſecluded from it, and free from all con- " tiguity to infected people, or ſubſtances, as the colleg- " ers were in the town of Cambridge, when the plague " was laſt in England, ſhould be exempt from it.

" But, in oppoſition to this, *Rhazes* lived 120 years, " and often practiſed in plagues. *Hodges* remained in " town, and attended the ſick, during the great plague " in 1665. *Kaye* was in the midſt of practice in the " ſweating ſickneſs in 1551, without any inconveniency. " *Procopius* informs us, that during a terrible plague at " Conſtantinople, in 543, which almoſt deſtroyed the " whole city, no phyſician nor other perſon got the " plague by attending, dreſſing or touching the ſick.

" Yet

* Sir John Pringle, from Stowe's Chronicle, gives the following account of theſe aſſizes. " On the 4th, 5th and 6th days of July were the aſſizes held " at Oxon, where was arraigned and condemned Rowland Jenkins, *for a ſedi-* " *tious tongue;* at which time there aroſe amidſt the people ſuch a damp, that " almoſt all were ſmothered. Very few eſcaped that were not taken. Here " died in Oxon three hundred perſons; and ſickened there, but died in other " places, two hundred and odd.

" The ſeſſions at the Old Bailey in Weſtminſter, in 1650, proved alſo fatal " to many; of which Sir John alſo gives an account. ' I have been informed " (ſays he) that, at thoſe Seſſions, about a hundred were tried, who were all " kept in cloſe places as long as the court ſat; and that each room was but " 14 feet by 11, and ſeven feet high. The bail-dock is alſo a ſmall room " taken off one of the corners of the court, and left open at the top: in this, " during the trials, are put ſome of the malefactors who have been under the " cloſeſt confinement. The hall in the Old Bailey is a room of only 30 feet " ſquare. Now whether the air was moſt tainted from the bar by ſome priſon- " ers then ill of the jail diſtemper, or by the general uncleanlineſs of ſuch " perſons, is uncertain; but it is probable that both cauſes concurred. And " we may eaſily conceive how much it might have been vitiated by the foul " ſteams of the bail-dock, and of the two rooms opening into the court in " which the priſoners were the whole day crowded together till they were " brought out to be tried. It appeared afterwards, that theſe places had not " been cleaned for ſome years. The poiſonous quality of the air was aggra- " vated by the heat and cloſeneſs of the court, and by the perſpirable matter " of a number of people of all ſorts, penned up for the moſt part of the day, " without breathing the free air, or receiving any refreſhment. The bench " conſiſted of ſix perſons, whereof four died, together with two or three of " the counſel, one of the under ſheriffs, ſeveral of the Middleſex jury, and " others preſent to the amount of above forty; without making allowance for " thoſe of a lower rank, whoſe death may not have been heard of; and with- " out including any that did not ſicken within a fortnight after the ſeſſions."

(Pringle's Obſervations p. 329 & ſeq.)

" Yet moſt of the Capuchins, the Jeſuits, the Recollets, " the Obſervantines, the Barefooted Carmelites, the " Reformed Auguſtines, all the Grand Carmelites, the " Grand Trinitarians, the Reformed Trinitarians, the " Monks of Loretto, of Mercy, the Dominicans, and " Grand Auguſtines, who kept themſelves ſecluded in " their ſeveral convents, and took every precaution to " avoid the plague, while it raged at Marſeilles, periſhed " by it.

" There are no epidemical nor contagious diſeaſes " that attack every perſon who breathes the ſame air, " or that is in contact with the infection, elſe whole " regions would be depopulated. The habit muſt be " graduated, or adapted, for the reception of a diſeaſe. " In ſome conſtitutions of body the acceſs is eaſy, in " ſome difficult, in others impoſſible. *But where the* " *revelation of this myſtery is to be found, none can tell.*"

In this, which our author ſeems to have deſigned as his *grand argument*, it is plain that the deficiency is as great as in any of the reſt. If we ſuppoſe the plague, or any other epidemic diſeaſe, to ariſe from ſome general cauſe, let that cauſe be *contagion* or any thing elſe, it ought to operate upon all who come within its ſphere of action, as Dr. Moſely obſerves of *infection*. If experience ſhows that it does not, the argument will hold equally againſt a conſtitution of the atmoſphere, putrid effluvia, heat, cold, or any thing elſe; and in fact the Doctor fairly gives up the point at laſt, by reſolving the whole into an *unrevealed* myſtery. With regard to what he ſays about the plague at Marſeilles getting into the convents, of which he preſents us with ſuch a catalogue, it is impoſſible to know what precautions were uſed, and we are aſſured that in Turky it is thought neceſſary for the Europeans not only to guard againſt a communication with their own ſpecies, but ſome of the brute creation alſo. Cats particularly are dreaded ſo much, that a general maſſacre of them commences among thoſe who uſe precautions, the favourites of that ſpecies muſt be ſent to a diſtance, and M. Volney mentions two merchants who had ſhut up their houſes, and yet had the

plague

plague imported by a cat. In ſhort, conſidering that infection is ſuppoſed to be altogether inviſible and imperceptible, it is impoſſible to ſay how it may be conveyed, or to what extent it may occaſionally act when once brought into a country. Dr. Fordyce is of opinion that the diſtance at which infection may act depends on the diſpoſition of the air at the time; and he obſerves, that a difference in this reſpect is obſervable in the odoriferous effluvia of vegetables. "If the air be loaded with moiſ-"ture, they reach to a much greater diſtance. Vapour "ariſing from a field of beans, for inſtance, or a pu-"trid ditch, is ſenſible to the noſtrils at a greater diſ-"tance if the air is moiſt." He obſerves indeed that this has never been verified with regard to infection; but as it is evidently the caſe with putrid effluvia, which very often accompany infection, we may reaſonably conclude that it is the caſe with the latter alſo.

Let us next take a view of what is advanced by the authors of The Science of Life upon this ſubject. Mr. M'Lean, who puts his name to this part, informs us of his conviction "that no general diſeaſe, which affects "a perſon more than once during life, can ever be com-"municated by contagion;" and he defines contagion "a ſpecific matter, generated in a perſon affected with "diſeaſe, and capable of communicating that particular "diſeaſe, with or without contact, to another." It would here be no improper queſtion, by what means he comes to know that a contagious diſeaſe can affect a perſon only *once*. But even this queſtion is unneceſſary. Dr. Guthrie gives an account of a gentleman who had the courage to inoculate himſelf for the plague, in conſequence of which he had the diſeaſe with the concomitant ſymptoms of buboes, &c. Here then we ſee the plague communicated by "a ſpecific matter generated in a perſon affected" with the ſame diſeaſe, i. e. by *contagion*, according to Mr. M'Lean's own definition. The diſpute therefore might ſtop, as this fact ſeems to be deciſive on the ſubject; but as he has at great length inſiſted upon the argument laſt quoted from Dr. Moſely, it ſeems neceſſary to follow him a little farther. "If

"If a perſon (ſays our author) be affected with any "diſeaſe, it will neceſſarily be communicated to every "other perſon who comes within the infectious diſtance, "and *is not at the ſame time labouring under ſome diſeaſe "higher in degree.* This proceeds upon a ſuppoſition that his theory is abſolutely perfect and infallible; which, however plain it may appear to himſelf, will not probably be admitted by others without ſome proof. Indeed he himſelf afterwards adduces ſome facts which deciſively overthrow it. "A child (ſays he) here and there is "exempted from ſmall-pox, even though expoſed to "its contagion." How comes this to paſs? The diſeaſe, we are told, is contagious, the child is expoſed to the contagion, and yet is not affected. In *all* ſuch caſes it would be ridiculous to ſuppoſe the ſubjects labouring under a diſeaſe higher in degree than the contagion could produce. In numbers of inſtances of this kind the children were evidently in good health, and yet would perhaps be ſeized at an after period when no more expoſed to contagion than they had been at firſt.

"Small-pox, meaſles, and other general diſeaſes, which "occur only once during life, never diſappear, until *the "whole* of thoſe who have been within the infectious "diſtance, and were not at the time labouring under "ſome diſeaſe higher in degree, have received the infec-"tion. As theſe diſeaſes are *very mild*, children ſome-"times reſiſt the power of contagion from the ſuperior "force of ſome other diſeaſes, although they may be ſo "ſlight as to eſcape *common* obſervation."

In this paragraph we have the favourite maxim of our author repeated, *twice* indeed, without a ſingle fact to ſupport it. Inſtead of this we find hypotheſis heaped upon hypotheſis, as the giants are ſaid to have heaped mountains upon one another in order to get up to heaven. He firſt ſuppoſes that the infection of the ſmall-pox ſeizes on *the whole* of thoſe on whom it falls. The exceptions to this maxim he explains by another *ſuppoſition*, viz. that the contagion of the ſmall-pox is counteracted by another diſeaſe. The ſecond hypotheſis is ſupported by a third, and that a very extraordinary one, that

that the ſmall-pox (a diſeaſe which has deſtroyed innumerable multitudes) is *very mild*; and this third by a fourth, that the diſeaſes which counteracted the contagion were ſo ſlight as to eſcape *common* obſervation. It was incumbent on Mr. M'Lean to have pointed out ſome of thoſe diſeaſes, and to have informed us how they came to counteract this contagion. But it is needleſs to argue with one who writes ſo extravagantly. Far from the mode of reaſoning followed by Dr. Fordyce, who decided from the majority of facts, our author determines every thing by his own preconceived opinions. "That the power which occaſioned diſeaſe at the Ox-"ford aſſizes (ſays he) was not contagious matter, is "proved by its producing diarrhœa in ſome, while it "produced fevers in others." But, if it was not contagious matter, what kind of matter was it? Or how comes our author to know that thoſe who were affected by the diarrhœa were not likewiſe affected by fever? How many fevers are attended by diarrhœa, or how many ceaſe when diarrhœa comes on! It would have been equally concluſive to ſay that the matter was not contagious, becauſe ſome died and ſome recovered.

I ſhall only take notice of one aſſertion more, it being both tedious and unneceſſary to follow him through the whole. "From *every* record of epidemic and peſtilential diſeaſes, it would appear, that they have their ſtated "periods of recurrence; that theſe periods are ſuch "months as are moſt remarkable for viciſſitudes of the "atmoſphere; that they become general only in thoſe "years in which theſe viciſſitudes are extreme; that "they do not occur in ſeaſons when the heats or colds, "however intenſe, are equable; nor in years when the "ſtate of the atmoſphere is tempered throughout; and "that they uniformly ceaſe with the eſtabliſhment of "an equable ſtate of the atmoſphere, whether the wea-"ther be cold or hot. . . . In Aleppo, according to Dr. "Ruſſel, the Europeans regularly ſhut themſelves up in "their houſes *every year*, at ſome period between April "and July; and the rich natives begin to adopt the "ſame plan, &c. . . . From this fact it appears, that

"the

" the plague occurs at Aleppo, in a ſtate more or leſs " mild, almoſt annually, and *that it commences and ceaſes* " *at certain known periods.* But it has been remarked " that, in its moſt ſevere ſtate, this diſeaſe recurs only at " periods of ten years, or *thereabouts:* a regularity which " cannot, upon any known principle, be attributed to a " power of ſuch caſual application as contagious mat- " ter."

In the beginning of this paragraph our author makes a bold appeal to *every* record of epidemic and peſtilential diſorders; but here we may aſk, Has he conſulted *every* record of theſe diſorders? That he has not, we may readily believe; but even thoſe which are hinted at ſeem either to have been very inaccurately conſulted, or wilfully miſrepreſented. To evince this I ſubjoin the following abſtract of what Dr. Alexander Ruſſel ſays of the plague in general, with the annotations of his brother, Dr. Patrick, taken from Ruſſel's Natural Hiſtory of Aleppo.

The inhabitants of Aleppo ſuppoſe that the plague viſits them once in ten years, and that it is always imported; and the moſt ſevere plagues are thought by ſome to come from Damaſcus, while others contend that they come from the northward. Dr. Alexander Ruſſel thinks this popular opinion of the return of the plague not altogether unfounded; and he thinks it alſo probable that it never invades Aleppo without having previouſly attacked either Damaſcus or Khillis, Aintab, Maraſh or Uuſa. He thinks that its appearance always is in one of the maritime towns of Syria; if in Sidon, Byroot or Tripoli, Damaſcus is commonly the channel by which it reaches Aleppo; but, if it ſhows itſelf firſt at Scanderoon or Byaſs, its approach is by the way of Khillis or Aintab.

On this Dr. Patrick Ruſſel obſerves, that the account of Aleppo being viſited only once in ten or twelve years is confirmed by a letter from an Engliſh gentleman, in 1719, who had reſided there for 30 years. The dates of the plagues which Dr. Patrick had procured were, 1719, 1729 and 1733. Another began in 1742, and terminated

terminated in 1744; from which time there was no return till 1757 or 1758, when it continued at Aleppo till 1762, and did not entirely quit the country till 1764. The plague of 1719 was ſaid to come from the northward, but this appeared to want confirmation; but all accounts agree that it raged at Tripoli, Sidon, &c. two months before it appeared in Aleppo. Egypt was ravaged by the plague in 1728, as was alſo Byaſs and the neighbouring parts in the ſame ſummer; and next year it appeared at Aleppo. In 1732 it raged at Sidon, Tripoli and Damaſcus; next year it ſeized Aleppo.

Dr. Alexander goes on to inform us, that the diſeaſe never ſpreads much in winter. It advances with the ſpring, comes to its height in June, declines in July, and terminates in Auguſt. "None (he ſays) are ever ſeized with in September and October, not even in the plague of 1742, which returned three years ſucceſſively;" but Dr. Patrick ſays that this was not confirmed by his experience in 1760, though he owns that the diſtemper declines remarkably at that period; and the natives are greatly inclined to have it believed that the diſtemper has totally ceaſed, and to deceive the Europeans in this reſpect. The times at which the Europeans ſhut up and come out of their confinement ſhow only the increaſe or decreaſe of the diſeaſe, but not its beginning or ending. The plague of 1719 made terrible havoc. Europeans then ſhut up about the middle of March, and kept confined till the middle of July. In 1729 they did not ſhut up till the middle of May, and were not confined above a month, the number of ſick being ſmall. In 1733 they were confined from the middle of March to the middle of July, but the diſtemper was leſs violent than in 1719. In 1742 the time of confinement much as in 1729. In 1743 ſhut up April 11, and opened the middle of July. The plague violent, but leſs ſo than in 1733. In 1744 few ſhut up, the number of ſick being inconſiderable. In 1760 they ſhut up on the 30th of June, and continued about a month. In 1761 ſhut up May 28, rode out Aug. 1, and opened completely the 10th of that month. In

1762

1762 they were confined from the laſt week in May to the firſt of Auguſt. From 1762 to 1787, a larger period than uſual, the city was free from the plague. In 1787 it broke out among the Jews in the month of April, increaſed in May, raged violently in June, and terminated in July.

From theſe accounts it appears, as Dr. Alexander Ruſſel informs us, that the plague of one year differs remarkably from that of another; but he ſays, that, at Aleppo, it is never attended with ſuch ſcenes of horror as have been known in European countries; for which Dr. Patrick aſſigns the following reaſons: 1. The markets are conſtantly ſupplied with proviſions. 2. The dread of the contagion is much leſs. 3. The ſick are leſs liable to be deſerted by their attendants (but this, according to his own obſervation, is not always the caſe) and 4. The regular, ſpeedy interment of the dead prevents a ſpectacle far from uncommon in the European plagues, and which of all others is the moſt ſhocking to humanity.

"Extreme heat (ſays Dr. Alexander) ſeems to check "the progreſs of the diſtemper. July is a hotter month "than June, and the ſeaſon wherein the plague ceaſes "at Aleppo is that in which the heats are moſt exceſ-"ſive." His experience did not confirm a popular opinion at Aleppo, and which has likewiſe been adopted by many medical writers, that the moon has any influence on the diſtemper. To have had the diſtemper once does not ſecure a perſon againſt future attacks. Numbers of people who were alive when he left Aleppo had it twice or oftener; and he had inſtances of ſome being infected thrice in one ſeaſon. Dr. Patrick Ruſſel has obſervations to the ſame purpoſe.

From this it appears, that the popular opinion at Aleppo, which Mr. M'Lean wiſhes to eſtabliſh as a certainty, is by no means ſo well founded that we can build any theory upon it. The misfortune is, that, wherever a theory is built upon any thing ſaid to be conſtant and invariable, a ſingle failure overturns the whole. Now, in the dates of plagues above mentioned, the variations are ſo great that it is impoſſible to draw any certain

concluſion from them. In the firſt three inſtances of 1719, 1729 and 1733 there is indeed a coincidence of the firſt two, but the laſt falls ſhort by no leſs than *ſix* years. What then does Mr. M'Lean mean by his "ten years, or *thereabouts?*" Can *thereabouts* imply a difference of more than half? The Engliſh gentleman's teſtimony who reſided 30 years in that country could extend no further than to three plagues, and even theſe are not mentioned. The fourth inſtance in 1742 is deficient in one year; the fifth in 1757 or 1758 exceeds by three or four years, and the ſixth from 1762 to 1787 by no leſs than fifteen years.

An anonymous writer in a Scots periodical publication entitled "The Bee," has partly adopted the above opinion, but adds others for which he has not thought proper to adduce any authority. "It viſits *moſt parts of* "*Aſia* once in ten or twelve years, and carries off an "eighth or tenth of the inhabitants. There have been "plagues which have carried off one fourth of the inha-"bitants. The farther eaſt you go, the leſs frequent it "is—every 20th, 40th, and, even at Baſſorah, every "90th year; but then this ſcourge is moſt dreadful. "The laſt plague at Baſſorah, which had not viſited the "city for 96 years, carried of more than nine tenths of "the inhabitants."* It is aſtoniſhing that people will write in ſuch a manner as to ſubject themſelves to endleſs criticiſm on account of their inconſiſtency. The plague, this writer ſays, viſits *moſt parts* of Aſia once every ten or twelve years, and yet it goes no farther eaſt than Baſſorah; a ſpace ſcarce equivalent to the twentieth part of Aſia! Even in this ſmall ſpace, it varies from ten or twelve, to twenty, forty, or even ninety years; and, to complete the whole, inſtead of giving any inſtance of the periodical return of the plague at an interval of *ninety* years, we have one of its diſappearance for *ninety-ſix* years!

From all this it is evident, that no dependence can be placed on ſuch vague accounts with regard to the periodical returns of the plague. Even the time of ſhutting up

* Bee, vol. xviii, p. 282.

up the houſes in Aleppo is not accurately related, for, from the above abſtract it is plain, that they are ſometimes ſhut up in March; while Mr. M'Lean would have us to believe that it is always between April and July. It is needleſs to wade through a jumble of unſupported aſſertions, which, being backed by no evidence, fall to the ground of themſelves. "I will *venture to aſ-* "*ſert* (ſays he) that no perſon in perfect health ever "was or *can be* expoſed to the power of contagion, with- "out receiving the ſpecific diſeaſe which that conta- "gion produces; excepting in ſmall-pox, meaſles, &c. "when the perſon has previouſly had the diſeaſe."— How comes he to know all this? Or, though our author ventures to aſſert, muſt we of neceſſity *venture to believe?* When he aſcribes the origin of epidemics, and the plague itſelf, to the viciſſitudes of the atmoſphere, not a ſingle fact is adduced in ſupport of his hypotheſis. One very ſtrange proof indeed he brings from Dr. Ruſh, viz. that the latter had been informed by a gentleman who reſided in tropical countries, that, in the month of July, ſeveral weeks before the yellow fever became general, he had obſerved a peculiar and univerſal ſallowneſs of complexion in the countenances of the people of Philadelphia, ſuch as he had ſeen in thoſe of the more ſouthern countries before the appearance of bilious fevers in them. Surely it is a very ſtrange mode of argument to tell us of the colour of people's countenances inſtead of the ſtates or viciſſitudes of the atmoſphere, which we are made to believe were the cauſes of that change. Another quotation is made from the ſame author in which a warm, dry, ſtagnating air is *conjectured* to have been the cauſe of *diſeaſes*; but he does not even quote Dr. Ruſh ſaying that it was the cauſe of yellow fever, much leſs of all epidemic diſeaſes. Beſides, to ſay that any thing is occaſioned by a *ſtate*, or *viciſſitude* of the atmoſphere, is ſuch a vague mode of expreſſion, that it muſt either mean nothing, or be contradictory to itſelf. A *ſtate* of the atmoſphere we muſt ſuppoſe to mean that it continues for ſome time either to be wet or dry; a *viciſſitude*, when it changes from one to the other. If an epidemic

epidemic then is produced by a *ſtate*, it cannot alſo be produced by a *viciſſitude*, of the atmoſphere: or, if ſome epidemics are produced by ſtates, and others by viciſſitudes, we ought to be informed which produce one kind, and which another. But throughout the whole of this diſſertation we have neither diſtinctneſs nor regularity, nor indeed any thing but aſſertion, ſupported only by an imaginary theory.

Diſmiſſing at length therefore theſe conjectural theories, let us endeavour to deduce from certain and undoubted facts the connexion between the ſtate of the body, and the operations upon it of other cauſes, inviſible indeed to our eyes, but diſcoverable by our rational faculties, and in ſome meaſure capable of being made the objects of our ſenſes alſo.

1. From the account given of the ſtructure of the human body, it undeniably follows, and has already been obſerved, that all parts of it are ſo connected together, that none can ſuffer any very grievous injury without affecting all the reſt.

2. The life of man depends immediately on the air. From this element the *blood* receives heat and a vital ſpirit diffuſing itſelf from the blood along the nerves, and thence expended in the operations of life and ſenſation.

3. From undoubted experiments* it appears, that this vital ſpirit poſſeſſes in a great degree the properties of electricity, inſomuch that many ſuppoſe them to be the ſame. This is indeed denied by the celebrated anatomiſt, Dr. Monro, but he allows that the nervous fluid is ſimilar to electricity, and it is certain that the electrical fluid can affect it in ſuch a manner that we may reaſonably believe them to be the ſame.

4. The air acts upon the blood by the *latent* heat it contains. The air itſelf is compoſed of ſomething volatiliſed by heat. In ſome caſes this is evidently a terreſtrial ſubſtance, as in that of inflammable air, or hydrogen, which is formed of charcoal volatiliſed by heat, with the addition of a little water. In the caſe of oxygen,

* Thoſe of Galvani and others on *animal electricity*.

oxygen, or dephlogiſticated air, the combination ſeems to be the matter of heat (which I ſhall hereafter diſtinguiſh by the name of the *ethereal fluid)* with water deprived of its carbonic principle. This coincides with the opinion of Dr. Prieſtley, who ſays that the baſis of dephlogiſticated air ſeems to be *dephlogiſticated water.* But, let the baſis be what it will, the ethereal fluid which volatiliſes it is the *agent* ; the baſis is entirely *paſſive*, and only modifies or reſtrains the action of the other fluid, ſo that it does not exert itſelf except in particular caſes. Fixed air, or carbonic acid, is compoſed of the baſe of oxygen united with a certain portion of carbon, and the whole volatiliſed by the ethereal fluid. Phlogiſticated air, azote, or ſepton, according to Dr. Prieſtley, conſiſts of the baſis of dephlogiſticated air along with a certain proportion of carbon different from that which produces fixed air, volatiliſed by the ſame agent ;* and ſo we may determine concerning every other ſpecies of air.

5. In certain caſes the ethereal fluid quits thoſe ſubſtances with which it is united : the air is then decompoſed, the ſubſtance into which the other fluid enters is heated, or rendered more fluid than before (perhaps both) while the baſis either unites itſelf to the moiſture of the lungs, or is thrown out by the breath. Whether in any caſe the baſis can pervade the membranes, and thus mix itſelf with the blood, notwithſtanding the poſitive aſſertions of Dr. Girtanner and others, is very doubtful, and does not admit of any poſitive proof.

6. The blood, being a *fluid,* muſt be ſubject to the ſame laws with other fluids. A certain quantity of *latent* heat muſt be contained in it, in order to give the degree of fluidity naturally belonging to it. If this quantity be augmented, the fluidity will be augmented, and the blood will become thinner ; if it be diminiſhed, the contrary will take place ; and if we ſuppoſe a great proportion of this latent heat to be abſtracted, it is not unreaſonable to ſuppoſe that ſomething like a congelation may take place, and the blood be changed into a ſolid ſubſtance of ſuch a nature as cannot any more be made to reſume its former qualities. 7. By

*See Medical Repoſitory, vol ii, No. iii.

7. By augmenting the ſenſible heat, the blood is affected in the ſame manner as any other fluid; it ſuffers expanſion, by which the veſſels are dilated in proportion, and, if this expanſion and dilation be carried to a certain length, a rupture of many of the ſmall veſſels, and apoplexy, or ſome other grievous diſeaſe, may enſue.

8. By breathing certain kinds of air, the fluidity, heat and expanſion of the blood, and of conſequence the dilation of the blood-veſſels, are affected. Thus, when a perſon breathes a quantity of the fume of charcoal, containing much fixed air, he feels himſelf affected with pain and a ſenſation of fulneſs in his head; he becomes ſleepy, and, if the quantity be ſufficiently great, he falls into an apoplexy, and dies. From diſſections it appears that ſuch as die in this manner have the capillary veſſels greatly diſtended, and even ruptured; the heat of the body is vaſtly augmented, and even continues ſome time after death. Hence it is evident, that, by breathing this kind of air, too much *ſenſible* heat is conveyed to the blood. In like manner when we breathe the ſteam of water, if any quantity of that ſteam be condenſed in the lungs, the whole quantity of latent heat contained in that ſteam diſcharges itſelf upon the lungs, and increaſes the ſenſible heat of the body; and from this we may learn why on ſome occaſions our ſenſations ſhould ſo ill correſpond with the thermometer, and why a warm air almoſt ſaturated with moiſture ſhould always appear much hotter than a dry one, though the thermometer ſtand at an equal height in both. Oxygen air ſeems to convey to the blood a much larger quantity of what we have called *vital ſpirit*, than any other kind. Whether this vital ſpirit be the ſame with the latent heat of the blood, we know not; but, as this kind of air is evidently capable of ſupplying the blood both with latent and ſenſible heat, it ſeems moſt probable, that, by breathing a conſiderable proportion of it, both theſe kinds of heat, as well as the vital ſpirit itſelf, will be augmented. In this caſe, wherever the air naturally contains a larger quantity of oxygen than uſual, the blood ought to be more fluid, as well as warmer, than uſual,

uſual, provided there be no evident cauſe why it ſhould be otherwiſe. Accordingly in warm climates it is always found that the blood is thinner and more fluid than in ſuch as are colder; but at the ſame time the temperature of the body is colder than in other countries. Zimmerman tells us, that, "at Curaſſau, Europeans gradually loſe their freſh colour and vivacity: their natural heat even becomes three or four degrees leſs than it was at their arrival." The reaſon of this laſt, however, is evidently the exceſſive perſpiration, which is more than ſufficient to carry off the ſuperabundant quantity of ſenſible heat thrown into the body, either by the rays of the ſun, or by the ſuperior quantity of oxygen naturally exiſting in the atmoſphere; for it is now found, contrary to the opinions hitherto received, that in the warmer climates the atmoſphere contains a larger proportion of oxygen than in the more temperate.*

From this diſcovery it appears, that, whatever may be the cauſe of the frequency and violence of epidemics in warm climates, it *is not* the want of oxygen. Nay, we ſhould rather be tempted to think that they were produced by too great an abundance of it; and this the more eſpecially when we know that animals confined in oxygen air are ſuppoſed to die of a burning fever; and it is likewiſe known that this kind of air is prejudicial to conſumptive people, and even brings on the diſeaſe on thoſe who

* That this is the caſe with the atmoſphere at Martinico is now determined by a letter from Dr. George Davidſon to Dr. Mitchell of New-York, inſerted in the Medical Repoſitory, vol. ii, p. 279. With equal parts of nitrous and atmoſpheric air, there was an abſorption of 67 parts out of 100; but when two parts of atmoſpheric air were uſed to one of nitrous, the abſorption was only from 52 to 58 parts; with a mixture of iron filings and ſulphur, upwards of four tenths of the air were abſorbed. Theſe experiments were atteſted by a number of medical gentlemen who were preſent. In a letter ſubjoined from Dr. Chiſholm, he ſays, that, having made a trial with iron filings and ſulphur, the abſorption was forty parts of an hundred, or exactly four tenths, with the eudiometer fifty-ſix. "It appears to me (ſays Dr. Chiſholm) to be "a ſingular circumſtance, that, although the ground on which the Ordnance "Hoſpital ſtands is a perfect moraſs, partially drained, yet a reſult almoſt "exactly ſimilar to that given by the experiments made with the eudiometer "at my houſe, ſhould take place, with the ſame inſtrument and in circum-"ſtances very different. The proportion at the Ordnance Hoſpital, I "think, has been 58 out of 100, and at your houſe, a ſituation leſs ſwampy, "and nearer the ſea, it has been 67. An explanation of ſo ſingular a reſult, "in ſituations ſo different, is perhaps more to be wiſhed than expected."

who had it not before. From the experiments mentioned in the note, it ſeems probable that there are but few even of ſwampy places in hot climates, where oxygen does not predominate; and in theſe the heat thrown into the blood muſt ſtill be augmented by that produced from the quantity of vapour decompoſed or condenſed in the lungs, which, as the condenſation depends upon unknown circumſtances, can never be foreſeen, or ever prevented, but by a removal from the place.

With regard to other kinds of air, ſuch as inflammable, phlogiſticated air, &c. experiments are yet wanting to determine their effects upon people who breathe them habitually. The proportion in which they occaſionally exiſt in the atmoſphere on particular occaſions has not been aſcertained, and from the experiment made by Dr. Prieſtley with offenſive air taken from a manufactory, as well as from Dr. Chiſholm juſt mentioned, the probability is, that, even in the moſt offenſive places, the proportion of azote is by no means ſo great to the oxygen that we could ſuppoſe the exceſs capable of producing a diſorder of any conſequence, much leſs a violent epidemic. Fixed air is always produced in the putrefactive proceſs, and from its quality above mentioned of rarefying and heating the blood, might reaſonably be ſuppoſed to have ſome ſhare in producing epidemics, were it not that this kind of air is ſo readily abſorbed by water, as well as a number of other ſubſtances, that, except at the very moment of emiſſion, we can ſcarce ſuppoſe it to have any conſiderable effect.

Mr. Watt in a letter to Dr. Beddoes gives an account of a kind of air, ſeemingly more noxious than any yet diſcovered, which he produced by diſtillation from fleſh and from wool. The effects upon himſelf were ſo diſagreeable that he determined to make no more ſuch experiments, leſt he ſhould to his own hurt diſcover a mode of producing ſome grievous diſeaſe. But we cannot, from an artificial air of this kind, argue to a natural one; as the one produced by Mr. Watt was totally different from any ſpecies of air naturally known. All that we can ſay is, that, as far as we can trace the connexion between

between our bodies and the different kinds of air which may be breathed, the latter act chiefly by the heat they contain, and which they impart to the body in various proportions; by which means the latent or ſenſible heat of the blood, and conſequently of the whole body, may be occaſionally augmented or diminiſhed. Thus the body may be conſiderably altered in its conſtitution, and rendered more liable to diſeaſes than it was before; but ſtill it is found that diſeaſes continue to appear at uncertain intervals, though all the cauſes we are able to diſcover, or at leaſt all that are conſtantly evident to our ſenſes, continue to operate without intermiſſion. Though the obvious qualities of air and climate therefore may *prediſpoſe* to an epidemic, we cannot affirm any thing farther: the direct *cauſe* is always different, and hath hitherto ſo much eluded our reſearches, that we can have little hope of diſcovering it, except by reaſoning from facts leſs obſcure.

8. In all the operations of nature which we have acceſs to inveſtigate, the action of electricity is ſo much concerned, that we can ſcarce ſuppoſe it to be wanting in any of them. That it is concerned in preſerving the health of the human body is likewiſe certain, if it be the fluid which acts in the nerves, as moſt probably it is. But whatever preſerves health will alſo bring on diſeaſe, if it be applied to that purpoſe; and we have already ſeen that this fluid is capable of bringing on the moſt dreadful ſymptoms, viz. mortification in its higheſt ſtage, fever, convulſions, bilious diſcharges, lethargy, &c. If it be capable of producing all theſe, can we ſay that it is not capable of producing thoſe of an inferior kind, or of varying diſeaſes and ſymptoms without end, according to the immenſe diverſity of its action? It may be ſaid that this diſeaſe was occaſioned by a violent ſtroke of electricity, ſimilar to lightning; but how many people have declared, that, in the beginning of ſome violent epidemics, they have felt a ſudden ſtroke at the time of ſeizure! Dr. Hodges mentions this in the plague of 1665 at London, but treats the accounts as effects of a diſtempered imagina-

tion. Procopius relates the ſame of the plague in his time, viz. that many of the diſeaſed felt a ſtroke. It is true that they ſaid ſuch ſtrokes were given by ſpirits in human ſhape, in which we know they muſt have been deceived; but, though they were miſtaken in ſuppoſing that they had been ſtruck by a ſpirit, it does not from thence follow that they felt no ſtroke at all. The people mentioned by Dr. Hodges did not ſay that they were ſtruck by a *ſpirit*, yet he treats their accounts with as great contempt as though they had. Where people have no intereſt in deceiving, we ought certainly to look with a favourable eye upon their teſtimony; for, even although ſome part of it ſhould be incredible, we have ſtill reaſon to believe that there is ſome foundation for what they ſay. Thus, the poor ſailor, ſo much frightened at the ſight of a large bat in New Holland, was certainly miſtaken in ſaying that he had ſeen the devil; he was even miſtaken in ſaying that he had *horns*;* but from all this it would have been doing him great injuſtice to ſay that he had ſeen nothing. In like manner, when numbers of people in Procopius's time ſaid that they were ſtruck by ſpirits, when we find others in Dr. Hodges's time ſaying that they were ſtruck by ſome inviſible agent, when we know that electricity *can* ſtrike in an inviſible manner, it certainly is more reaſonable to conclude that violent diſeaſes ſometimes do begin by an electric ſtroke, than that *all* who ſaid they were ſtruck in this manner were madmen or liars.

It may now again be aſked, If the plague, or violent epidemics, be produced by electric ſtrokes, why are they not much more frequently felt, or by what are thoſe milder diſeaſes produced which are not accompanied by any ſenſible ſtroke? Here we can be at no loſs to ſay, that whatever produces the higheſt diſeaſe, may alſo produce the loweſt. But, beſides this argument, we have poſitive evidence that commotions in the electric fluid will

* In the account of this ſailor's ſpeech a moſt eſſential part of the devil's character was omitted. The ſpeech, according to Capt. Cook, was, that the devil "was about the ſize of a one gallon keg, and very like it. He had horns "and wings; and he was ſo near, that, if I had not been *afear'd*, I might "have touched him." (See p. 105, n.)

will not only produce ſickneſs, but very extraordinary and ſeemingly miraculous effects upon inanimate bodies. It has frequently been remarked that people are ſick during the time of earthquakes, when the electric matter is in violent agitation. This has been accounted for from the motion of the earth, as the motion of a ſhip produces ſea-ſickneſs. But Dr. Hillary mentions a ſlight earthquake in Barbadoes where people were affected with ſickneſs and vomiting for *ſome hours* after the phenomenon had ceaſed altogether; which undoubtedly ſhows, that a certain ſtate of this fluid will diſorder the human body, independent of every other circumſtance, either of the heat or cold of the atmoſphere, or the oxygen, hydrogen or azote contained in it. Again, we find that a certain ſtate of the electric matter is not only capable of producing very extraordinary effects by itſelf, but alſo of communicating a power to the human body to do the ſame. A good number of years ago, a powder-mill near London was blown up. The exploſion, as might be expected, was violent and tremendous; but the moſt remarkable circumſtance was, that the electric matter, for a great way round, was thrown into unuſual, though inviſible, commotions, which diſcovered themſelves by the rattling and breaking of china diſhes though ſitting apparently undiſturbed upon their ſhelves. This phenomenon did not ſuddenly ceaſe, and, during the time of it, ſome people appeared to be infected by an electric *contagion*; the power of breaking china ſeemed to reſide in their bodies, ſo that if they approached or touched this kind of ware, it would inſtantly fly to pieces. Accounts of this extraordinary circumſtance were publiſhed in many of the periodical works of the time, particularly in Dodſley's Annual Regiſter; and the fact ſeems to be eſtabliſhed beyond controverſy. It proves that what has been advanced by Dr. Prieſtley concerning electrical operations, on a ſmall ſcale, holds good alſo on a large one, viz. that the fluid, when once ſet in motion, is not eaſily quieted. It eſtabliſhes the fact, alſo, that by great exploſions of gun-powder the electric matter is violently agitated; and the conſe-

quence

quence of theſe agitations we cannot know. It may be ſaid, indeed, that in the operations of nature the electric matter is often violently moved without any ſickneſs taking place; neither in fact did any enſue at the time the powder-mill in queſtion was blown up. But it muſt be remembered, that, in the ordinary courſe of nature, if the electric matter is moved, a receptacle is alſo provided for it. In a thunder-ſtorm, where immenſe diſcharges of electricity are made from one cloud, there is another cloud of an electricity oppoſite to the former ready to receive them, or if not, the earth itſelf is frequently ſtruck. In eruptions of volcanoes, the ſmoke receives the electricity diſcharged, and becomes charged with lightning of a more dangerous kind than that of ordinary thunder-ſtorms; and Sir William Hamilton relates, that in the great eruption of Veſuvius, in 1794, lightning of this kind proceeded from the ſmoke for no leſs a ſpace than *ſeventeen* days. But in artificial commotions of this fluid, where nature has not provided any receptacle, the phenomena muſt be quite different; and though we may with ſafety to ourſelves interfere with the operations of fire and electricity to a certain degree, yet we may at laſt rouſe theſe terrible elements into ſuch action as will prove fatal to great numbers. Hence poſſibly may ariſe in part ſome of thoſe ſickneſſes which take place after battles, in violent ſieges, &c. An inſtance of this is ſaid to have happened at Valenciennes, when laſt beſieged by the Duke of York. A diſeaſe prevailed chiefly among women, children, and perſons of a weak conſtitution; great numbers of whom died ſo ſuddenly that it was at firſt thought to be a plague, until it was found not to be infectious. The blood was found greatly diſſolved, and the phyſicians aſcribed it to the monſtrous bombardment and cannonading which took place during the ſiege. Such was the account publiſhed in ſome of the newſpapers of the time, and from the ſubſequent conſiderations it will not ſeem improbable that ſuch things may take place.

From the experiments of Mr. Bennet (an Engliſh gentleman who has made ſeveral diſcoveries in electricity) it

it appears, that we can neither bruſh a piece of chalk, open or ſhut a book, or do ſeveral of the moſt trifling actions, without agitating this ſubtile fluid in a perceptible manner. It is well known that in ſome caſes we cannot ſtroke a cat's back without making the electric matter viſible, and in ſome poſitions, by putting our fingers near the ears of the animal, very pungent ſparks will be received. If then we can neither open or ſhut a book, if we cannot ſtroke a cat's back, or approach a finger to her ear, without agitating the electric fluid, is it reaſonably to think we could burn a book, or kill a cat, without doing the ſame? Certainly it is not. If we cannot burn a book or kill a cat without affecting this fluid, it cannot be ſuppoſed that we can burn a houſe or kill a man without producing a ſtill greater commotion; and in proportion to the extent of our deva ſtations, and the multitude of our maſſacres, the inviſible agitation of this element muſt become ſtill greater and greater. In all theſe tranſactions it muſt be remembered that the fluid is forced out of its natural mode of action; for electric matter is made for the preſervation, not the deſtruction, of life: but if, by long continued and extenſive application of its power to a contrary purpoſe, we in ſome meaſure pervert its action, no wonder that we then feel the conſequences of our own proceedings by its partly turning its power againſt the human race altogether.

Again, the human body is not made for the habitation of an infernal ſpirit, but for one of a quite different character. The boiſterous paſſions of fury, diſcord and hatred ought never to diſturb the mind, which is made for the habitation of endleſs peace and joy. The tumultuous paſſions are enemies to health; and this is ſo well known to phyſicians that they are very careful to prevent their patients from being any way ruffled or diſturbed by violent paſſions. It is true theſe paſſions act upon the rational ſoul, which we may ſuppoſe to be diſtinct from that merely animal ſpirit, probably no other than the electric fluid, which runs along the nerves; but experience ſhows that each of theſe can act upon the other; a diſorder

diſorder in the body, particularly in the nervous ſyſtem, will ſometimes diſturb the rational ſoul in ſuch a manner as almoſt entirely to deprive it of all its faculties; while on the other hand a violent commotion in the rational ſoul may at once extinguiſh all the powers of life, as has already been ſhown from Zimmerman. Now, let any one conſider what muſt be the ſenſations of thoſe who engage in war. Whatever pity or humanity may be pretended, it is evident that in the day of battle all theſe ſenſations muſt give way to horror and fury on the part of the conquerors, and terror and diſmay on that of the vanquiſhed. That theſe paſſions never do entirely ſubſide, is evident from the treatment of conquered countries and conquered people. When Jenghiz Khan beheaded his priſoners by hundreds of thouſands, when Tamerlane pounded them in mortars, when Khouli Khan cauſed thoſe who offended him to be carried from place to place, and a piece of fleſh to be cut from their bodies at each ſtage, what muſt have been the ſenſations of theſe miſcreants, and thoſe whom they employed in ſuch horrid ſcenes? On the other hand, what muſt be the ſenſations of thoſe who ſee their deareſt relations torn from them and ſlaughtered or treated even worſe than if they were; themſelves driven from their peaceable abodes to wander like beaſts, while their cruel enemies exult in the miſeries they have brought upon them, and glory in doing all the miſchief they can, and ſpreading devaſtation as wide as poſſible? Thus, every paſſion, inimical to health, muſt, on both ſides, be carried to its utmoſt height; and if theſe horrid ſcenes overſpread a great part of the earth, for hundreds of years together, is it any wonder that plagues ſhould enſue? If man, forgetting the dignity of his nature, converts the habitation aſſigned him by his Maker into a kind of hell, and himſelf into a devil, can we wonder that, in ſuch circumſtances, the ſpirit of life, originally appointed for his uſe, ſhould become to ſuch a being the ſpirit of death? Dr. Moſeley ſeems to ſpeak ſlightly of Helmont for aſſigning *moral* cauſes to fever; but if we conſider the matter attentively it will certainly be found that the moral conduct of the human race in general

general has more connexion with the diſeaſes which befal them, than we are perhaps willing to believe.

Moſt authors ſpeak of ſome hidden, unknown and unſearchable power in the atmoſphere as the occaſion of plagues and other epidemics; and, from what has been already laid down, it ſeems by no means improbable that this hidden power reſides in the electric part of it. But we know that electricity proceeds from the earth, as well as from the air; ſo that in ſome countries the evaporation of electric matter from the earth may affect the health of the inhabitants, as well as the conſtitution of the atmoſphere. Hence ſome ſpots may be naturally unhealthy, and incurably ſo, independent of either the perceptible or imperceptible properties of the air; their healthineſs may occaſionally increaſe or decreaſe by means entirely beyond the reach of our inveſtigation. Here then our inquiries muſt ſtop. We may indeed make a general conjecture that ſuch differences are produced by the action of the electric matter; but, unleſs this action be pointed out, and ſome connexion traced between the ſituation of the country and a particular mode of action of the fluid, we may as well own our ignorance at once.

9. From all that has been ſaid, then, we may conclude, that none of the obvious properties of the atmoſphere, or of any conſtituent part of it, or of any variation in the proportion of its ingredients, can be accounted the cauſe of epidemic diſeaſes; that the hidden conſtitution of the atmoſphere may with probability be attributed to the agency of the electric fluid, and that by the action of this ſecret cauſe, along with the other more obvious properties of the air, ſuch as heat or cold, moiſture or dryneſs, &c. the human body may be ſo prediſpoſed to diſeaſes, that they will readily break forth; and that the conduct of mankind themſelves may greatly contribute to this prediſpoſition; the queſtion then is, ſuppoſing every thing to be thus laid, like a train of gun-powder, what is the ſpark which firſt ſets it on fire. Does the diſeaſe ariſe ſpontaneouſly in the firſt perſon affected by it, or does it come from without?

In

In anſwer to this we muſt in the firſt place obſerve, that the accounts of all plagues mentioned in profane hiſtory trace their progreſs from one place to another; whence the probability is, that at its origin the diſeaſe was confined to a few, perhaps to a ſingle perſon. In very few caſes, however, has it been poſſible to trace it to an individual; and, even when this has been done, the unfortunate individual is always ſaid to come from ſome other place. The inſtance quoted from Dr. Moore is perhaps the only one upon record where the plague aroſe ſpontaneouſly in any perſon ſeparated from ſociety; and from a ſingle inſtance little can be inferred. In thoſe terrible examples we have given of people being burned to death without any accident from terreſtrial fuel, the agent ſeems almoſt certainly to have been electricity. In the plague of Procopius, ſaid not to have been infectious, the ſtrokes complained of by many patients ſeem to indicate an action of the ſame fluid. The ſame in the plague at London, which was infectious, and likewiſe of others. But, in caſes of plagues which are not infectious, another queſtion ariſes—By what means do ſuch diſeaſes ſpread from place to place? for even this dreadful peſtilence of Procopius did not overſpread the earth at once, but is ſaid to have begun at Peluſium in Egypt. To this no anſwer can be given. To ſuppoſe an omnipreſent contagion in the atmoſphere, proceeding either from contagion or any thing elſe, cannot be admitted; for upon this ſuppoſition the whole world muſt have been infected at once. The cauſe, whatever it was, plainly moved from one place to another, or was ſucceſſively generated in different places. Recourſe may be had to the precipitation of the contagious matter of former plagues from the atmoſphere; but to account for this in ſucceſſion will be found very difficult; and the ſame difficulty will attend every other ſolution which may be attempted. Mr. Gibbon indeed cenſures Procopius for ſuppoſing it not to have been infectious; and perhaps the ſpreading of the diſeaſe by infection is the only way by which we can account, in a ſatisfactory manner, for the way in which it diffuſed

itſelf

itſelf over the world, which was, by firſt infecting the maritime places, and afterwards thoſe which were more inland; always viſiting the ſecond year thoſe whom it had ſpared the firſt.

10. Laſtly, to form ſome idea of the nature of contagion, or infection, as it is more properly called, we muſt conſider, that as the ethereal fluid, acting as heat, pervades the human body, ſo doth it likewiſe under that particular modification which we call electricity. Some kinds of air, indeed moſt of thoſe with which we are acquainted, ſeem to act by augmenting or diminiſhing the latent or the ſenſible heat of the body. Such, when taken in moderate quantity, may produce ſlight diſeaſes, as head-ach, &c. and, when taken very largely, may even put an end to life at once, either by rarefaction of the blood and rupture of the ſmall veſſels, as is the caſe with fixed air, or by oppreſſing the lungs entirely with their baſis, which cannot be thrown out by the breath as in ordinary reſpiration. Others may affect the electricity of it, or what in this treatiſe has been called the *vital ſpirit*, as well as the latent or ſenſible heat. The conſequence of this will be diſeaſes of a more ſerious nature; for upon this principle in all probability depend not only the ſecretion and proper regulation of the nervous fluid, but what has been called the *craſis*, or proper conſiſtence of the blood and other fluids. Hence it is poſſible that ſuch an inſtantaneous ſhock may be given to the body, as will not only injure the organization in an irreparable manner, but may be felt throughout the whole body like an electric ſtroke, even though there be no viſible fire, or ſenſation of burning, as in the caſe of the Italian prieſt and others, who periſhed in ſuch a miſerable manner.

Formerly all acute diſeaſes were ſuppoſed to depend on morbific matter taken into the body, and abſorbed by the blood: the cure was thought to be accompliſhed by the expulſion of this morbific matter from the body by ſweat, or ſome of the other natural evacuations. The doctrine was attended by many difficulties, and in many caſes did not admit of a ſatisfactory explanation.

It was therefore laid aſide, and the debility or excitement of the nervous ſyſtem aroſe in its place. But this new ſyſtem admitting of *miaſmata* and *contagion*, it was plain that morbific matter ſtill kept its ground. With a view, it would ſeem, to render the nervous theory more complete, it has been found neceſſary to deny the doctrine of contagion and infection entirely. This has been done, wherever there was a poſſibility; but the phenomena of the ſmall-pox and meaſles, as well as thoſe ariſing from poiſons, ſtill militated ſtrongly in favour of morbific matter. To avoid the force of arguments drawn from theſe ſources, the doctrine of abſorption was denied, and contagions of all kinds were ſaid to act immediately upon the nervous ſyſtem without affecting the blood or other fluids. At laſt the matter ſeemed to be decided by the experiments of the Abbe Fontana on poiſons. He found that ſome proved fatal by being mixed with the blood, others by being applied to the nerves, and others by being taken into the ſtomach. Even this did not give ſatisfaction. It was contended that the effects of poiſonous bites were too quick to be accounted for on the principle of abſorption; that, after the moſt violent ſymptoms had commenced, they might be removed by cutting out the part affected; and conſequently that, inſtead of any abſorption by the blood, we were only to believe that the nervous ſyſtem was irritated.

"Poiſons, (ſays Dr. Girtanner) remedies, and, in ge-
"neral, all ſurrounding bodies, acting only on the irri-
"table fibre, it follows that they act upon the ſyſtem in
"a ſimilar manner, and that every ſubſtance capable of
"producing the greateſt poſſible effect upon the fibre,
"that is to ſay, every ſubſtance capable of exhauſting all
"the irritability both of the fibre itſelf and of the ſyſtem,
"in an inſtant, as for inſtance, laurel water, or white ar-
"ſenic, is alſo capable of producing all the inferior de-
"grees of action, either by acting on a fibre leſs irritable,
"or by acting upon the ſame fibre, but in a leſs quanti-
"ty. Laurel water, opium, white arſenic, ammoniac,
"are of courſe both medicines and poiſons capable
"of *healing*, as well as of *producing*, *all maladies whatſo-*
"*ever*,

" *ever, without exception.** And this is confirmed by a " number of experiments which I have made upon dif- " ferent animals. This *truth* ſeems to me *of the utmoſt* " *importance*; and the Abbe Fontana, who made more " than ſix hundred experiments to prove that ammoniac " is no remedy againſt the bite of a viper, would have " ſaved himſelf the trouble, had he known it. If, inſtead " of applying the venom of the viper to ſo many animals, " and afterwards applying ammoniac to the wound, he " had made a ſingle comparative experiment, and appli- " ed ammoniac to a wound made by a lancet that was " not poiſoned, he would have found that ammoniac " itſelf, applied in this manner, would have produced a " diſeaſe exactly analogous to that cauſed by the venom " of the viper; and, conſequently, ſo far from removing " the malady, muſt neceſſarily increaſe it, by exhauſting " the irritability of the fibre in a much leſs time than " the venom of the viper by itſelf was capable of doing. " Mr. Fontana has made more than ſix thouſand ex- " periments upon the poiſon of the viper; he employed " more than three thouſand vipers, and cauſed to be bit " more than four thouſand animals; and the concluſion " he drew after this truly enormous number of obſerva- " tions was, that the poiſon of the viper kills all animals, " and produces the diſeaſe by its action on the blood. " But why did Mr. Fontana neglect to make the de- " ciſive experiment, the *experimentum crucis* of Bacon? " It is well known that frogs, and many animals with " cold blood, live a long time without the heart, and " entirely deprived of blood. If therefore the poiſon of " the viper kills animals by its action on the blood, it " will not deſtroy frogs without blood. But experiment " contradicts this reaſoning. The poiſon of the viper " will kill frogs without blood in as ſhort a time as it " kills

* This is an aſſertion ſo extravagant, that is difficult to imagine what could induce any one to make it. Did our author ever hear that laurel water, &c. produced the venereal diſeaſe, the plague, yellow fever, gout, ſtone, ſmall-pox, &c. &c. or to what patients and in what diſeaſes did he ever adminiſter this remedy with ſucceſs? I mean not to deny that theſe ſubſtances will cure *ſome* diſeaſes as well as produce others; but ſuch an unqualified expreſſion that they can not only produce but cure all diſeaſes without exception, never can be admitted.

" kills thoſe animals who have not loſt their blood. It " is not therefore by its action upon the blood that the " venom of the viper deſtroys animals; and thus does it " happen that a ſingle experiment frequently overturns " all that *ſix thouſand* other experiments have apparently " eſtabliſhed. According to my experiments, poiſons " operate upon the blood juſt as they do upon the muſ- " cular fibre, by depriving it of its principle of irritability, " or of its oxygen. After having made this obſervation " upon the experiments of Mr. Fontana, I muſt do him " the juſtice to add, that I have found all his experi- " ments very accurate, and that in all thoſe which I have " repeated, the reſult has been exactly conformable to " the account given by him; it is in his concluſion only " that he appears to be deceived."

On this I muſt in the firſt place obſerve, that ſince *philoſophers* and *truth* ſeem to be ſo far diſtant from each other that even *ſix thouſand* experiments cannot bring them together, it were greatly to be wiſhed that in their reſearches they would pay a little more regard to humanity. If the Author of Nature has ſet man at the head of the creation, if inferior animals muſt patiently reſign their lives to preſerve ours, are we therefore authoriſed to torment and put them to death by thouſands for every idle whim that comes into our heads? After Spallanzani, Fontana, Girtanner and a multitude of other learned *barbarians* had cut in pieces, boiled alive, poiſoned and tortured thouſands of inoffenſive animals, new maſſacres it ſeems muſt be made, and new tortures inflicted, becauſe an *experimentum crucis* is ſtill wanted! If knowledge is to be obtained only by ſuch means as theſe, it certainly muſt be derived from a very polluted ſource.

2. The experiment on which Dr. Girtanner builds ſo much is far from being above ſuſpicion. Though we may cut the heart out of an animal, and let it bleed as freely as poſſible, yet we certainly overrate our abilities if we ſay that *all* the blood is taken out of it. The more perfectly an animal is bled, the leſs irritability it has; which gives a reaſonable ſuſpicion, that, if *all* the blood

blood could be taken away, the irritability would ceaſe entirely. In frogs, and all other cold blooded animals, the blood contains fewer red globules than in ſuch as are warmer; the circulation is more languid than in ſuch as have warm blood, and, of conſequence, the blood will retain its irritability for a longer time, and it will likewiſe be more difficult to deprive the body of all its blood. In making this experiment, therefore, Dr. Girtanner ought to have brought unexceptionable proofs that he had deprived the frog of *all* the blood it contained. But, as this was not done, we ſhall be ready to ſuſpect that ſome was left; in which caſe we ſhould be ſtill as uncertain as before whether the poiſon acted on the irritable fibre, or on the blood. But the deciſive experiment, or *experimentum crucis*, ſeems to have been made by Fontana himſelf, by injecting a little of the diluted poiſon of the ticunas into the jugular vein of a rabbit. Here the poiſon was applied to the blood itſelf. It could get at no other part of the fibre but the inſide of the vein, which is not accounted very irritable; and the quantity injected was ſo ſmall, that the Abbe thought his experiment had failed; yet the animal died as if by lightning. The moment he turned his eyes towards it, it was abſolutely dead, without diſcovering the leaſt convulſive agony, or other ſign of ſome little life remaining, generally obſervable for ſome time in animals killed by the common methods. On applying the ſame poiſon to a large nerve of another animal of the ſame ſpecies, no injury followed.

3. The diſpute is of no conſequence, and the experiment will prove the ſame thing whether we ſuppoſe the poiſon to act upon the irritable fibre (the nerves and muſcles) or upon the blood. The only important point to be aſcertained is, whether there be in nature any ſubſtance which, applied to the internal parts of the body, or to a wound, will inſtantly diſorder the whole in ſuch a manner as to bring on a violent diſeaſe which may prove mortal in a ſhort time. If any ſuch there is, that ſubſtance, whether ſolid or fluid, viſible or inviſible, may with propriety be called *contagion*; and if any ſuch proceeds from

from the body of a diſeaſed perſon to one in health, the vapour ſo proceeding is *infection*. As to the *mode* of its operation we are little concerned; the ſudden manner in which people are affected ſhows that poiſons kill by ſuppreſſing in a very ſhort time the principle of life, which ſeems to be analogous to electricity, or rather the very ſame with it; neither is it more incredible that the poiſon of a ſerpent ſhould kill by diſturbing the natural electricity of the body, than that the ſtroke of a torpedo, or electrical eel, ſhould kill by the ſame means. The only difference is, that, in the caſe of poiſons, the pernicious ſubſtance is introduced into the body itſelf; in the torpedo, it comes with violence from without. The former we may compare to the ſilent diſcharge of an electrified jar by a point, the latter to its diſcharge with a violent flaſh by a knob. But that in poiſonous bites the blood is greatly affected, and that in a very ſhort time, we certainly know. There are ſome kinds of ſerpents whoſe bites are ſo ſuddenly fatal, that no cure can be applied: one of theſe, called the ſmall *laharra*, is mentioned by Mr. Bancroft in his Natural Hiſtory of Guiana. Mr. D'Opſonville, in his Philoſophic Eſſays, takes notice of one in the Eaſt-Indies, which he calls the *poiſon ſerpent* or *ſerpent poiſon*, which ſeems to be as bad as the *laharra* mentioned by Bancroft. This too is but ſmall, viz. two feet long, and very ſlender. Its ſkin is freckled with "little traits of brown, or a pale red, and "contraſted with a ground of dirty yellow: it is moſtly "found in dry and rocky places, and its bite proves mor-"tal in leſs than one or two minutes. In the year 1759, "and in the province of Cadapet, I ſaw ſeveral in-"ſtances of it; and, among others, one very ſingular, "in the midſt of a corps of troops, commanded "by M. de Buſſy. An Indian Gentoo merchant per-"ceived a Mahometan ſoldier of his acquaintance "going to kill one of theſe reptiles, which he had found "ſleeping under his packet. The Gentoo flew to beg "its life, proteſting that it would do no hurt if it was "not firſt provoked; paſſing at the ſame time his hand "under its belly, to carry it out of the camp; when

"ſuddenly

" ſuddenly it twiſted round, and bit his little finger; " upon which this unfortunate martyr of a fanatic chari- " ty gave a ſhriek, took a few ſteps, and fell down in- " ſenſible. They flew to his aſſiſtance, applied the ſer- " pent-ſtone, fire, and ſcarifications, but they were all " ineffectual; his blood was already *coagulated*.* About " an hour after I ſaw the body as they were going to " burn it, and I thought I perceived ſome indications " of a *complete diſſolution of the blood*."

The bite of the *brulan* or *burning ſerpent*, according to the ſame author, is almoſt as terrible. " This is nearly " of the ſame form with the laſt, its ſkin is not quite ſo " deep a brown, and is ſpeckled with dark green ſpots: " its poiſon is almoſt as dangerous, but it is leſs active, " and its effects are very different. In ſome perſons it is " a devouring fire, which, as it circulates through the " veins, preſently occaſions death; the blood diſſolves " into a lymphatic liquor reſembling thin broth, with- " out apparently having paſſed through the intermedi- " ate ſtate of *coagulation*,† and runs from eyes, noſe and " ears, and even through the pores. In other ſubjects " the poiſon ſeems to have changed the very nature of " the humours in diſſolving them; the ſkin is chapped " and becomes ſcaly, the hair falls off, the members are " tumefied, the patient feels all over his body the moſt " racking pains, then numbneſs, and is not long in " periſhing."

From theſe accounts it is plain that poiſons do operate very powerfully on the blood; and if they do ſo in one caſe it is reaſonable to think that they do ſo in all. According to the degree of ſtrength of the poiſon, however, we are ſure that the effects will be more or leſs viſible to us; but, though we ſhould not be able to perceive any alteration whatever in the conſiſtence or colour of the vital fluid, we cannot poſitively ſay that it has not

* There muſt certainly be ſome error here; for as he mentions a *diſſolution* of the blood ſo ſoon afterwards, we ſhould think it impoſſible that any coagulation would have taken place. Perhaps the word only imports that the circulation was completely ſtopped.

† The blood certainly does not coagulate in the veſſels, in any caſe whatever, unleſs by injecting ſomething into them.

not undergone any change; for the ſpirit which operates in it is too ſubtile for our obſervation. In the beginning of almoſt all diſeaſes, perhaps, blood drawn from a vein will not be perceptibly different from that of a perſon in health; and Dr. Fordyce particularly takes notice of this in fevers; but as the diſeaſe goes on, an alteration becomes very perceptible, which gives juſt ground for ſuſpicion, that there had been ſome alteration from the very firſt, though inviſible to us.

After all our diſputes, however, we ſhall find that the controverſy, though ultimately important, begins more about words and trifles than any thing elſe. Dr. Brown uſed the word *excitability*, Dr. Girtanner uſes *irritability*, and the author of this treatiſe, the words *vital ſpirit* and *electricity*, to expreſs ſomething equally unknown to them all. The only difference is, that Drs. Brown and Girtanner ſpeak of their excitability and irritability as a kind of power eſſentially inherent in living bodies, acted upon indeed by certain ſubſtances, but incapable of deriving any ſupply from without; the author of this treatiſe conſiders it only as a modification in the human body, or an *organization*, if we pleaſe to call it ſo, of that fluid which he believes to be univerſally diffuſed, under the names of heat, light and electricity. Hence that portion modified or organized in the human body muſt be under an entire and abſolute dependence upon the immenſe maſs of ſurrounding fluid, and, by any alteration in the motions of it, muſt be often very perceptibly affected; nevertheleſs as this fluid was originally created to preſerve and not to deſtroy human life, there is much leſs danger from a *natural* than from an *artificial* commotion in it. In ſome viſible bodies, ſuch as poiſons, the fluid acts in ſuch a manner as to counteract the operation of that part which is organized in the blood or nerves, or both. Hence on the introduction of ſuch into the body the diſorder flies like lightning through all parts of it, and in a very ſhort time brings on death. In thoſe vapours properly called *contagions*, the oppoſite action is leſs violent, and therefore the diſorders they produce are in proportion. Hence ſuch diſeaſes may either

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be promoted or retarded by the perceptible properties of the atmoſphere, which in poiſons have little or no effect. There is indeed a remarkable difference in the ſtrength of the poiſon ſecreted in the bodies of ſerpents at certain ſeaſons of the year, or according to their food. M. D'Opſonville obſerves that the poiſon of ſerpents is in general more powerful, the more they live in hot and dry places, where they feed upon inſects that are full of ſaline, volatile and acrimonious particles. But, notwithſtanding this difference in the ſtrength of poiſons according to the circumſtances of time and place, there is not the leaſt reaſon to ſuppoſe that poiſon of a given ſtrength would not produce the very ſame effects, let the ſtate of the atmoſphere be what it would.

If therefore we certainly know that there are ſome kinds of aerial vapours which when applied to the human body do exert a power directly oppoſite to the vital principle, there is no reaſon to doubt that ſuch vapours may be confined among certain ſoft ſubſtances, ſuch as cotton, wool, &c. and remain there for an unknown length of time, again exerting their malignant powers, when a freſh object comes in their way. Beſides, as all kinds of air with which we are acquainted conſiſt of a baſis united with the ethereal fluid and volatiliſed by it, there is reaſon to ſuppoſe that contagions themſelves are formed in the ſame manner. Some kinds of air alſo are very eaſily decompoſed, in which caſe the baſis attaches itſelf to ſome terreſtrial ſubſtance, the ethereal fluid which volatiliſed it diffuſing itſelf around in an inviſible manner, but generally with a perceptible heat. Fixed air affords a notable example of this; for, by expoſing it to lime-water, or even dry lime, alkaline ſalt, volatile alkali, or common water, a decompoſition of the air very readily takes place, and its baſis is found to be attached to thoſe ſubſtances. What happens to fixed air may alſo happen to *contagion*. The baſis of it may have a tendency to unite itſelf to cotton, or ſuch like ſubſtances, and thus may not only infect them, but concentrate itſelf to ſuch a degree as to produce a diſeaſe much more violent than that of the perſon who gave the infection;

and ſomething of this kind has even been obſerved with regard to infected cotton. But now another queſtion occurs: As fixed air, by being attached to terreſtrial ſubſtances, loſes its aerial property, why ſhould the baſis of contagious effluvia ſtill retain its malignant quality though in a ſtate of decompoſition? Here we are again helped out by analogy. Fixed air is known to be capable of reſuming its aerial properties occaſionally, from cauſes unknown to us, though we cannot ſuppoſe them to be any thing elſe than the inviſible action of the ethereal fluid ſo often mentioned; which, being guided by laws unknown to us, we cannot poſſibly comprehend. The fact, however, is certain, that the baſis of fixed air does very often quit the ſubſtances to which it is attached, and aſſume an aerial ſtate in great quantity, and with very miſchievous effects. Thus the old lavas of volcanoes, if chemically tried will be found at *all* times to contain great quantities of the baſis of fixed air, but it is only at *ſome* times that the moſetes which are ſuppoſed to be the air itſelf, break forth.* In like manner the ſtrata under ground always contain great quantities of the aerial baſis, but the *damps* in mines, which are certainly known to conſiſt moſtly of fixed air, do not always appear; neither do they gradually accumulate, but come ſuddenly, ſpreading unexpected deſtruction among thoſe who unfortunately come in their way. The ſame may take place with contagion. After remaining ſome time in a ſtate of decompoſition it may have a tendency to become volatile again, or it may lie dormant entirely; and this laſt will explain what is quoted from Dr. Ruſſel, p. 178, that ſometimes commerce may be carried on with infected places without danger.

Thus we ſee that the diſpute, originally begun about a word, involves at laſt a matter of the utmoſt importance; for, if it be found unreaſonable to believe that any ſuch thing as contagion exiſts or can exiſt, it follows of courſe that it is alſo unreaſonable to take any precautions againſt it. Mr. M'Lean even goes a ſtep beyond thoſe who deny the exiſtence of contagion; for we find him

* See p. 128, note.

him alſo denying that putrid effluvia can produce epidemics; according to which doctrine, it ſeems, we may not only ſafely viſit places accounted the moſt dangerous on account of infection, but live in all manner of filth and naſtineſs with impunity. It is plain that no perſon can ever prove that it is impoſſible for contagion or any thing elſe to *have an exiſtence.* Indeed if nothing had ever induced people to believe that it did exiſt, it would have been ſuperfluous to ſay any thing about it. But when we have innumerable teſtimonies to the contrary; when the opinions of the greateſt phyſicians, as Dr. Lind, Dr. Clarke, Dr. Mead, Dr. Sydenham, Dr. Fordyce, Dr. Ruſſel, &c. agree that not only the plague, but *every* kind of fever, is infectious; when we know from the analogy of nature that contagion *may* exiſt; when we know that there certainly *are* powers in nature able to produce it; is all this to be thrown aſide merely on the ſtrength of a theory, and a theory too which can never be proved? for it is impoſſible to prove the *non-exiſtence* of any thing, much leſs the *impoſſibility* of its exiſtence. The lives of mankind are too precious to be ſported with on philoſophical theories; and prudence will always ſuggeſt, that wherever danger may at any time ariſe, there it is proper to be on our guard.

Diſmiſſing at length the ſubject of contagion in general, we now enter upon the queſtion, Whether doth it appear from fair inveſtigation of teſtimony, that the plague has, at any time, been communicated by contagion or not? And here I ſhall confine myſelf to what has been adduced by Dr. P. Ruſſel on the ſubject; for, if we find that the diſeaſe has only *once* been introduced by contagion, it ſignifies nothing though we were able to prove, which we never can do, that it had been *an hundred* times bred in ſome other way. The matter is of too great importance to allow even a *chance* of its importation by the neglect of the precautions neceſſary to prevent it.

Our author begins with obſerving, that though the infectious nature of the plague had been a queſtion much agitated in the ſchools, "it was leſs to be expected that phyſicians

" phyſicians who had been engaged in practice among " the infected ſhould have perſiſted in the opinion that " the diſeaſe was never communicated by contagion." Such, however, has been the caſe. In 1720 ſome French phyſicians laboured exceedingly to prove that the plague which then raged at Marſeilles and throughout Provence aroſe from corrupt humours bred in the body in conſequence of irregularity in the ſeaſons, and bad aliment; that it was ſpread by the ſame means, in concurrence with terror, grief, deſpondence, or other debilitating affections of the mind; but was neither bred nor diſſeminated contagion. Dr. Ruſſel mentions in a note, ſeemingly with ſurpriſe, that " *ſo late* as the year 1778, " Dr. Stoll of Vienna ſhould have written expreſsly " againſt the doctrine of peſtilential contagion." To this profeſſor he thinks it a ſufficient anſwer to quote the following paſſage from Mr. Howard on Lazarettos. " It muſt appear very ſtrange, that he ſhould go back to " Livy's Roman Hiſtory for proofs to eſtabliſh his point, " totally neglecting all the facts concerning the numerous viſitations of the plague recorded in modern medi- " cal books, or which had happened during his own " time. I ſuppoſe profeſſional men will lay very little " ſtreſs upon all that can be ſaid on peſtilential diſeaſes, " in general, which happened in wars and ſieges two " thouſand years ago, as applied to the plague properly " ſo called, a diſeaſe then confounded with various " others from which the accuracy of latter obſerva- " tions have ſufficiently diſtinguiſhed it."

Dr. Ruſſel complains of the French phyſicians at Marſeilles having made unfair repreſentations; particularly that while they produce as irrefragable arguments againſt contagion their own eſcape unhurt, amid circumſtances of ſuppoſed danger, they paſs ſlightly over, or omit all mention of numbers of the medical aſſiſtants whom they ſaw periſh in the exerciſe of their profeſſion. M. Dedier, however, who at firſt oppoſed the doctrine of infection, at laſt renounced his opinions ſo far as to allow that the diſeaſe might be communicated to dogs by injecting peſtiferous bile into their veins; and he likewiſe

likewiſe admitted that it might be communicated from one human creature to another, by drawing in for a conſiderable time the breath of a diſeaſed perſon, putting on his ſhirt, lying in the ſame bed-clothes, and touching the wounded parts of one's own body with hands embrued with the ſweat or blood of one infected. He affirms, however, that the atmoſphere of a perſon in the plague is no more to be dreaded than that of a venereal patient; and that the touching or dreſſing of buboes or carbuncles is not attended with any danger. He reſtricts the infectious quality of the humours to the bile; but the *inoculation* of a perſon by the matter of a peſtilential ulcer* undoubtedly decides this point againſt him.

On the ſubject of contagion Dr. Ruſſel obſerves, that the vague manner in which the word has been uſed has given riſe to much confuſion. Some, taking advantage of the inaccurate mode of expreſſion on this ſubject uſed by Dr. Mead, attacked him with ſophiſtical nonſenſe. The following may ſerve as a ſpecimen, from a pamplet entitled "Diſtinct Notions of the Plague, &c. by the *Explainer*." This *explainer* obſerves, that, according to Dr. Mead, "air and his other cauſes propagate and "ſpread contagion, not the plague; and therefore either "contagion and the plague are the ſame, or elſe the "plague is not conſidered; if the firſt, then his cauſes "propagate the plague; and the plague accompanies "the plague; an excellent defence! But, if the plague "is out of the play, then contagion accompanies no-"thing."—From writers like this we certainly can expect nothing.

The opinion of Dr. Cullen concerning contagion has been already noticed, p. 179; but though he ſuppoſes it to be a matter floating in the atmoſphere, he obſerves that contagions are never "found to act but when they "are near to the ſources from whence they ariſe; that "is, either near to the bodies of men, from which they "immediately iſſue, or near to ſome ſubſtances which, "as having been near to the bodies of men, are embu-

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* See p. 196.

" ed with their effluvia, and in which ſubſtances theſe " effluvia are ſometimes retained in an active ſtate for a " very long time. The ſubſtances thus embued with " an active matter may be called *fomites*; and it appears " to me probable, that contagions as they ariſe from fo- " mites, are more powerful than as they ariſe immedi- " ately from the human body." This opinion concerning the great power of contagion imbibed by certain ſubſtances is conformable to what was above laid down by reaſoning *a priori* on the nature of contagion.* It is doubted by Dr. Ruſſel, but Dr. Lind adopts it, and Van Swieten gives his opinion to the ſame purpoſe. " I am convinced, that the body of the diſeaſed, kept " exactly neat and clean, is not ſo liable to impreſs the " taint, as his late wearing apparel, dirty linen, and un- " cleanlineſs of any ſort about him long retained in that " impure ſtate. I ſay, theſe laſt contain a more concen- " trated and contagious poiſon than the newly emitted " effluvia or excretions of the ſick."

With regard to the original cauſe, our author obſerves, " that the plague is bred or produced originally from " vitiated human effluvia, is a matter which has by no " means been eſtabliſhed on proper authoriry." Setting aſide therefore inquiries of this kind, he thinks it ſufficient to inquire whether the infection be not communicated from a ſick to a ſound perſon by immediate contact; whether it be not alſo communicated at ſome diſtance through the medium of the air; and whether ſubſtances of various kinds do not imbibe the infectious effluvia, and retain them for a conſiderable time. So far as theſe points admit of proof from the experience of times paſt, the queſtion concerning peſtilential contagion will admit of a ſolution, independent of all theoretic reaſoning whatever.

2. On the ſubject of contagion people have been embarraſſed by confounding the true plague with other malignant diſeaſes. This has been done, not only by the ancients, but by ſome moderns; and our author quotes Dr. Pye, ſaying " that any epidemic ſickneſs, " which

* See p. 226.

" which rages with more than ordinary violence, and " which occaſions extraordinary mortality amongſt " mankind, may be, and is, properly termed a peſti- " lence, or the plague." By not attending to the pro- per diſtinctions, in theſe caſes, circumſtances belonging to what are commonly termed malignant or peſtilential fevers will often come to be very improperly applied to the true plague.

3. " It may be remarked, that thoſe who contend " in favour of contagion, from zeal for accumulating " proofs, have collected a number of facts from hiſtorical " records of very unequal authority, and often with lit- " tle critical ſkill in diſcrimination. Of this error their " antagoniſts availing themſelves, have ſelected from the " maſs the inſtances moſt liable to doubt or objection, " and have endeavoured, by their manner of arranging " them, to place the whole in a ridiculous light; while " more important inſtances are either evaſively paſt " over, miſſtated in the repreſentation, or invalidated by " general declamation on the little credit due to hiſto- " rians in matters of phyſic, or the prejudices prevalent " in ancient times of ignorance, and on contradictions " to be found in the arguments of thoſe who ſupport " the ſyſtem of contagion."

To this the Doctor adds the great quantity of hypothetical reaſoning which has been introduced into the controverſy, and above all the unfair dealing of the parties in carrying on the diſpute, which has reduced the matter from "a calm inquiry in purſuit of truth, to a wrangling conteſt for victory." Laſtly he inſiſts, that, had it not been for the miſrepreſentations and ſiniſter dealings of thoſe who have written againſt contagion, " the queſtion ſeems to have been properly re- ſolved in the affirmative;" and he complains greatly of the conduct of the Montpelier phyſicians in this reſpect, inſomuch that " their miſſtating of circumſtances, and " the partiality ſo evidently diſcoverable in their narra- " tive of caſes, will ſerve more effectually to remove " doubts on the ſubject, than any arguments that could " be uſed againſt their hypotheſis."

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On the ſubject of contagion our author obſerves, that ſome difficulties ſtill remain; but theſe, though proper ſubjects of future inquiry, "do not appear to be "of force ſufficient to invalidate facts already eſtabliſhed. "It is well known, that the ſame perſon who has been "inoculated two or three times for the ſmall-pox with- "out effect, even in an epidemic ſeaſon, has afterwards "received the infection upon repeating the operation "at a diſtance of time when the diſeaſe was hardly ſpo- "radic. The cauſe of this remains unknown; but ig- "norance of it was never produced as an argument "againſt the reality of variolous contagion. . . . . If, "of one hundred perſons expoſed to the infection of "the plague by a near aproach to the ſick, ninety "ſhould fall ſick, ſhall human inability to aſſign ſatis- "factory reaſons for the eſcape of the other ten be con- "verted into a poſitive proof againſt the diſeaſe having "been caught by contagion? If perſons retired from all "commerce with the infected and their attendants, "breathing the ſame air with the reſt of the inhabitants, "and nouriſhed by the ſame aliment, remain untouch- "ed during the ravage of the plague, as long as they "continue ſecluded, but, upon unguarded communica- "tion, are taken ill like others; can any rational doubt "be entertained about the cauſe of their former ſecu- "rity? Or if through ſtealth, or neglect of requiſite "precautions, ſubſtances tainted by the ſick ſhould be "conveyed into theſe ſecluded retreats, and perſons "living temperately as before, ignorant of what had "happened, and conſequently in the midſt of imaginary "ſecurity, happen to be ſeized with the diſtemper; can "it with any ſhow of reaſon be aſcribed, not to conta- "gion, but to terror, or to colluvies in the ſtomach and "bowels, produced by intemperance and bad aliment? "The inſtances here alluded to are not the *creation of* "*fancy*, but *ſtrictly conſonant to repeated experience* in "Turky; to ſay nothing at preſent of what has been ob- "ſerved at Marſeilles and in various cities in Europe."

"But a greater difficulty than that of all perſons not "being equally ſuſceptible of the infection ariſes from "the

" the ceſſation of the plague, at a period when the ſup-
" poſed contagious effluvia, preſerved in apparel, furni-
" ture, and other fomites, at the end of a peſtilential
" ſeaſon, muſt be allowed to exiſt, not only in a much
" greater quantity than can be ſuppoſed to be at once
" accidentally imported by commerce, but in a ſtate
" alſo of univerſal diſperſion over the city: the fact,
" however unaccountable, is unqueſtionably certain;
" the diſtemper ſeems to be extinguiſhed by ſome cauſe
" or cauſes equally unknown as thoſe which concurred to
" render it more or leſs epidemical in its advance and at
" its height. In Europe ſomething may be aſcribed to
" the means employed for the cleanſing of houſes and
" goods ſuppoſed liable to retain the latent ſeeds of in-
" fection; but, at Aleppo, where the diſtemper is left to
" take its natural courſe, and few or no means of puri-
" fication are employed, it purſues nearly the ſame pro-
" greſs in different years: it declines and revives in cer-
" tain ſeaſons, and, at length, without the intervention
" of human aid, ceaſes entirely."

On this we ſhall remark in general, that the failure of contagion in ſome caſes to produce the uſual effects may proceed from ſome conſtitution of the body, diſpoſing it not to allow the cauſe to produce its uſual effects at one time, though at another, the conſtitution may be ſo far changed as very readily to admit it. This opinion has been very generally received among medical people, who have, to this ſingularity of conſtitution given the name of *idioſyncraſy*. It is, however laughed at by Mr. M'Lean, " As the fact (ſays he) cannot be denied, that a great
" majority have eſcaped after contact with perſons ill of
" diſeaſes ſuppoſed to be contagious, attempts may per-
" haps be made to account for it by ſuppoſing a certain
" peculiarity of conſtitution, which exempts from, or
" diſpoſes to, diſeaſe. Is it the many who eſcape that
" have this happy peculiarity of conſtitution; or the few
" who are ſeized that are ſo unfortunate as to poſſeſs it?
" The former are evidently too numerous to admit ſuch
" an hypotheſis. The property muſt therefore, I con-
" clude, by given to the latter. But a child here and

" there is exempted from ſmall-pox, although expoſed " to its contagion. In order to preſerve a conſiſtency, " this fact muſt be accounted for by the ſame or another " peculiarity of conſtitution. Peculiarities of conſtitu- " tion, then, exempt from contagion in one caſe, and " diſpoſe to it in another; and thus a term, which in " reality means nothing, may be made to account for " any thing. For my own part I confeſs my inability to " comprehend any other *peculiarities* of *conſtitution*, or " *idioſyncraſies of habit*, than what are conſtituted by the " different degrees of health and diſeaſe; the different " ſtates of the excitability."

In the ſame manner that Mr. M'Lean argues with regard to diſeaſe, let us argue concerning bodily ſtrength. Some men are able to lift a weight of 6 or 700 pounds, but a great majority cannot lift above 300. Whence proceeds the difference? Is it the few who lift the great weight that *by nature* have *more* ſtrength, or is it the many who can lift only the ſmaller that *by nature* have *leſs?* This is preciſely his argument, and there needs no other refutation than ſtating it in this manner. What he calls the ſtates of excitability are as much *idioſyncraſies* at the time as any thing elſe. Mr. M'Lean will not deny that a perſon debilitated by certain cauſes is more liable to be ſeized with typhus fever than one who is not. What does this proceed from, but that the body of the one is prepared for the diſeaſe, is *conſtitutionally* diſpoſed to receive it, or has an *idioſyncraſy* of habit diſpoſing to it, which the other has not? It is true, that unleſs we point out the circumſtances which conſtitute this idio-ſyncracy we do nothing; but Mr. M'Lean's ſcheme, of reſolving every thing into *excitability*, would forever prevent us from doing ſo. This is the great deficiency of the Brunonian ſyſtem altogether; for, by attending only to the animal life of the body, he ſeems to have abſolutely forgot that we had any thing in common with vegetables. The bones, for inſtance, or indeed any part of the body, cannot be formed by the power which governs it after it was formed. The growth of the human body is as ſtrict vegetation as that of a tree; and there-

fore

fore we find that after the excitability is entirely gone, after death has taken place for a conſiderable time, the body ſtill retains its form, and would do ſo forever, did not other powers interfere with it. Human life therefore is a compound of the vegetable and animal life, the former being the baſis of the latter; and it is the vegetable life which is much more commonly the ſubject of diſeaſe than the animal life. In vegetables we obſerve an *idioſyncracy* of habit, as well as among animals. Some, even of the ſame ſpecies, are much more vigorous than others, and, among ſome, diſeaſes are much more common than others. In like manner among the human race ſome are ſtrong, others weak; in ſome the blood is much more conſiſtent, and coagulates on expoſure to the air much more firmly than in others. Excitability, or excitement, is common to all, and the degrees of it (though enumerated by Yates and M'Lean in a kind of thermometrical ſcale) muſt be merely imaginary, becauſe excitability is not the object of our ſenſes. The obvious properties of the body itſelf, independent of any excitement whatever, are principally to be conſidered in medicine. Theſe conſtitute the peculiar conſtitution, or the *idioſyncracy* of habit, belonging to each individual. Yet, in defiance of every conſideration of theſe obvious properties, which all have acceſs to obſerve, the new ſyſtem leads us only to conſider an inviſible and unknown being called *excitability*. Hence diſeaſes peculiar to certain conſtitutions more than others are ſaid to be occaſioned only by certain degrees of excitability common to all, or perhaps to conſiſt in theſe very degrees themſelves. Thus a peculiar mode of practice has been introduced, in which almoſt the whole materia medica is rejected. We have already quoted Dr. Girtanner, ſaying that *all diſeaſes whatever* may be *cured*, as well as *produced*, by only *four* articles; but in the following quotation he goes ſtill farther. "The art of pharmacy and the ſcience of pre-
"ſcription will become uſeleſs; a phial of alcohol or
"laudanum will ſupply the place of that enormous
"quantity of drugs which crowd the ſhops of apothe-
"caries. The trade of the druggiſt——but hold; if I
"continue

" continue this prophetic language, I ſhall only expoſe " myſelf to ridicule," &c. Reveries of this kind certainly deſerve the moſt ſevere reproof. People may no doubt amuſe themſelves with *theories* as well as any thing elſe, while theſe theories continue inoffenſive; but when the belief of them leads to a rejection of what has been eſtabliſhed by the *experience* of many ages, they begin to aſſume a conſequence which they originally had not. We have already ſeen that a diſbelief of the doctrine of contagion leads people into a practice accounted dangerous by many, and which cannot be proved to be ſafe. A total rejection of medicines, the efficacy of which have been atteſted by thouſands, and which never can be proved to have *no* efficacy, muſt be attended with ſtill worſe conſequences, as thus we ſhould be deprived of the means of curing thoſe diſeaſes which our imprudence in rejecting the former doctrine might have brought on. But, to return to the ſubject of the plague.

The diſappearance of the diſeaſe, while all the cauſes that we ſuppoſe capable of producing it remain in full force, is a demonſtration that it depends on ſomething entirely diſtinct from the human body, and from all thoſe powers which perceptibly act upon it. It proves that this unknown power has only a temporary exiſtence, coming to perfection at one ſeaſon, and dying away in another; ſometimes capable of being revived, and ſometimes not. This correſponds entirely with what has been laid down concerning contagion itſelf, viz. that like other aerial vapours it is capable of decompoſition, and remaining for an uncertain length of time in a dormant ſtate; but that occaſionally it may revive, and appear unexpectedly, as *mofetes* ariſe from lavas, or damps in mines. After a city has been thoroughly infected with a peſtilential diſorder, therefore, there can be no ſecurity againſt its re-appearance; it being impoſſible to know whether the contagion may not be ſtill exiſting and capable of being revived by ſome unknown cauſe, though it has been dormant ever ſo long. In ſuch caſes it may with propriety be ſaid to have ariſen *ſpontaneouſly*, though, had it not been there at a former period, there could

could be no reaſon to think that it would have appeared at that time.

Dr. Ruſſel next takes into conſideration the plague at Marſeilles in 1720, of which he ſays the accounts "are "more full, and circumſtances better authenticated, "than moſt of the accounts of anterior plagues to be met "with in books." From the oppoſition to the doctrine of contagion at the time, he alſo ſuppoſes that the facts relative to its introduction would be ſeverely ſcrutinized, and falſehoods detected: "but (ſays he) if, inſtead of "ſuch detection, the moſt material have been paſſed "over in ſilence, and little more than hypothetical rea-"ſoning oppoſed to others, the main facts may be con-"ſidered as eſtabliſhed, if poſſible, more firmly than "they were before." Theſe facts are ſtated as follows: "1. That the plague did not exiſt in France before the "25th of May, 1720. 2. That it was imported in "goods from the Levant, by a ſhip which left the coaſt "of Syria the beginning of February, and arrived at "Marſeilles the 25th of May. Two days after her ar-"rival one of the ſailors died; an officer of quarantine "who had been put on board died on the 12th of June, "and a cabin boy on the 23d. Some porters employed "in opening the merchandiſe at the lazaretto alſo died "about this time. Three others were taken ill in the be-"ginning of July, with buboes in the groin and axilla. "This alarmed the ſurgeon of the lazaretto; a conſul-"tation was held with two other ſurgeons on the 28th; "the diſeaſe was unanimouſly declared to be the plague, "and the three patients died next day: the ſurgeon of "the lazaretto, with part of his family, and the prieſt "who attended the ſick, were alſo taken ill and died."

From the lazaretto the diſeaſe made its way into the city, and began to appear about the 20th of June. By what means it was introduced is not directly ſaid; but it ſeems to have been by ſmuggling infected goods. In the beginning of July it began to ſpread; but a kind of pauſe having taken place between the 12th and 23d, the phyſicians were reproached with having miſtaken the diſtemper. During this ſuppoſed interval, however,

it

it was discovered on the 18th of July that the disease had spread in a certain part of the city. A surgeon, employed to examine into the matter, declared the distemper to be the worm-fever; and about the 23d the council of health were informed of the death of fourteen persons in that quarter, and of several others falling sick. The surgeon still adhered to his opinion, but a physician declared it to be the true plague. About the end of the month it had got into the suburbs; four physicians declared it to be the true plague, but their report was not believed; they were insulted in the streets, and it was not until some of the inhabitants of better rank were taken ill, that the true state of the matter gained credit.

"Such (says Dr. Russel) was the rise of the plague "at first, and its progress afterwards in the months of "June and July; whence it appears, that persons on "board the suspected ship, those employed in airing the "goods, a surgeon and a priest, who attended the sick, "were among the first infected; that the passengers "from the several ships, all of which ships, the first "excepted, brought foul patents, were, together with "their baggage, admitted into the city, after preforming "a quarentine of little more than eighteen days; that "the distemper from the 20th of June till towards the "end of July advanced very slowly, and sometimes seem-"ed to pause; that it attacked chiefly the poorer sort of "people, and was found in distinct quarters of the city; "and lastly, that, *during the first forty days, few or none of "the infected recovered*; a circumstance entirely conso-"nant to what was observed in the beginning of the "plague at Aleppo."

Three other facts are mentioned by our author, viz. that the disease was evidently communicated by infection; that those who were careful to seclude themselves from all communication with the sick and with infected goods, were not infected; and lastly, that the disease, which began to rage violently in August, continued to do so through that and the following month, but declined fast in the months of October and November,

ber, and ſeemed to ceaſe in the middle of winter. Some accidents happened in 1721, between the months of February and July, which gave occaſional alarm; but the diſtemper did not ſpread, and ceaſed entirely after the ſummer ſolſtice of that year.

To all this, however, objections have been made. 1. That the irregular ſeaſons of the former year, a bad crop, and unwholeſome aliment, had produced a malignant epidemic, all which, joined to the popular dread of contagion, were ſufficient to produce the plague without any imported infection. To this Dr. Ruſſel replies, that theſe poſitions, aſſumed as facts, had no exiſtence; for which he refers to the publications of the times. 2. It was objected that there were inſtances of the plague in Marſeilles before the 25th of May. Theſe inſtances are only five in number, produced by M. Deidier, "who "ſaw not the caſes himſelf, yet (ſays Dr. Ruſſel) from "the very imperfect accounts he had been able to glean, "he thought himſelf juſtified in declaring they bore all "the marks of the true plague. Nothing (adds the "Doctor) but extreme partiality to an hypotheſis could "have led any one practiſed in the plague, into ſuch a "declaration; the caſes bearing every internal mark of "belonging to a different claſs from the plague. I ſhall "endeavour to ſhow this in a few words.

"Of the five ſuppoſed infected patients, three reco-"vered, two died, and all had eruptions. One who "died had a parotis (the moſt ambiguous of all peſti-"lential tumours) without any concurrence, ſo far as "appears, of peſtilential ſymptoms. The tumour had "appeared ſix days before the woman's death, but how "long ſhe had been ſick remains unknown. The other "died the 16th or 17th day, a very unuſual period in "the plague. She alſo had a parotis, which did not "make its appearance till the 10th or 11th day of the "diſeaſe. No peſtilential ſymptoms whatever are men-"tioned. Of the three who recovered, one was very ill "with a fever and carbuncle; but neither the invaſion "nor the duration of the diſeaſe are mentioned. Ano-"ther had a carbuncle and a ſmall tumour on the "thigh;

" thigh; and the third (which bears the neareſt reſem-
" blance to a very ſlight infection) had alſo a bubo in
" the thigh; but the tumours in neither of theſe pa-
" tients are deſcribed in ſuch a manner as diſtinguiſhes
" them from ordinary tumours; and the apothecary,
" who gives the account from memory, had in all like-
" lihood never ſeen a peſtilential bubo before."

" Of the perſons infected for ſome time after the ar-
" rival of the ſhips from the Levant, none had erup-
" tions, and all periſhed after a few days illneſs; which
" agrees entirely with what was obſerved at Aleppo in
" the beginning of the plague: hardly any of the ſick
" recovered, and the major part died in three or four
" days, without any appearance of buboes. Upon the
" whole, therefore, I think it very clearly eſtabliſhed,
" that the plague did not exiſt in France before the
" month of May, 1720. Prior to M. Deidier, how-
" ever, I find a M. Pons had endeavoured to prove
" that the plague was in Marſeilles, not only before the
" month of May 1720, but even in the preceding year.
" I have not had an opportunity of examining that gen-
" tleman's book."

3. It is objected that the diſeaſe was not brought from the Levant by infected goods. " Captain Cha-
" taud's veſſel, ſuppoſed to have brought the infected
" goods, arrived with a clean patent, or bill of health,
" having left the coaſt of Syria before the plague broke
" out there; ſhe conſequently cannot reaſonably be
" thought to have tranſported the plague, which was
" not in the ports from whence ſhe came."

To this Dr. Ruſſel anſwers, that on commercial accounts the Turks carefully conceal the appearance of the plague from the Europeans. Should reports of accidents get abroad, they are variouſly and contradictorily repreſented, and peſtilential marks and tumours fraudulently concealed. Though Chataud obtained a clean patent, the plague broke out ſoon after his departure, and three veſſels with foul patents arrived at Marſeilles a few days after Chataud. " To this (ſays
" Dr. Ruſſel) it may be further added, that, notwith-
ſtanding

" ſtanding his clean patent, perſons acquainted with the " Levant will think it far from improbable, that the " plague might actually have been in Sidon when he " ſailed, though unknown to the magiſtrate, by whom " the patents are granted. . . . A clean bill of health " imports that the place has been free from plague, and " all ſuſpicion of plague, for a certain ſpace of time; but " the clean patents of the two firſt arriving from the " Levant, after the ceſſation of the plague, are, according " to Mr. Howard, deemed foul at Marſeilles, and the " paſſengers are obliged to perform a quarantine of thirty- " one days. The French conſuls lying under an obli- " gation to inſert in their patents a detail of circum- " ſtances, it muſt appear ſtrange, when the condition of " Syria at that time is conſidered, how Captain Chataud " ſhould have obtained a clean patent."

Though this muſt certainly be deemed a ſufficient anſwer to the objection, Dr. Ruſſel goes on to give an account of what had happened the preceding year, when the plague had raged violently at Aleppo; and ſhows that, from the condition of the whole coaſt of Syria, a return of the plague was certainly to be expected; that the French conſuls could not be ignorant of this, neither could the council of health at Marſeilles be unacquainted with what had happened at Aleppo the preceding year. " The facility with which the patents " ſeem to have been iſſued in Turky, and the partial " indulgence of the council to Chataud's ſhip, notwith- " ſtanding the very extraordinary mortality which had " avowedly happened on the voyage, together with their " eaſy confidence afterwards in the reports of the ſurgeon " of the lazaretto, can only be accounted for from the " prevailing influence of private commercial intereſt over " a ſenſe of official duty."

Our author next proceeds to take notice of what happened during this ſhip's voyage to Marſeilles. On the 31ſt of January he left the coaſt of Syria with a clean patent, before the plague broke out. On the 25th of May he arrived at Marſeilles, from Sidon, Tripoli and Cyprus. On the voyage, or at Leghorn, he loſt ſix of

the crew; but, by the certificates of the phyſicians of health at Leghorn, theſe died only *of malignant fevers cauſed by unwholeſome proviſions*. Theſe laſt words in the *Traite de la Peſte* are ſaid to have been interpolated at Marſeilles. At any rate, as Dr. Ruſſel obſerves, they could relate only to thoſe who died at Leghorn, not to the others, whom the phyſicians had not ſeen.

The other account is much leſs favourable. According to it, Chataud "left Sidon the 31ſt of January with "a clean patent. The plague diſcovered itſelf there "a few days after his departure. Having ſuſtained ſome "damage by bad weather, he put into Tripoli, where he "embarked ſome merchandiſe; he took in alſo ſome "Turks, paſſengers for Cyprus, together with their lug-"gage. Soon after the ſhip had left Tripoli, one of "theſe paſſengers fell ſick and died. Two of the ſailors "employed to throw the corpſe overboard deſiſted at the "deſire of the pilot, and the reſt of the ceremony was "performed by the other Mahommedan paſſengers; "the ropes with which the body was lowered down, be-"ing by way of precaution thrown into the ſea. With-"in a few days the two ſailors who had handled the "corpſe were taken ſick and died. At Cyprus the ſhip "put her remaining paſſengers on ſhore, and made a "very ſhort ſtay. Soon after her departure from that "iſland, a third ſailor and the ſurgeon died of an illneſs "of a few days duration. The captain, juſtly alarmed "by theſe accidents, ordered the bedding and other "things uſed by the deceaſed to be thrown into the "ſea; and kept himſelf carefully ſeparate from the "crew during the remainder of his voyage. Some time "after this three more ſailors fell ſick, and, there being "no ſurgeon on board, the veſſel put into Leghorn, "where the three ſick men died, and the phyſician and "ſurgeon of the lazaretto declared the diſeaſe to be a "malignant peſtilential fever."

Our author conſiders the above account as a full proof of the plague being imported by Chataud's veſſel: he declines entering into the queſtion about the *poſſibility* of importing contagion in merchandiſe. How this

this *might* take place has already been explained; and the preſent inſtance of its having been imported is as clearly proved as can be expected. A collateral proof, with regard to the contagion of the ſmall-pox, we have from Dr. Huxham. A beggar, ill of that diſeaſe, approached a certain town in England, but was not ſuffered to enter, for fear of infection. The beggar died, and the infected clothes were burnt at ſome diſtance from the town; but the ſmoke being blown upon it by the wind, the ſmall-pox in a ſhort time made its appearance, beginning in that part upon which the ſmoke was blown. This clearly proves that *one* ſpecies of contagion may adhere to clothes, and is a very ſtrong preſumption that any other may do the ſame. It alſo ſhows that contagion, when once produced, is by no means eaſily deſtroyed; and conſequently that all kinds of purification, even when uſed with the utmoſt care and diligence, are ſcarce ſufficient to enſure ſafety.

It would now be ſuperfluous to enter farther into the ſubject of the plague being communicated by infected goods, did not our author quote a work of Dr. Pye of London, in which the latter from the very *Journal* (which has been uſed as containing arguments in favour of contagion) makes inferences directly oppoſite. "The facts "related in this journal (ſays Dr. Pye) ſeemed to me "to make ſo clearly againſt the modern doctrine of con- "tagion, that if this writer had not mentioned them as "undeniable inſtances in his favour, I ſhould not have "thought there had been any perſons here in England ſo "dull of underſtanding, or ſo much blinded with pre- "judice, as to ſtand in need of having theſe facts put "into a more obvious light: but, having this occaſion, "I ſhall conſider them more largely than otherwiſe I "would have done, and ſhow that the porters, who di- "ed in the lazaretto at Marſeilles, received no hurt or "infection from the goods.

"To leave no room for objection, I ſhall take notice, "that a guard of quarantine died on board Chataud's "ſhip the 12th of June; but, as this officer was no "ways concerned either in unloading or opening the "goods,

" goods, he could receive no hurt from them ; and be-
" ſides, this muſt have been fourteen or fifteen days af-
" ter the goods had been carried out of the ſhip into
" the lazaretto. Further, ſix of their men are ſaid to
" die at Leghorn ; but the town of Leghorn was not in-
" fected from thence, which would have been more
" likely if there had been any infection in the caſe, than
" that Marſeilles ſhould be afterwards infected.

" If any infection or infectious *aura* can be ſuppoſed
" to be packed up, and brought in goods, ſuch infection
" or infectious aura muſt neceſſarily iſſue forth from
" them in greateſt abundance, and with the greateſt
" force, at the firſt opening or unpacking of them ; and,
" as it muſt continue to fly off every moment, and be
" thereby continually diminiſhing, it is likewiſe cer-
" tain, that in a very few days the goods muſt be in a
" great meaſure, if not entirely, cleared of it. Where-
" fore, if the porters could have been infected from the
" goods at all, it muſt have been at the firſt opening of
" them : but, even according to this journal, the porters
" that firſt fell ſick were not taken ill before the 23d of
" June, whereas Chataud's ſhip arrived the 25th of May
" preceding ; ſo that the goods of that ſhip, in purifying
" which the porter firſt mentioned was employed, had
" been airing and purifying for twenty-ſix or twenty-
" eight days before this accident happened ; and it can-
" not be conceived that after ſo long a time they ſhould
" not have been entirely purged of all infection or infec-
" tious aura, if any could have been brought with them.
" Or if it can be ſuppoſed, which I think impoſſible, that
" any part might ſtill be left, it muſt withal be ſuppoſed
" ſo much leſs than at firſt, as not to be capable of doing,
" thoſe porters eſpecially, the leaſt hurt : to ſuppoſe
" otherwiſe would be to argue that the ſame man who
" ſome days before had received and borne a very great
" quantity and force without any injury, could then be
" killed by a quantity and force infinitely leſs.

" According to the report of merchants, *Frenchmen*
" *are not ſubject to the plague in Turky* ; and it cannot
" be conceived that ſo ſmall a quantity of infectious air

" as

" as can be packed up and brought in a bale of goods, " ſhould deſtroy them in France, or in an air and cli- " mate diſtant and different; when the whole atmo- " ſphere of the ſame infectious air is found not to injure " them in very infected places, and wherein it is al- " lowed to be bred and generated."

Thus far Dr Pye.—Let us now hear Dr. Ruſſel in anſwer.

" The death of the quarantine officer was mentioned " in order to leave no room for objection; but ſtill it " may be objected that he has omitted the death of " the ſailor on the 27th of May, and aſſerted, in con- " tradiction to the journal, that the former ſix ſailors " died at Leghorn. That Leghorn was more likely to " be infected than Marſeilles, is a ſtrange notion. The " ſhip had landed no goods there, nor had any inter- " courſe with the ſhore; for the phyſician who viſits " the ſick on board, remains at a diſtance from the ſhip, " in a boat, and the dead bodies are ſunk in the ſea. " As to the circumſtance of the goods of Chataud's veſ- " ſel being all in the lazaretto before the 12th of June, " it is a ſuppoſition to be attributed to Dr. Pye's un- " acquaintance with matters of that kind; for it is im- " poſſible a ſhip which arrived the 25th of May ſhould " diſcharge the whole of her cargo in two or three days. " The diſpatch would have been miraculous, conſider- " ing the ſhip lay near two leagues from the lazaretto, " and was unloaded, and the boats navigated, by her " own crew. It did not occur to Dr. Pye, that ſome " time, previous to the veſſels beginning to unload, is " taken up in examination and other forms at *Pomegue*, " and the council of health. The loſs of ſix men on the " voyage was an extraordinary circumſtance, that re- " quired deliberation; and it appears that on the 29th, " after the death of the ſailor on board Chataud's veſ- " ſel, the council determined the quarantine of his " cargo to be forty days, commencing from the landing " of the laſt bale; which was double the time uſually " allowed for a ſhip with a clean patent. It is very " probable, therefore, that the ſhip did not begin to

" unload

" unload till after the 29th of May, and poſſibly had " not finiſhed when the quarantine officer died, the 12th " of June, who muſt have been taken ill two or three " days before.

" In regard to the time requiſite for the complete " evaporation of the infectious aura, in what propor- " tionate gradation its activity is impaired by ventila- " tion, and the ſpecific quantity required to produce " effect on the human body, they are matters which I " apprehend will not readily be admitted to be clearly " and certainly known. That the firſt porters were " not taken ill before the 23d of June, is very true; " but that the goods had been airing and purifying for " twenty-ſix or twenty-eight days, has been ſhown above " to be an error. The Doctor alſo makes two other " ſuppoſitions equally erroneous. The firſt, that the " whole of the cotton contained in a number of bales " is equally imbued with infectious aura; the ſecond, " that all the bales of a ſhip's cargo are opened nearly " about the ſame time. But, as the cotton contained " in theſe bales may not only have been collected from " different villages at different times, but packed up " under various circumſtances relative to the materials " uſed for embalage, and the perſons employed in em- " baling or ſteeving them; it may eaſily be conceived " how the cargo of a ſhip, coming even from a place " where the plague actually rages, may be only par- " tially infected, or not infected at all. The warmeſt " advocate for contagion never contended for every " bale of a ſhip's cargo being equally infectious. As " to the airing of the bales, it is a laborious and a " tedious proceſs. Where there is a conſiderable " number, it takes up ſeveral days to open and arrange " them, goods of different kinds muſt be diſpoſed ſepa- " rately, accounts taken, and the cordage, &c. laid up " with care where it may be found again. The labori- " ous part of theſe operations is performed by the porters, " who alſo tranſport the goods from the water ſide to the " encloſure where they are to be aired: and, as the days " of quarantine do not begin to be reckoned till all the

" goods

" goods are landed, the porters for ſome days at the be-
" ginning are ſufficiently employed in receiving and ar-
" ranging the cargo, that being the buſineſs requiring the
" firſt diſpatch. When theſe circumſtances are conſi-
" dered, it will appear no extravagant ſuppoſition, that
" ſome of the laſt opened bales of Chataud's cargo might
" ſtill retain enough of infectious aura to infect the por-
" ter on the 23d of June. To ſet this retardment, al-
" moſt unavoidable in the opening of bales, in a ſtill clear-
" er light, it ſhould be obſerved, that, by the regulations
" at Marſeilles, all ſuſpected goods are ſubject to what is
" termed *fereines*; that is, a certain number of bales are
" taken out of the hold, and, being opened at both ends,
" are expoſed to the air for two, three, or ſix days, by
" way of trial, in order to ſee if any ſigns of infection
" ſhould appear among thoſe employed in handling the
" merchandiſe. When theſe have been aired, more or
" leſs, according to circumſtances, another parcel is
" opened and expoſed to ventilation in like manner:
" ſo that, according to the burden of the ſhip, there may
" be ſeveral of theſe fereines, each of ſeveral days dura-
" tion. In this manner, independent of accidental im-
" pediments from wind and weather, in ſending the goods
" from the ſhip, it may be ſuppoſed, were it at all neceſſa-
" ry to make the ſuppoſition, that the porters, not only
" on the 23d of June, but on the 7th and 8th of July,
" were infected upon opening ſome new bales. As to
" the porter being infected by goods from another ſhip,
" Dr. Pye thinks it impoſſible, becauſe the ſhip had been
" twelve days in port, and the goods muſt have been
" eight or nine days in airing and purifying: had he
" been acquainted with the practice of the fereines in
" quarantine, he would have been at no loſs to make the
" accident agree exactly with his notion of the infectious
" aura. . . . The plain matter of fact, as it ſtands in
" the journal, is this, that ſix porters, employed in pu-
" rifying ſuſpected merchandiſe from the Levant, died
" of the plague; and their death was followed by that
" of the ſurgeon who attended them, and part of his
" family."

From

From this the reader will be able to judge how far the queſtion is decided in favour of the fact that the plague at Marſeilles was actually produced by imported contagion. It ſeems needleſs to follow our author through his inveſtigation of thoſe facts which his adverſaries have miſrepreſented; for theſe muſt of courſe be in his favour; every miſrepreſentation by a diſputant being plainly an abandonment of his cauſe. Indeed the argument againſt contagion at that time was properly but *one*, and is ſet forth in no ſtronger language now than formerly. Even as long ago as 1665 Dr. Ruſſel quotes one Gadbury an aſtrologer ſtating the difficulty as ſtrongly, and giving a ſolution of it as clearly, upon *his* principles, as the beſt modern theoriſts can do upon *theirs*. "If the peſtilence, "(ſays Mr. Gadbury) be infectious, and really catching "in itſelf, it muſt be ſo equally to all perſons that "approach it, or that it approacheth; or elſe it muſt be "infectious to ſome particular perſons only. If it be "infectious to all perſons, or catching to all alike, then "all perſons, that come into the ſight or within the ſcent "of it, muſt neceſſarily be ſubject unto it. If not in-"fectious unto all, but unto ſome particular perſons on-"ly, I ſay then it ought not to be deemed or eſteemed "infectious at all, at leaſt not any more infectious than "are all other diſeaſes, viz. ſmall-pox, ſcurvy, pleuriſy, "ague, gout, &c. ſince (though the notion of infection "be laid aſide) there is not a perſon born into the world "that hath not at ſome time of his life (as his *nati-*"*vity* ſhall truly ſhow) ſome one diſeaſe or other. Ne-"ver was any perſon ſubject to violent diſeaſes, as plague, "&c. but had a violent *nativity* to ſhow it, and *e contra*."

The anſwer to this has been already given.—Let any other cauſe than contagion or infection be ſuppoſed, and the difficulty remains equally great. The probability is in favour of contagion, rather than a general diſpoſition of the atmoſphere, becauſe in the latter caſe the diſeaſe would, contrary to experience, begin in a great many places at once; but the plague begins in ſuch a ſecret manner that we ſcarce know whence it comes. Like fire, or a ferment in liquors, it diffuſes itſelf far and wide, and laſtly,

laſtly, like an immenſe inundation, the ſource of which is dried up, it ſeems to loſe its power by extending too far, and dies away altogether. We cannot penetrate into the cauſes of thoſe things, but, without any ſpeculation at all, we can obſerve that the diſeaſe falls upon people of a certain conſtitution more than others, and this may be of uſe in preſerving ourſelves from it, as ſhall be explained in the next ſection.

It is ſtill neceſſary to ſay ſomething of the infection ſpreading from one perſon to another, and being kept off by refraining from communication with the diſeaſed. This indeed naturally follows from its proceeding originally from the cotton: for as all the infected did not touch this cotton, there can be no other cauſe aſſigned from its ſpreading than by communication from one to another; and, therefore, if ſuch communication was cut off, we ſhould naturally think that the diſeaſe would not ſpread. But, in oppoſition to this, we have already quoted Dr. Moſeley giving a long liſt of convents infected, though they kept themſelves ſtrictly ſhut up. Dr. Ruſſel cites, in favour of prevention by ſhutting up, two certificates, one by the biſhop of Marſeilles, the other by the ſheriff of the ſame place. To theſe he adds the teſtimony of M. Langeron, who was actively employed throughout the whole time that the plague continued, firſt as a commodore of the gallies, and afterwards as governor of the town and its dependencies. In oppoſition to theſe, however, he takes notice of two paſſages "in books of acknowledged authority," which he is at pains to anſwer; the one is from the Journal already quoted, which ſays, "and what is unaccountable, thoſe "who have ſhut themſelves up moſt ſecurely in their "own houſes, and are the moſt careful to take in nothing "without the moſt exact precautions, are attacked there "by the plague, which creeps in no one knows how." The other paſſage is taken from the *Relation Hiſtorique*, "that, in the height of the peſtilence, the infection "penetrated into places which had till then remained "inacceſſible; that monaſteries and houſes ſhut up in "the moſt exact manner were no longer places of ſecu-"rity."

To the former of theſe our author anſwers, that "from "the manner of ſtating the caſe, one would think that "all theſe religious had been cloſe ſhut up, without any "communication with perſons without doors; and this "was certainly intended by an author who has made "remarks upon it; but it will be found, upon looking "into the beginning of the very paragraph cited, that "the greateſt part of them are repreſented as martyrs "who had meritorioufly expoſed themſelves. Of the "twelve different orders mentioned on this occaſion, "the Grand Auguſtines only are ſaid to have kept in "their convent. But, ſuppoſing the Auguſtin convent "to have been actually ſhut up, and in that ſtate in-"fected; it would by no means invalidate the inſtances "brought of the preſervation of the convents, the cer-"tificates concerning which were granted deliberately, "after all was over; whereas the journal, written from "day to day, marking circumſtances rapidly as they "occurred, the author, amongſt various other affairs, had "not always leiſure or opportunity to examine minutely "into circumſtances. It is in this light I am inclined "to conſider the houſes being infected which took in "nothing without the moſt exact precautions; and the "rather, becauſe I met with ſeveral inſtances of the like "kind at Aleppo, in the houſes of the Chriſtian and "Jewiſh nations: but in the ſequel it generally appear-"ed there had been ſome improper communication car-"ried on by the domeſtics, unknown to the family at "the time.

"That the atmoſphere, in a city ſo dreadfully cir-"cumſtanced as Marſeilles, may become ſo highly "tainted as to convey the plague into houſes ſhut up, "cannot conſiſtently be affirmed to be impoſſible, by "thoſe who hold mediate contagion; and the concur-"rence of circumſtances at that period in Marſeilles, ren-"ders it highly probable that ſuch accidents happened. "But, in general, the peſtiferous effluvia once emitted "into the air, do not appear to operate at any great "diſtance from their ſource; and M. Deidier aſſerts, "that two monaſteries (from their ſituation, one near a

"burial

" burial ground, the other near a peſt-houſe) very dan-
" gerouſly ſituated, remained nevertheleſs untouched,
" which he thinks an argument againſt infection being
" conveyed by the air."

From this long and conteſted account of the manner in which the plague was received into Marſeilles, we ſee how very difficult it muſt be to come at a true ſtate of facts, when a number of people think it their intereſt to miſrepreſent or conceal them. The limits of this treatiſe will not allow us to follow our author through the numerous details of miſrepreſentations and unfair methods which the adverſaries of the doctrine of contagion have made uſe of to eſtabliſh their opinion: neither ſhall we enter into any diſcuſſion concerning the origin of other plagues, as we ſhould in them find the ſame oppoſite kinds of evidence without ſuch documents for diſtinguiſhing the true from the falſe as Dr. Ruſſel has produced in the caſe of Marſeilles. A ſingle fact only, mentioned by Mr. Howard in his Treatiſe on Lazarettos, ſhall be related, and which, if allowed to be *fact*, decides the queſtion as effectually as a thouſand.

" When the plague raged at London in 1665, it was
" conveyed to the remote village of Eyam near Tideſwell
" in Derbyſhire. In this place it broke out in Septem-
" ber 1665, and continued its ravages upwards of a year,
" when two hundred and fifty of the inhabitants had
" died of it. The worthy rector, Mr. Mompeſſon,
" whoſe name may rank with thoſe of Cardinal Borro-
" meo of Milan, and the good biſhop of Marſeilles, at
" its breaking out, reſolved not to quit his pariſhioners,
" but uſed every argument with his wife to quit the in-
" fected ſpot. She, however, refuſed to forſake her huſ-
" band, and is ſuppoſed to have died of the plague.
" They ſent away their children. Mr. Mompeſſon con-
" ſtantly employed himſelf, during the dreadful viſita-
" tion, in his paſtoral office, and preached to his flock
" in a field, where nature had formed a ſort of alcove
" in a rock, which place ſtill retains the appellation of
" a church. He ſurvived, and the entries in the pariſh
" regiſter relative to this calamity are in his own hand
" writing, viz.

In

In 1665,	Sept.	Died 6	1666,	May	Died 5
	Oct.	22		June	20
	Nov.	5		July	53
	Dec.	7		Aug.	78
1666,	Jan.	3		Sept.	14
	Feb.	5		Oct.	17
	March	2		Nov.	1
	April	12			

This plague is said to have arisen from a box of clothes sent from London while the distemper was at its height in that city. But whether this be admitted or not, it cannot well be supposed that in a small village there could either be a peculiar constitution of the air, collections of filth, immoderate heat, cold, or in short any general cause from which a plague could be supposed to arise, that would not have affected the country for a great way round. How then came this insulated spot to be so violently affected, except by contagion? No matter whether by clothes or any thing else. The very particular manner in which the numbers who died are recorded, leaves no doubt as to the fact of the distemper having been there; neither is it possible to account for its rise on any other principle than contagion.

Mr. Howard, previous to his going abroad, had been furnished, by Dr. Aikin and Dr. Jebb, with a set of queries relative to the plague, to be put to the physicians in the different countries through which he travelled. This commission he executed with great fidelity and exactness. The physicians to whom he proposed them were, *Raymond* of Marseilles, physician; *Demollins* of do. surgeon; *Giovanelli*, physician to the lazaretto at Leghorn; *They*, to do. at Malta; *Morandi*, physician at Venice; *Verdoni*, at Trieste; *Jew* physician at Smyrna; *Fra. Luigi di Pavia*, prior to the hospital of San Antonio at Smyrna. The questions proposed were as follow:

1. Is the infection of the plague frequently received by the French?

Though

Though this was not aſking in direct terms whether the plague is infectious or not, all to whom it was propoſed ſeem to have viewed it in this light, Raymond of Marſeilles only excepted, who anſwered directly, "Sometimes it is." All the reſt, except Giovanelli, agreed that it might be communicated by the touch, or by the breath. Verdoni gave an inſtance of its being communicated by a flower which three perſons ſmelt at; two remained free, but the third ſickened and died in twenty-four hours.

2. Does the plague ever riſe ſpontaneouſly?

In this Verdoni alone anſwered poſitively in favour of the ſpontaneous riſe of the plague. *They* ſpoke ambiguouſly.

3. To what diſtance is the air infected? How far does actual contact, wearing infected clothes, or touching other things, produce the diſeaſe?

To this queſtion Verdoni anſwered in a manner ſeemingly inconſiſtent with his former anſwer; allowing not only that the plague was infectious, but that infected things might communicate the diſeaſe after an interval of many years. All agreed that the ſtrength of the infection was greater or leſs according to circumſtances; the diſtance at which it could act was likewiſe uncertain. Raymond ſaid that the ſick might be ſafely converſed with, acroſs a barrier, at a few paces diſtance; the Jew ſaid at *two ells* diſtance, provided the chamber windows be not all ſhut. Giovanelli ſaid it had been proved that the infection did not extend beyond five geometrical paces. The touch of infected clothes, or drawing in the breath of the ſick, was looked upon by him and Fra. Luigi to be very dangerous.

4. What are the ſeaſons in which the plague chiefly appears; and what is the interval between the infection and the diſeaſe?

To this it was anſwered by Raymond, that the two ſolſtices are the times in which it has leaſt power. The others agreed that hot and moiſt weather was favourable to its ravages; the ſpring, ſummer and firſt month of autumn are dreaded. Theſe circumſtances, however, muſt

muſt be variable in different countries. As to the time in which the infection ſhows itſelf, the anſwer was various. According to *They*, it "ſometimes acts ſlowly, ſometimes like a *ſtroke of lightning*." According to Verdoni, "the diſeaſe generally ſhows itſelf at the inſtant of touch, *like an electrical ſhock*." Sometimes the infection will be communicated from a ſick perſon to a ſound one, who without any diſeaſe may communicate it to a ſecond, and that ſecond to a third, in whom alone it would become active.

The other queſtions, relative to the ſymptoms, prevention and cure of the diſtemper, will be taken notice of in the courſe of the treatiſe. In the mean time having diſcuſſed, with a prolixity almoſt exceeding our bounds, ſuch preliminaries as ſeemed moſt likely to throw ſome light on the nature of the diſtemper, we ſhall now proceed to the medical hiſtory of the plague, as we find it laid down in different authors.

Though this diſtemper has moſt frequently been accounted a *fever* in the higheſt degree, yet, as we have already noticed, it ſeems to be eſſentially different.* The teſtimonies there quoted are ſufficient to eſtabliſh the fact; and, were it needful, many others might be brought from authors both ancient and modern. In the plague ſaid to have taken place in the days of Romulus,† Plutarch relates, that the people died without any ſickneſs. To this very ancient teſtimony we ſhall add that of Dr. Patrick Ruſſel, who cloſes the account of his firſt claſs of patients with the following paragraph: "That the "plague, under a form of all others the moſt deſtruc"tive, exiſts without its characteriſtic eruptions, or "other external marks reckoned peſtilential, can admit "of no doubt; and it is to be regretted that mankind "have ſo often, from the abſence of theſe, been betrayed "into errors of fatal conſequence on its firſt invaſion; "at which early period human prudence can only be "exerted in the way of defence with any probability "of ſucceſs."

The

* See p. 102 *et ſeq.* † P. 19, note.

The ſymptoms of this fatal diſeaſe were ſometimes a ſudden loſs of ſtrength, confuſion or weight in the head, giddineſs at intervals, oppreſſion about the præcordia, dejection of ſpirits, taciturnity, an anxious aſpect, but without any ſymptoms of fever. In theſe, death enſued within twenty-four hours; ſome were ſaid to have died within a few hours, but our author ſaw none of theſe, and is inclined to doubt the truth of the accounts, having in ſeveral inſtances, where this is ſaid to have happened, found upon inquiry that matters had been inaccurately ſtated, and that the patients had really been ill one or two days.

In others the diſorder was more perceptible. In a few hours the eyes became muddy, the ſurface of the body cold, with drowſineſs, lethargy, and pain at the heart. In the progreſs of the diſtemper they frequently loſt the power of ſpeech, the ſkin ſeldom recovered its warmth, or, if it did, it was only by irregular fluſhings. The pulſe ſometimes remained nearly in its natural ſtate, but was, for the moſt part, low and quick. They were "by turns delirious, confuſed and ſenſible, but the coma-"toſe diſpoſition was moſt prevalent. Towards the "end they ſuffered extreme inquietude. Vomiting in "ſome occurred the firſt night; in others a diarrhœa "next day; both accelerating the fatal period; but "theſe ſymptoms were leſs frequent than in ſome of the "other claſſes. Buboes appeared only in a very few "who ſurvived the third day. . . . The total abſence "of buboes in ſuch patients as periſhed ſuddenly I have "no doubt of, nor of their being in general very rare in "others of this claſs; though I ſuſpect that the buboes "might ſometimes have been concealed, where the diſ-"eaſe ran out to the fourth or fifth day, and for the "ſame reaſon that the reports concerning the ſtate of "the corpſe were ſometimes not true. . . . . It was "very rare to find ſuſpicious marks of infection on the "bodies [of thoſe who died within 24 hours] . . . . . "Carbuncles were ſeldom viſible till the month of May, "which was later than this form of the diſeaſe. It pre-"vailed chiefly at the riſe of the plague in 1760, and its

" its revival in the two ſucceeding years, decreaſing as " the diſtemper ſpread; and though they were found " diſperſed in every ſtage of the peſtilential ſeaſon, yet " the number of this claſs was proportionably ſmall, " compared with that of others. Petechiæ, vibices, or " broad, livid, roundiſh ſpots, occurred ſometimes, but " were not common, and the two latter were ſeldom vi- " ſible till after death."

This account of the moſt malignant form of the peſtilence differs conſiderably from that of Dr. Hodges, who ſeems to think that the *tokens*, as he calls them, very generally were to be found on the bodies of thoſe who died ſuddenly. He mentions indeed a young man who was ſuddenly ſeized with a violent palpitation of the heart, and thus continued till his death, which took place in a few hours. In this caſe the Doctor ſuppoſed that there might be a carbuncle broke out on the heart. Dr. Ruſſel has conſidered the deſcription of the tokens given by Dr. Hodges, and compared it with that of others called by Diemerbroeck *maculæ mortis*, *ſpots* or *tokens* of *death*; and by this compariſon it appears that the former has ſpoken ſomewhat indiſtinctly on the ſubject, confounding two different kinds of eruptions together. Dr. Hodges, however, as we have already ſeen (p. 10) aſſerts, in his *Loimologia*, that the tokens riſe from within, and are broadeſt at their baſes, where he alſo ſuppoſes the peſtilential poiſon chiefly to lie. To the ſame purpoſe, in his Letter to a Perſon of Quality he ſays, " The tokens have their original and riſe from within, " and afterwards externally ſhow themſelves; which is " evident, becauſe the baſis of them is larger than their " outward appearance, and the internal parts are found " very often ſpotted, when there is no diſcoloration " viſible on the ſkin." Dr. Ruſſel, after quoting Diemerbroeck, makes the following obſervations: " The " author (Diemerbroeck) is diffuſe on this ſubject, and " thinks it a miſtaken though prevalent notion, that the " maculæ are merely ſuperficial in the ſkin, proceeding " from putrefaction, ebullition, &c. in the blood or hu- " mours: on the contrary he affirms, they ariſe from the " internal

" internal parts, even the periosteum, broad at the base, " and tapering to their termination in the skin, being " produced by the *extinction* and *extravasation* of the vi- " tal spirits. Now (says Dr. Russel) this answers exact- " ly to one species of the tokens described by Hodges, " which therefore may be reckoned the same with the " *maculæ mortis*, and was probably the only one observed " at Nimeguen," &c. On the same subject he quotes a book entitled *Medela Pestis*, in which the author says that by careful dissection the *tokens* may be traced half-way deep in the flesh, and some, in the muscles of the breast, have been followed by the incision knife even to the bone. By the directions given by authority to the searchers in 1665, they were ordered to look narrowly for these tokens, which were described as " spots arising on " the skin, chiefly about the breast and back, but some- " times also in other parts. Their colour is something " various, sometimes more reddish, sometimes inclining " a little towards a faint blue, and sometimes a browniſh " mixed with blue; the red ones have often a browniſh " circle about them, the browniſh a reddish."

On the subject of tokens Dr. Hodges further observes, that they differed also in their degrees of hardness, some being easily penetrated with a needle or penknife, while others, more callous or horny, were penetrated with more difficulty. They so strongly resembled warts, that they could scarce be distinguished from them; and Dr. Hodges himself was often obliged to have recourse to a needle for this purpose. They seemed hard to the touch, not unlike kernels under the skin, the superfices being smooth. " When I essayed to prove some of them (says he) I found them *almost impenetrable*." Another very remarkable circumstance relative to them was, that they were often quite insensible, and this distinguished them from the carbuncle, which is always very painful. Hodges also remarks, that a quick sensibility in the skin was always a good sign, and those that went no farther than the skin would sometimes slough off.

Along with theſe tokens we can ſcarce doubt that *petechiæ* and *vibices* made their appearance. The former, even in the inferior degrees of the diſtemper, were dangerous, the latter always fatal, never appearing till the patient is within a few hours of death, ſometimes indeed not till death has taken place. Of the petechiæ Dr. Ruſſel ſays, that for the moſt part they predicted death, but not without exception. Such as he obſerved were round, ſomewhat ſmaller than a recent flea-bite. They were diſtinct, few in number, and ſcattered irregularly about the breaſt and maſtoid muſcles. When they did not appear till the approach of death, they were from the firſt livid, or very duſky; but if they appeared early, they were of a leſs deep colour, changing afterwards to livid. Hodges ſpeaks of them as deeper coloured than the ſpots of malignant fever, not fixed in any particular ſpot, ſometimes few, but commonly very numerous; the colour ſometimes red or purple, ſometimes yellow, and ſometimes livid or black. From Gotwald, Ruſſel quotes a deſcription of theſe ſpots, which he divides into four ſpecies. 1. Reddiſh, like flea-bites, ſoon growing brown or black; appearing on all parts of the body except the face. 2. In the form of lentils, ſpreading like the former all over the body; ruddy at firſt, but in 24 hours growing dark or aſh-coloured. 3. Large brown ſpots, ſcattered here and there, ſometimes intermixed with the lentil kind. 4. Not unlike the meaſles, ſpreading all over the body, riſing afterwards in ſmall bliſters without any matter, vaniſhing about the fifth day. Ruſſel alſo takes notice of a ſpecies of petechiæ which were very numerous, confluent, and of a dark red or duſky colour and irregular figure. Theſe were ſometimes remarked in the interſtices of the former. Such inſtances occurred but rarely.

The vibices were much larger than the petechiæ. Gotwald ſays that they covered the face as high as the noſe, and from thence ſpread to the forehead, diſfiguring the patient in a frightful manner. They did not appear till a ſhort time before death. Often they appeared unexpectedly, ſhooting up like lightning from the breaſt to the face, in ſpots of various colours, blue, green, brown and

and yellow. Diemerbroeck deſcribes them as oblong ſpots of a livid or black colour, like ſtrokes drawn with a pen; ſometimes they were larger, the biggeſt reſembling the ſtrokes of a whip. Ruſſel takes notice of a kind of marbled appearance which took place at the height of the diſeaſe, or a few hours before death; the colours being a faint blue, and darkiſh red, both more or leſs obſcure at times, but never bright. It was not permanent, vaniſhing in one place, without leaving any trace, and returning at ſhort intervals. "The ſkin in various places was ſometimes deformed by narrow ſtreaks of red-"diſh purple, or livid colour. When ſuch took poſſeſ-"ſion of the face they gave a frightful appearance to the "countenance, and frequently made ſuch an alteration "in the features, and ſo completely diſguiſed the patient, "as to render him hardly *knowable* by his acquaintance. "A ſtreak nearly of the ſame kind was ſometimes obſerv-"ed darting from the edges of the buboes and carbun-"cles. The vibices or weals were much longer and "broader, and more exactly reſembled the marks left in "the fleſhy parts by blows or ſtripes; they were found "chiefly on the thighs, buttock, and back, and made "their appearance ſeveral hours before death, in ſome "caſes, but in others not till after. Large blue or pur-"ple ſpots, the *maculæ magnæ* of authors, were ſome-"times obſerved with or without the vibices, a little "while before the patient expired, but moſt commonly "were diſcovered only on the corpſe. Their figure in "general was round, ſometimes irregular."

Whether all theſe mortal ſigns appeared on ſuch as died very ſuddenly of plagues, and were by the Engliſh writers confounded under the general name of *tokens*, cannot certainly be determined. Dr. Ruſſel ſaw none who died within the twenty-four hours, and few who died within thirty hours, ſo that we cannot from him expect any particular account of the ſituation of thoſe who died ſuddenly. In general, however, he ſays, that "in "the moſt deſtructive forms of the plague, the vital "principle ſeems to be ſuddenly, as it were, extinguiſh-"ed, or elſe enfeebled to a degree capable only for a ſhort

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" while to reſiſt the violence of the diſeaſe; in the ſub-
" ordinate forms, the vital and animal functions, vari-
" ouſly affected, are carried on in a defective, diſorderly
" manner, and denote more or leſs danger accordingly."
It ſeems probable therefore that in thoſe who are ſuddenly killed, the ſame effects take place in a ſhort time which are obſerved to take place after a longer ſpace in thoſe who die gradually, buboes only excepted, which require for their formation a longer time than is allowed to the patient to live. Internal mortifications, or rather eſchars, are therefore to be ſuſpected, and diſſections have evinced that this was really the caſe; but beſides theſe there was an appearance obſerved in the plague at Marſeilles which is not taken notice of by former phyſicians; viz. a preternatural enlargement of the heart. M. Deidier on that occaſion communicated an account of nine diſſections, but of theſe only one had died without eruptions. This was a woman of 40 years of age, who lived till the third day. In her " the mediaſtinum* was torn
" towards the upper part; the pericardium of a livid co-
" lour; the heart larger than in its natural ſtate, by the
" ſwelling of its ventricles; full of thick, black blood.
" The liver was alſo very large, and of a livid colour, with
" a carbuncular puſtule on the ſide of the gall-bladder,
" which was filled with very black bile." In others who had eruptions, and who of conſequence we muſt ſuppoſe to have lived longer, the enlargement of the heart was ſtill more remarkable. In one who lived eleven days, the heart was of double the bigneſs, having ſcarce any blood in the ventricles, whoſe cavities were filled each with a large polypus, that on the right ſide having dilated the auricle to the breadth of four inches. The liver alſo was larger than ordinary, and the gall-bladder full of a black and green bile. The appearances were much the ſame in all the reſt; but, as the time they

* The Mediaſtinum is a membrane by which the cavity of the breaſt is longitudinally divided. The tearing of it in any diſeaſe ſeems altogether unaccountable, unleſs we ſuppoſe an extraordinary loſs of coheſion to have taken place without any mortification. The pericardium is a membrane ſurrounding the heart, and in a natural ſtate contains ſome water, condenſed from vapour after death.

they ſuſtained the diſeaſe is not mentioned, we cannot determine whether the enlargement of the heart took place at the very firſt, or was only an adventitious ſymptom after the fever had come on. Dr. Ruſſel takes notice that ſuch patients as he attended complained greatly of their heart. "A ſenſe of oppreſſion about the "præcordia (ſays he) which the ſick were at a loſs to "deſcribe, was, in one degree or other, a conſtant at-"tendant on the plague, except in very ſlight caſes of "infection; and where it came on early, or perſiſted in "a high degree, was always a dangerous ſymptom. "The ſick ſhowed how ſeverely they ſuffered by their "perpetually changing their poſture, in hopes of relief; "but, when aſked where their pain lay, they either an-"ſwered haſtily they could not tell, or, with a fixed, wild "look, exclaimed *kulbi! kulbi!* (my heart! my heart!) "This anxiety increaſing as the diſeaſe advanced, ter-"minated at length in mortal inquietude, the patient, "for many hours, in the laſt ſtages, inceſſantly writhing "his body and limbs as if in agony. Though pain at "the heart was often conjoined with the ſymptom juſt "mentioned, and by the ſick ſeemingly blended together, "it appeared to be different, and to exiſt ſeparately. "They often exclaimed as in the other, my heart! my "heart! pointing alſo towards the ſcrobiculum cordis, "but then would add *eujani kulbi*, my heart pains me; "or *naar fi kulbi*, my heart is on fire." This laſt pain the Doctor ſuppoſes might have its ſeat in the upper orifice of the ſtomach; the extreme anxiety may be accounted for from the enlargement of the heart; but as neither of theſe ſymptoms took place in ſuch as died in a very ſhort time, we muſt be apt to conſider this enlargement not as any primary and eſſential ſymptom of the diſeaſe, but as one which takes place when the vital powers are able to oppoſe for ſome conſiderable time the cauſe of the diſeaſe.

In his account of the origin of the plague, Dr. Ruſſel takes notice of the opinion that, at the communication of the infection, the ſick were ſometimes ſenſible of having received it. This has been obſerved by Dr Lind

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in malignant fevers; it has alſo been obſerved in plagues, as we have ſeen from Dr. Hodges, Verdoni, and others; but Ruſſel ſays he never ſaw any inſtance of this. He owns, however, that he has ſeen inſtances of the diſeaſe quickly ſucceeding a panic fear of being infected. "In "caſes (ſays he) where the diſeaſe was not diſcovered to "be the plague, till upon the eruption of buboes after "two or three days, I have known ſeveral perſons who "had, till then, without the leaſt ſuſpicion, frequented "the ſick, ſtruck ſuddenly with a panic, and imagine "themſelves ill. They felt ſhooting pains in their "groins, confuſion in the head, and a loathing. Though "in ſome theſe complaints were merely imaginary, and "ſoon vaniſhed, in others they proved real; the ſymp-"toms increaſing, and being followed by eruptions. In "ſuch caſes I ſuſpected the latent infection to have "been excited by terror."

In the inſtance formerly quoted from Dr. Guthrie at Peterſburg, we have a notable example of this ſudden ſeizure by a ſtroke. His information was derived from the phyſician-general of the Ruſſian army. This gentleman aſſured him, that "he had ſeen men, in appa-"rent good health, inſtantaneouſly drop down, as if ſhot "by a muſket ball, by the ſudden action of the peſtife-"rous miaſma, and upon duty again in 24 hours, per-"fectly recovered by the operation of a ſtrong vomit." Whether or not theſe men *felt* any ſtroke at the inſtant of their falling we are not told: poſſibly it might be only a ſyncope very common in the plague, which took place at the very firſt invaſion. Ruſſel informs us, that "the ſudden loſs of ſtrength, and diſturbance of the "functions attributed to the brain and heart, are rec-"koned, in a particular manner, ſymptoms of the plague. "In their higheſt degree they diſtinguiſh the moſt fatal "forms of the diſeaſe; and, under different modifica-"tions, adhere to all its varieties. . . . The early ap-"pearance of faintneſs was very remarkable in the "plague," &c.

Thus we ſee that the plague attacks without fever in two different modes; one, by attacking and deſtroying the

the ſolid parts of the body, the other, without any diſorganization of the body, attacking the vital principle itſelf, or rather the blood, from which this principle is derived, ſo that a temporary ſuſpenſion of all the functions enſues. The analogy between the cauſe of peſtilence and thoſe viſible ſubſtances called *poiſons*, is very remarkable in ſome things, though in others it totally fails. In the Medical Repoſitory * we have a diſſertation upon this analogy by Dr. Edward Miller. He obſerves, that this analogy has been generally overlooked, chiefly on account of the inviſible nature of the aerial poiſon, and the ſuddenneſs of death from poiſons, more frequently than from peſtilential diſeaſes. This he accounts for from the largeneſs of the doſe of poiſons compared with that of contagion; "but (ſays he) by diminiſhing the "quantity to an appropriate amount, theſe noxious ſub-"ſtances (the poiſons) may be made to exhibit the "courſe, duration, and nearly all the phenomena, of "what is called a malignant fever. But, above all, the "attention of phyſicians has been diverted from this "analogy between miaſmata and poiſons, by the febrile "part of the character which generally belongs to peſti-"lential diſeaſes, and which, in common apprehenſion, "is conſtantly connected with them. Yet theſe diſea-"ſes are by no means univerſally accompanied with what "is ſtrictly called *fever*. There is often a degree of "virulence in the Aſiatic plague, in the yellow fever, "and in all the other forms of peſtilential and malignant "diſeaſes, which altogether tranſcends the proceſs of fe-"ver, and extinguiſhes life in a more ſummary manner. "In the worſt caſes both of poiſon and peſtilence, the fe-"brile part of the ſymptoms excites little attention."

Our author does not ſay in what this virulence conſiſts. In the caſes of thoſe who die with the *tokens* upon them, the cauſe is plainly within the body; the deſtroying power acting with greateſt efficacy below the ſkin in the ſoft ſubſtance of the fleſh. Where the patient is ſuddenly ſeized in the manner deſcribed by Dr. Guthrie, the cauſe ſeems to be ſomething foreign to the body ſuddenly

* Vol. ii, p. 409.

ſuddenly inhaled, the effects being ſimilar to thoſe of fixed air when drawn in by the breath, and of conſequence eaſily expelled by a vigorous action of the powers of the ſyſtem. Guthrie obſerves, that, in ſuch caſes, it ſeems "as if the contagious matter exiſted in a very looſe ſtate in the firſt paſſages at the beginning of the diſeaſe."

In the production of thoſe *tokens* mentioned by Dr. Hodges, we know that there muſt have exiſted in the body a certain cauſe capable of totally deſtroying the parts, and reducing them to an hard eſchar, ſimilar to that produced by fire or by a cauſtic. As we are unacquainted with any thing capable of producing this effect but fire, we can attribute the origin of theſe tokens to nothing elſe but the emiſſion of the latent heat of both the ſolids and fluids which compoſe theſe parts, and their conſequent tranſmutation into an hard, and as it were charred, ſubſtance. That ſuch an emiſſion of latent heat does in ſome caſes take place is evident from the production of a great quantity of ſenſible heat when certain ſubſtances are mixed together. Thus, upon mixing together oil of vitriol, oil of turpentine and ſtrong ſpirit of nitre, the whole mixture will take fire and burn violently, though two of the ingredients, viz. oil of vitriol and ſpirit of nitre, are by themſelves incapable of being inflamed. In like manner if ſtrong ſpirit of nitre be poured upon oil of cloves or ſaſſafras, the mixture will burſt out into a violent flame. Water poured upon quick-lime occaſions great heat, and ſeems in great part to be converted into a ſolid ſubſtance; for only a ſmall part evaporates, and the ſlaked lime falls into a powder to appearance perfectly dry, and from which the moiſture cannot be expelled without a very violent fire. In this caſe Dr. Black is of opinion that the heat comes from the water, which, as we have already ſeen, contains a great quantity of it in a latent ſtate. But, according to his experiments, the emiſſion of 135 degrees of heat is ſufficient to reduce water to a ſtate of ſolidity; and the heat of lime when ſlaking is ſo much ſuperior to this, that ſhips have frequently been

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ſet on fire by it. We muſt therefore either ſay that water in certain circumſtances can part with much more than 135 degrees, or that the lime itſelf emits part of the heat it contains. This laſt indeed ſeems to be the more probable ſuppoſition of the two; for though fluids contain more heat in proportion to their bulk than ſolid bodies, we have no reaſon to ſuppoſe that the latter contain none at all: on the contrary the experiments formerly mentioned, eſpecially thoſe made by Count Rumford, ſhow that they are furniſhed with an almoſt unlimited quantity.

The cauſe of the moſt violent kind of plague then we muſt ſuppoſe to be ſomething received into the body, which in a certain time, probably ſooner or later according to the ſtrength of the contagion, diſpoſes to an irregular emiſſion of its heat, which coming by a kind of exploſions, or, as Dr. Hodges calls them, *blaſts*, produce thoſe eſchars which have been called *tokens*, and ſeem to be no other than partial combuſtions, by which the parts affected are reduced to a ſtate of charcoal, or nearly ſo.

In aſſigning this cauſe for the moſt deadly kind of plague, we muſt naturally aſk the queſtion, how can all this take place without any pain? for of thoſe who died in this manner, many felt neither pain nor uneaſineſs till within a few moments of death. This can only be accounted for by the ſudden and perfect deſtruction of the parts, which did not allow time for any ſenſation of pain to take place; and indeed in the application of cauſtic for an iſſue, the patient often feels but little pain. It is impoſſible to avoid perceiving a very ſtrong connexion between this kind of plague and the dreadful caſes of ſpontaneous combuſtion related p. 182—186. In the caſe of the prieſt indeed the fire ſeems to have come from without, though even this cannot be aſcertained beyond a doubt; but in thoſe who were abſolutely conſumed to aſhes, it ſeems equally probable that it may have ariſen from within; and as none of the unfortunate perſons ſeem to have made any noiſe or ſtruggle, the prieſt alone excepted, it ſeems probable that the firſt attack had deprived them of all ſenſation, and that, not-

withſtanding the terrible ideas with which ſuch extraordinary occurrences muſt have inſpired thoſe who ſaw them, the ſufferers may have died without feeling any pain. The prieſt ſeems to have felt nothing after the firſt ſtroke.

Should this cauſe be admitted (indeed whether it is admitted or not) we ſee that it is in vain to attempt to ſolve the phenomena of peſtilence by the doctrine of ſtimuli, excitement or debility. There is no degree of ſtimulus, fire exepted, which can convert part of the body into an hard eſchar, neither can it be done by any degree of debility or exhauſtion. Beſides, the irregular manner in which theſe eſchars are ſcattered up and down, ſhows that the cauſe has not acted from a regular diffuſion all over the body, but in a number of inſulated ſpots, between which the connexion can by no means be traced. In all peſtilential eruptions indeed the action of fire ſeems to be very perceptible. Gotwald mentions his having obſerved in two patients what he calls *papulæ ardentes* "burning pimples," which Dr. Ruſſel ſuppoſes to be a modification of carbuncular puſtules. Gotwald calls them alſo *fire-bladders*, and ſays that they were as broad as a ſhilling, of an irregular ſhape, and the ſkin ſeemed as if *ſhrivelled with fire*. The carbuncle itſelf approaches much to the nature of the eſchar, and is attended with violent heat in the adjacent parts. Gotwald, who gives an account of the plague at Dantzic, diſtinguiſhes the carbuncle into four kinds, (to be afterwards deſcribed.) Of theſe he ſays in general, that they all *burn* very violently at firſt, &c.

From all theſe accounts it ſeems plain, that in the plague there are partial diſcharges of heat, from *ſome* cauſe, upon various parts of the body; and that, in many inſtances, this heat deſtroys the texture of the parts entirely. When this is done inſtantaneoſly the patient feels no pain, but if more gradually, the pain is exceſſive, as in the caſe of buboes and carbuncles; which the Journaliſt of the plague year in London informs us were attended with ſuch horrid pain as to make the patients cry out in a lamentable manner. This extraordinary

nary heat muſt either come from without or within, and we have all the reaſon in the world to believe that it comes from within. Mr. Hunter, in his Treatiſe on the Blood, informs us that in a local inflammation there is always an increaſe of heat in the inflamed part. Should this heat ariſe, as it probably does, from an emiſſion of part of the latent heat, we may conclude, that ſuch a quantity might be emitted, as entirely to change the texture of the parts. Thus mortifications or deſtructions of thoſe parts may enſue, of all kinds, from the mild *pus* to the peſtilential eſchar.

In the effects of peſtilential contagion we obſerve, if not a *ſuperiority*, at leaſt a *different mode of action* from what takes place in poiſons. All theſe ſeem to act by diſſolving the blood, or infecting it in ſuch a manner that it ſupplies no ſufficient quantity of animal ſpirits; of conſequence, the creature ſoon faints and dies. In the plague, the blood does not appear to be much affected, nevertheleſs it emits, in various places, certain exploſions which convert the parts into an eſchar. Poiſons always ſeem to produce the petechiæ or purple ſpots which ſometimes appear in the plague. In Dr. Miller's Treatiſe, already quoted, we find, among the ſymptoms occaſioned by arſenic, "red or dark ſpots appearing on the "ſkin, and rapid putrefaction, which renders ſpeedy in-"terment neceſſary." Herein it differs from the plague, for the bodies of ſuch as die of that diſtemper are not more liable to ſpeedy putrefaction than others. Of the vegetable poiſons he alſo obſerves, that, "after death, "ſometimes before, livid ſpots are obſerved on the body, "the appearance of the blood is dark and diſſolved, and "putrefaction ſpeedily takes place." Of animal poiſons—"The bite of the poiſonous ſerpents is generally "followed by tumour, and livid colour of the part bit-"ten, extravaſation of dark coloured blood into the ad-"jacent cellular membrane, nauſea and vomiting, ſud-"den proſtration of ſtrength, paralyſis of the limbs, con-"vulſions, yellowneſs of the ſkin, hæmorrhages, &c. "Livid appearances of the body, a dark coloured and "diſſolved ſtate of the blood, and a rapid putrefaction, "are obſerved after death." From

From all theſe accounts, however, it is plain, that, whatever may be the analogy between the action of poiſons and malignant fevers, they do not in any manner operate like the contagion of the true peſtilence. Of this the conſtant effect is to produce buboes, carbuncles, and other eruptions, reſembling much more the effects of fire than any thing elſe; or, if the patient is cut off without the appearance of theſe, ſimilar effects are obſerved on the internal and vital parts. Dr. Miller's concluſion ſeems therefore liable to exception; in which he ſays, "that only the lighter caſes of peſtilence are unlike "the effects of poiſon, but that, in proportion to the de-"gree of malignity, the reſemblance grows ſtronger." It doth not appear that any poiſon hath produced one of the characteriſtic ſymptoms of the true plague, or any thing but what is common to animals dying of various diſeaſes, the red ſpots on the ſkin only excepted.

In the eighth volume of the Philoſophical Tranſactions abridged by Martyn, we have an account of a number of experiments by M. Deidier and others, made upon dogs into whoſe veins he injected, or poured into wounds made in the miſerable animals, the bile of people dead of the plague at Marſeilles. "The conſequence was, "that they became melancholy, drowſy, and without "caring to eat. All of them died in three or four days, "with the eſſential marks of the true plague, declared "by buboes, carbuncles, and gangrenous inflammations "in the viſcera, in the ſame manner as in the human "carcaſes from whence the bile was taken."

The poiſonous bile affected the creatures differently according to the vicinity of the place of injection to the heart. In the jugular vein it killed them in twenty-four hours, injected in the quantity of a drachm to two ounces of water. In this ſhort time were brought on gangrenous inflammations, the heart was ſtuffed with *thick and black* blood, the liver was ſwelled, and the gall-bladder full of green bile. This ſhows a very eſſential difference between the action of the peſtilential poiſon and that of others; the former, in ſome parts of the body at leaſt, coagulates the blood; the latter, in all parts, diſſolves it.

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In the crural vein (the vein of the leg) the effects were leſs violent. In about an hour they became heavy. In the former caſe they inſtantly became drowſy. In the ſecond experiment they contracted ſuch a loathing for food, that they would neither eat nor drink any thing after the injection was made. On the third day there appeared conſiderable tumours under the *axilla* (the fore leg I ſuppoſe) and on their thighs, about three inches from the wound. The wound itſelf turned to a gangrene, and the creatures died uſually on the fourth day.

In another experiment the animal had convulſive motions all over immediately after the injection, followed by a lethargy. Next day a carbuncle appeared on the great pectoral muſcle on the right ſide. On the third, a bubo appeared on the thigh, and the ſame day the dog died. From the time of the injection he had neither eat nor drank. On diſſection the fore part of the breaſt under the teguments was found entirely gangrened, the inward parts and viſcera full of black clotted blood, the outward ſurface of the lungs was all purple, the heart was ſwelled as big again as uſual, and the four cavities were full of black clotted blood. The bile of this dog, injected into the crural vein of another, produced ſimilar ſymptoms, only the latter eat a little boiled meat, which he vomited up again in two hours. He died the third day, with the ſame ſymptoms of the plague as the others.

The bile of people who died of ordinary malignant fevers was muh leſs powerful. A quantity (not mentioned how much, but probably a drachm) mixed with four ounces of warm water, was partly injected into the jugular vein of a dog, and a compreſs ſoaked in the reſt of the liquor applied to the wound. He appeared heavy and ſleepy, and would neither eat nor drink till the third day, when he did both willingly. On the fourth day the compreſs fell off, the wound was found to be diminiſhed one half, and healed by degrees, the dog recovering perfectly. In another experiment with the bile of a patient who had died of a malignant fever, the dog not only

only had about a drachm of it put into a wound in his thigh, but was made to ſwallow ſome of it; notwithſtanding which he was not ſeized with any diſtemper, and the wound healed in fifteen days. This bile was as black as ink, in great quantity, and very thick. In the other ſubjects it was of a deep green. In another experiment, with the ſame bile applied on a compreſs, the dog likewiſe eſcaped without any apparent diſorder; but in a third, the animal died in twenty-three hours, though at firſt he had ſhown no ſign of being affected, only that he ſeemed to be thirſty, and drank with greedineſs. On opening him his heart was found ſtill to beat with violence, and, after the beating ceaſed, no blood was to be found in it, either in the auricles or ventricles. "This liquor, crowded together in the great "veſſels, appeared of a lively red, and very fluid, with-"out any of thoſe concretions that we conſtantly ob-"ſerved in thoſe who died of the plague. Here ap-"peared neither external nor internal marks of the "plague." The bile of a perſon who had died of an eryſipelas, injected into the crural vein of a dog, produced no bad effect. A dog was killed by half a drachm of Hungarian or blue vitriol injected into the jugular vein. He died in univerſal convulſions: the heart was full of grumous blood, reduced to a kind of thick pap, but without any clots. The bile, applied to two wounds in another dog, produced no bad effect.

From other experiments it appeared that even the peſtilential poiſon itſelf, taken into the ſtomach of dogs, did not produce any deleterious effects. "A dog of "the Hoſpital of the *Mail* in Marſeilles, who followed "the ſurgeons when they went to dreſs the ſick, uſed "greedily to ſwallow the corrupted glands, and the "dreſſings charged with pus which they uſed to take off "the plague ſores: he licked up the blood that he found "ſpilt on the ground in the infirmary; and this he did "for three months, being always gay, briſk, well, full "of play, and familiar with all comers." The health and briſkneſs of this unfortunate dog proved his ruin, by making him the ſubject of philoſophical experiment.

A drachm

A drachm of the peſtiferous bile injected into the crural vein, killed him in four days. He had a conſiderable hæmorrhage from the wound the night before he died, and he had alſo a diſagreeable ſmell both while living and after he was dead. Two other dogs, which had ſwallowed a quantity of peſtiferous bile, became heavy and melancholy, refuſed their food, and ſhowed other ſigns of diſorder; but all theſe went off in a ſhort time, and no ſigns of the diſtemper appeared.

Theſe experiments induced M. Deidier to ſuppoſe that the contagion of the plague lay only in the bile; but the following experiment ſhows that the blood was equally infected, and capable of communicating the diſeaſe, and that of the moſt malignant ſpecies. It was made by M. Couzier, phyſician to the infirmary at Alais, and in the Philoſophical Tranſactions we have the following account: "I took a quantity of blood from "a perſon dead of the plague, and mixed it with warm "water, which mixture I attempted to inject into the "crural vein of a dog, but the end of the ſyringe being "too large to enter the vein, the experiment did not ſuc-"ceed. This made me reſolve to try to lay ſome of the "ſame infected blood upon the wound. This I accord-"ingly did, and covered it with a dreſſing, which the "dog got off in the night. I found the next morning "that the dog had licked the wound, and that he refuſ-"ed his food. Towards night he began to bemoan "himſelf, and gave ſigns of an approaching death. The "next morning I found him dead, the wound being con-"ſiderably ſwelled and gangrened, and the edges round "the ſwelling were likewiſe gangrened.

"Upon opening the body, we found the liver ſome-"thing larger than uſual, with ſpots of a livid purple, as "in the bodies of perſons dead of the plague. In the "ſtomach was found a quantity of black coagulated "blood, of the ſize of a hen's egg. This in all likeli-"hood was what he had ſwallowed upon licking the "wound. The heart was very large, with a black gru-"mous blood in the ventricles, and the auricles were "turned blackiſh and gangrenous."

This

This laſt experiment naturally brings to remembrance thoſe of Dr. Home at Edinburgh, in which he inoculated the meaſles by means of the blood of patients ill of that diſorder. From the accounts he has given in his treatiſe entitled Medical Facts and Obſervations, we can have little doubt that *his* experiments ſucceeded, however others may have failed. One thing, however, is very obvious, viz. that if we mean to communicate a diſeaſe by means of the blood, we muſt uſe a much greater quantity than if we make the experiment with the matter of an abſceſs. The caſe of contagious diſeaſes ſeems to be the ſame as in fermenting liquors. With a ſmall quantity of yeaſt we can eaſily induce fermentation in any proper liquor, but, if we ſkim off the yeaſt, and uſe only the pure fermenting liquor, we muſt uſe a much greater quantity; and to inattention to this circumſtance we may with probability aſcribe the difficulty which Dr. Home himſelf met with in introducing the diſeaſe, and the total want of ſucceſs in others. In M. Couzier's experiment a conſiderable quantity muſt have been uſed, as he ſays that in the dog's ſtomach it equalled the ſize of an hen's egg. A much ſmaller quantity of matter taken from a peſtilential abſceſs is capable of producing the diſeaſe in a human body, as is evident from the caſe formerly quoted of that gentleman who inoculated himſelf for the plague, and of which Dr. Guthrie gives the following account: "This was Mathias Degio, one of the "ſurgeons of the hoſpital at Buchareſt, a building appro-"priated to the cure of the plague in the Ruſſian army. "He, perceiving the gentlemen of his profeſſion *condemned* "*in a manner to death, if punctual in the diſcharge of their duty** "had the reſolution to inoculate himſelf for the plague, in "the full confidence of its efficacy, and ever afterwards "found himſelf invulnerable, whilſt his companions "around him were falling victims to its fury. He pro-"duced the diſeaſe by inſerting, with the point of a "lancet, under the epidermis of his arm, matter from a "peſtiferous abſceſs, and followed the cold regimen ob-"ſerved

* This, among innumerable other inſtances that might be brought, is a proof of the infectious nature of the plague.

" ſerved in the ſmall-pox, as he had imitated its mode " of inoculation. On the fourth day of the puncture " the fever declared itſelf, and he, being perfectly devoid " of fear, got through the diſeaſe without feeling more " inconvenience than if it had been that which he imi- " tated. He drank freely of cold water, with vinegar, " or a little wine, and kept generally out of doors. This " beverage was the only thing that had the appearance " of medicine," &c.

From a careful attention to all theſe hiſtories, it is plain that the plague is naturally an eruptive diſeaſe, as, in all the animals in which it was artificially brought on, eruptions took place, provided the life of the creature was ſufficiently prolonged to allow them to come out. Dr. Ruſſel ſays, that, from his diary, he noted down the caſes of *two thouſand ſeven hundred* patients, *all* of whom had eruptions of one kind or other. In this it agrees with the ſmall-pox, which Dr. Mead juſtly conſiders as an inferior kind of plague. In the latter, however, the eruptions ſeem to reſemble thoſe called by Dr. Hodges the *tokens*, only that the cauſe which produces them is leſs violent in its nature; but why the eruptions of the ſmall-pox ſhould be in diſtinct puſtules, and not one continued boil all over the body, is undoubtedly inexplicable on any theory whatever. The ſame is true of the plague. No man can explain why the tokens, for inſtance, inſtead of being collected into one great eſchar, are diſperſed into ſmall diſtinct pieces; or why, inſtead of buboes in the groin and armpit, or inſtead of carbuncles in different parts of the body, there ſhould not be a ſingle one equivalent in bulk and power to them all. This appears ſimilar to the phenomena of rain, hail or ſnow, which fall in diſtinct drops, fluid or congealed, or in flakes, inſtead of being equally diffuſed all over the ſpot on which they fall. In the latter caſe we ſay that the phenomenon is occaſioned by *electricity*: we may ſay the ſame, if we pleaſe, of the ſmall-pox and plague, with equal emolument.

From the accounts we have juſt now quoted, it appears that there is between malignant fevers and the

true peſtilence a very eſſential difference; the latter tending to thicken the blood, the former to make it thinner. In this reſpect therefore the poiſons ſeem to reſemble malignant fevers very conſiderably; for M. Fontana obſerved that by mixing animal poiſons with blood drawn from a vein, it was prevented from coagulating. In the inſtance above related where a dog died in conſequence of bile injected into his veins from one who died of a malignant fever, the blood was found extremely fluid. In ſome who died of the hoſpital fever, Sir John Pringle informs us, that ſuppurations had taken place in the brain; but in the true plague the tendency to mortification always prevailed above every thing.

Laſtly, that the plague proceeds from too great a quantity of heat, either emitted from the body itſelf, or ſome how introduced into it, ſeems to be pretty plain from the effect it has of augmenting the venereal appetite to an almoſt inconceivable degree. This was taken notice of in the plague of Marſeilles, and indeed in many others. Ruſſel quotes two remarkable paſſages to this purpoſe; one in a plague at Genoa, the other in Meſſina. "Amidſt ſo many dreadful fears and terrors, amid ſo many "fetid and putrefying bodies, amid the ſhrieks, the ſighs "and the groans of the ſick, what would you have "expected? That the people, ſtruck with dread and "horror, remained ſad, modeſt and quiet. You are "miſtaken. They ſung, played on inſtruments, danced, "intrigued, and Genoa never was ſeen ſo ſhameleſs, "debauched, and diſorderly. I have ſaid before, that "God in this plague gathered in a harveſt for heaven; "but it ſeemed to be alſo a vintage for the laſcivious of "of the earth. If not ſo, how came ſo many marriages "to be celebrated in the Lazaretto of Conſolation, and "that ſo many women, without ſhedding a tear for the "death of their huſbands, immediately entered into new "engagements? One day, in particular, five marriages "were performed, four of the bridegrooms being buriers "of the dead, and dreſſing themſelves and their brides "in clothes ſtripped off from the bodies of the deceaſed." On the plague of Meſſina he quotes the following extract

of

of a letter written by a gentleman who reſided in that city during the plague in 1743. "It has always been "obſerved, that, after *every* plague, thoſe who recover "are addicted in an extraordinary degree to lewdneſs "and incontinence, which was ſurpriſingly viſible at "Meſſina, and carried to ſuch a degree of frenzy and "beſtiality, that many were known to violate the bodies "of dead virgins!"

That an extraordinary propenſity to venery may be produced by introducing into the body a quantity of heat, admits now of a kind of demonſtration from a fact mentioned by M. le Roy concerning phoſphorus.* This ſubſtance is exceedingly apt to take fire on the application of a ſmall degree of heat, and even by ſlight friction. It is now introduced into the materia medica, and is found to be a very powerful medicine, though dangerous on account of its inflammability, the heat and air contained in the human ſtomach being ſometimes ſufficient to ſet it on fire. The taking ſuch a ſubſtance into the body therefore ſeems not much different from taking actual fire into it; and indeed M. le Roy mentions the caſe of a woman who had taken only a ſingle grain, and who he ſays had been recovered, *by it*, from a putrid fever, but died ſuddenly from ſome imprudence. In this woman the whole ſubſtance of the body was found luminous upon diſſection, and the hands of the operator continued luminous even after being waſhed. M. le Roy, having taken three grains of this fiery ſubſtance, found himſelf extremely incommoded by it for ſome hours, and was obliged to drink great quantities of very cold water. Next day he found his muſcular powers amazingly increaſed, and had an *almoſt inſupportable venereal irritation*. This we ſee was the conſequence of throwing into the body a quantity of heat from without; but if the body itſelf emits that heat which it inviſibly contains, the effects muſt be the ſame as though an extraneous quantity had been thrown into it. Neither are we to imagine that the *quantity* of heat contained in our bodies is ſmall or inconſiderable; for we have already ſeen

* Memoires de Societe Medicale, &c.

ſeen that heat conſiſts in the efflux from any ſubſtance, of an inviſible and moſt ſubtile fluid, in all directions. When this flux is gentle, the heat is moderate, but in proportion to the activity of the diſcharge, the temperature becomes hotter and hotter, and if very violent, the coheſion of the parts is diſſolved entirely, and the ſubſtance is ſaid to be on fire. There is required therefore only ſome cauſe to begin the emiſſion of this fluid; for as ſoon as this begins, the immenſe quantity with which we are ſurrounded, will ſupply more in abundance,* and continue ſo to do, as long as the original cauſe ſubſiſts, or until the ſubſtance can no longer bear the power which operates upon it.

From this view of the cauſes of the plague, and from the facts which have been laid down concerning it, we cannot help perceiving a very ſtrong ſimilarity between the plagues mentioned in the Old Teſtament and thoſe which ſtill exiſt in the world. In one of the paſſages formerly quoted it is called an *inflammation*, an *extreme burning*; and from the teſtimonies of different authors above quoted, it is plain that the diſeaſe ſtill deſerves the name beſtowed upon it in the ſacred writings. From the account given of its proximate cauſe, it is plain that plagues of all degrees of intenſity may take place, from abſolute accenſion of the body, and its reduction to aſhes, to the mildeſt ſtate of the diſeaſe, in which the patient is not confined to his bed; and all this from the ſingle principle of emiſſion of heat from the body itſelf. It likewiſe appears that there may be either in the body itſelf, or in the element which ſurrounds it, ſuch a conſtitution as will diſpoſe that element which is the natural and immediate preſerver of our life, ſuddenly to attack and deſtroy it, of which the caſe of the Italian prieſt is a moſt remarkable inſtance. In other caſes, ſuch as the

* If we conſider the compoſition of the atmoſphere which ſurrounds us, we muſt acknowledge that by far the greater part of it conſiſts of fire and electric fluid, the latter being properly the element in a comparatively quieſcent ſtate. In deflagrating dephlogiſticated and inflammable air, the mixture has ſometimes ſhrunk up into a three hundredth part of its bulk; which ſhows that of theſe airs two hundred and ninety-nine parts are fire, the ſingle remaining part only being earth, water, or ſome ſolid matter which we call the *baſis* of air.

the Italian lady, and the woman at Coventry, the body itſelf ſeems to have given out its heat, though this could not be done without a concurrence of the ſurrounding ethereal fluid. In a ſtage ſtill lower, the body is partially conſumed, or rather partly charred into a kind of cinder, as where the *tokens* are produced; and when the cauſe acts with ſtill leſs violence, a fever is produced. In the Old Teſtament we find theſe different kinds of plagues very diſtinctly mentioned. In ſome caſes the offenders died by actual fire, which either ſtruck them from without, or was kindled within their bodies. In others, they ſeem to have died by that very deadly kind of plague of which we have already ſaid ſo much, which kills in a few hours. This was probably the plague which deſtroyed the army of Sennacherib, and this in the tenth chapter of Iſaiah is by ſome thought to have been propheſied of under the title of a *burning like the burning of a fire.*

Of theſe things I the rather take notice, as I perceive, in a late oration, not only the doctrine of the plague being propagated by contagion ſeverely ridiculed, but the ſcripture itſelf treated in a moſt indecent and ſcandalous manner. "In the earlieſt ages of the world (ſays he) "when ignorance and ſuperſtition led men to attribute "all extraordinary phenomena to the direct agency of "ſupernatural beings, peſtilence was ſuppoſed to be "immediately imported from heaven. This is the opi-"nion which appears to have prevailed among the an-"cient Hebrews, and may be ranked at the head of the "catalogue of abſurdities on this ſubject. The domi-"nion of prejudice over the minds of that ignorant and "obſtinate people appears in this inſtance particularly "ſtriking. Such was the depth of their blind bigotry "in favour of the healthfulneſs of the globe they inha-"bited, that they would ſeem to have conſidered it as "even ſuperior to that of the celeſtial regions. Hence, "unwilling to believe that their favourite earth could "give origin to an evil ſo dreadful as the peſtilence, they "imported the ſeeds of this calamity from the more un-"healthful climate of heaven! !"

In

In this extraordinary paragraph we find the matter ſo much miſrepreſented, that every veſtige of truth is ſwallowed up in it. The Hebrews believed that they were under the immediate inſpection and government of the Deity; a doctrine which, however our author may *diſbelieve*, he cannot *diſprove*. But, notwithſtanding this immediate inſpection and government, the Deity never did bring upon them any plague but by the intervention of natural cauſes. The agents which he had originally created were ſufficiently able to execute his purpoſes. The Creator never employed any power but what already exiſted in the world, and the power that he generally did employ was *fire*. This agent he directed to exert its force in ſuch degrees as he pleaſed, and againſt whom he pleaſed. It is a miſtake to think that miracles were *immediately* the effects of ſupernatural power. They were all accompliſhed by the very powers which exiſt in the world at this moment, only theſe powers were by the Creator at particular times directed to act in a manner that they would not have done had they been left to the mechaniſm of their own nature. When we read therefore of people being conſumed by fire from the Lord, there was neither importation of fire from heaven nor any where elſe; the element exerted its power on theſe particular perſons, either by lightning proceeding from the cloud which repreſented the Deity, or their bodies threw out the latent heat which they contained, and conſumed of themſelves. That in caſes of this kind there was no *importation* ſuppoſed, is evident from an expreſſion uſed about bringing water from the rock. It is not ſaid that the water fell from the ſtars, or came down with the tail of a comet, but that the rock gave out the water which it previouſly contained. At the preſent day the ſame powers exiſt, and ſometimes produce the ſame effects that they did in former times, with this difference, that now, having no intelligent agent to interfere with their natural mode of action, they exert their force indiſcriminately, and as the mechaniſm of their nature happens to be ſtimulated, they deſtroy every thing promiſcouſly before them. In all this I cannot perceive the

the ſmalleſt abſurdity, or any thing but what a reaſonable man *may* indeed *muſt* believe, if he makes uſe of his reaſon. As to the cauſes which Dr. Caldwell ſo much inſiſts upon, viz. filth and corruption, it is extremely probable that (while the Iſraelites were in the wilderneſs) theſe had no exiſtence. By their law they were enjoined ſuch frequent ablutions, that their bodies muſt always have been perfectly clean. Human excrements were not allowed to lie above ground. The offals and dung of their ſacrifices were carried to a diſtance, and they were expreſsly told, that they muſt not allow of any uncleanneſs in their camp, leſt God ſhould turn away from them and abhor them. Add to all this the great heat and dryneſs of the deſert in which they wandered, which would quickly parch up and carry off the moiſture from any dead carcaſes or putrefying matters that might be allowed to remain notwithſtanding the injuctions to the contrary. Indeed if we conſider the dryneſs of the climate where theſe people were, and that they were conſtantly attended by a large ſtream of water, it is difficult to conceive any ſituation upon earth more healthy than that of the Jews in the wilderneſs. If plagues therefore came upon them, it is difficult to ſay how they could have happened according to the ordinary courſe of nature; and, if not according to this, it muſt have been by an alteration of it, or by miracle.

The plague, as has already mentioned, in its very ſevere ſtate appears moſt commonly in the beginning of an epidemic ſeaſon, and is neither very common nor very infectious. The moſt common mode in which it invades the patient is with the ſymptoms of a malignant fever; and of caſes of this kind Dr. Ruſſel has made up his five claſſes of patients, the firſt or deadly kind having been already deſcribed. In his ſecond claſs, the next in malignity to the fatal kind, the diſeaſe made its attack with a ſlight ſhivering, ſucceeded by fever with giddineſs, vomiting, head-ach, and ſometimes looſeneſs. In the night the fever increaſed, the thirſt was exceſſive, and the patient, haraſſed by the vomiting, &c. paſſed a very unquiet night, frequently with delirium or coma.

Towards

Towards morning the fever abated, the ſick recovered their ſenſes if delirium had taken place, but if coma, it continued through the day, and the remiſſions were leſs. Throughout the firſt day, and part of the ſecond, the pulſe was full and ſtrong, but on the ſecond it began to alter, and ſome of the characteriſtic ſigns of the diſeaſe to appear. The principal of theſe was a certain muddineſs in the eyes, which ſometimes took place even on the firſt day. This is by our author accounted a ſymptom very difficult to be deſcribed, and, though he recounts the deſcriptions given by ſeveral authors, none are found adequate to the real appearance. "It reſembled (ſays he) "ſomewhat the dull, fixed eye obſervable in the laſt ſtage "of malignant fevers; but the dullneſs was different, "muddineſs and luſtre being ſtrangely blended together. "It continued with little alteration in the remiſſions, "and even where the patient appeared ſenſible and "compoſed it did not increaſe in the febrile exacerba-"tions, but the eyes acquired a redneſs that added "wildneſs to the look, which abating or going off in "the remiſſions, the muddineſs remained behind. It "was this which contributed chiefly in compoſing that "confuſion of countenance which I ſhall not attempt "to deſcribe, but which enabled me to pronounce with "tolerable certainty whether the diſeaſe was or was not "the plague, though not independently of other ſymp-"toms. When this muddineſs diſappeared or abated, "it was conſtantly a favourable ſign. After a critical "ſign it often diſappeared ſuddenly, but where there "was a ſucceſſion of ſweats, or where no viſible criſis "happened, its diſappearance was ſlow and gradual."

Along with this muddineſs the patient had a peculiar confuſion of countenance; the pulſe quick and equal, or low and flattering, but rarely intermittent; the external heat moderately feveriſh, at other times intenſe, with irregular fluſhings, with pain at the heart, or oppreſſions about the præcordia; burning pain at the pit of the ſtomach, and inceſſant inquietude. When to theſe ſymptoms were added a faltering in the tongue, loſs of ſpeech, while the ſurface of the body became cold

cold and damp with clammy ſweat, death was inevitable. In the evening of the ſecond day all the ſymptoms became worſe, and in the morning the patient appeared to lie quiet more from his ſtrength being exhauſted than from any change to the better. When the vomiting had ceaſed, however, there was frequently ſuch a remiſſion on the third day as gave the attendants great hopes of a favourable event; but theſe hopes were always fallacious and of ſhort duration. Sometimes where vomiting, looſeneſs or hæmorrhage had preceded, the patient died on the third day: at any rate, none of this claſs recovered, whether the diſeaſe was left to itſelf, or treated with medicine. The appearance of buboes was of no conſequence, for they never came to maturity, and the little advances they made neither accelerated nor retarded the termination of the diſeaſe, which happened ſometimes on the third, but more frequently on the fifth or ſixth day.

The third claſs of patients were equally unfortunate with the other two. "The difference between the "ſecond and third conſiſted in the abſence of vomiting "at the beginning, the later acceſſion of coma and other "bad ſymptoms, and a ſlight tendency to perſpiration, "which very rarely occurred in the ſecond. . . . From "the ſecond or third night the courſe of ſymptoms in "both claſſes varied very little, and the termination of "the diſeaſe was in both the ſame: it may be added "they reigned together through all the periods of the "peſtilential ſeaſon, but were moſt prevalent in its aug"ment; for at its height, and in its decline, they gave "place to varieties of the diſeaſe leſs deſtructive."

The fourth claſs was the moſt numerous of all. Its diſtinctive marks were, "the continuance of the inflam"matory or febrile ſymptoms with leſs interruption than "in the other, a pulſe more conſtantly ſuſtained, or ſoon "recovering itſelf when hurried in the exacerbations; "the length and vigour of the exacerbations decreaſing "in the advance of the diſeaſe; and, above all, the "prevalent tendency to a favourable diſcharge by the "ſkin, with the critical ſweats on the 3d, 5th, or ſub-

" ſequent days. . . . Vomiting was a concomitant in
" about one fourth of the ſick. The fever, for the
" moſt part, was very moderate the firſt night, very
" rarely accompanied with delirium, and almoſt never
" with the comatous diſpoſition. . . . The buboes and
" carbuncles commonly made their appearance the firſt
" day; but it was not unuſual to ſee a ſucceſſive erup-
" tion of theſe in the courſe of the diſeaſe. . . . The
" morning ſweat, on the third day, in ſome caſes proved
" completely critical, but more commonly produced
" only a remiſſion ſo favourable as to encourage the ex-
" pectation of a more favourable criſis on the fifth; but,
" where the patient neither ſweat on the third, nor a
" ſenſible remiſſion took place on that day, ſome degree
" of danger was always to be apprehended. . . . After
" the ſweat on the fifth, the ſubſequent exacerbations
" proved ſlighter and ſlighter, and the buboes for the
" moſt part advancing favourably, little or no fever was
" left remaining after the beginning of the ſecond week,
" except perhaps ſymptomatic heats occaſioned by the
" eruptions." In this claſs the patients ſometimes ap-
peared only to have a ſlight attack, and yet at laſt were ſeized with mortal ſymptoms, while others who ſeemed to be much worſe at firſt yet happily recovered and did well. In general the ſevere peſtilential ſymptoms did not come on till a conſiderable time after the attack.

To the fifth claſs our author refers all caſes of ſlight infection, wherein the more formidable ſymptoms of peſtilence never concurred, and *all* the infected recovered. " The acceſs here was often attended with ſo little ap-
" parent diſorder, that the eruptions gave the firſt alarm;
" and the fever which came on afterwards was frequently
" ſo ſlight as not to confine the ſick to the houſe. Others
" found themſelves indiſpoſed for two or three days,
" but were not ſenſible of any febrile heat whatever.
" But in this claſs the diſeaſe did not always invade
" thus inſenſibly. The febrile ſymptoms, eſpecially the
" firſt three days, ſometimes run pretty high; and the
" fever afterward, in nocturnal exacerbations particularly,
" run out to the end of the week or longer: but, as
" there

" there was no concurrence of alarming ſymptoms, and " the exacerbations, terminating for the moſt part in " ſweats, gradually diminiſhed in force after the third or " fourth night, it was not difficult in the worſt caſes to " foretel the event at that period, nor neceſſary in others " to defer the deciſion ſo long."

" *All* the infected had buboes or carbuncles, and very " often both eruptions concurred in the ſame ſubject. " Perſons not confined by indiſpoſition were often, by " the inguinal buboes, prevented from walking abroad. " The carbuncles conſtantly formed the *black cruſt*,* and " then ſuppurated; the buboes in one third of the ſick " diſperſed. The diſperſion of the buboes was never " obſerved to be attended with bad conſequences, not- " withſtanding the general neglect of purging in the " decline of the diſeaſe: indeed very few had recourſe " to remedies, topical applications excepted, unleſs per- " haps a bleeding at the beginning, where the febrile " ſymptoms ran high. This claſs was *nearly as numerous* " as the fourth, but began to predominate rather later, " and reigned moſt of all in the decline of the plague " in 1762."

The ſixth claſs muſt be omitted, as containing dubious, anomalous and extraordinary caſes. We ſhall therefore proceed to conſider the accounts of the plague given by other phyſicians, which, without queſtioning the accuracy of Dr. Patrick Ruſſel in relating what *he* has ſeen, may ſerve to throw ſome light on the ſubject, by relating what *others* have ſeen. Dr. Alexander Ruſſel, in his Natural Hiſtory of Aleppo, gives the following deſcription of it. " The diſtemper in itſelf is the " moſt lamentable to which mankind are liable. The " torments of heat, thirſt and pain frequently unite in " ſome patients; an unſpeakable dejection and languor " in others; and even thoſe who eſcape with life do " not ceaſe to ſuffer from painful and putrid ulcers, the " painful remains of the diſeaſe. The deſertion of rela- " tions, of friends, and of domeſtic ſervants, the want " often

* This is in favour of what has already been obſerved, that the peſtilential eruptions in *all* caſes ſhowed a tendency to mortification.

" often of the common neceſſaries of life, and the diffi-
" culty of procuring medical aſſiſtance, are circumſtances
" likewiſe which aggravate the miſeries of the ſick, and
" contribute greatly to augment the general horror.

" But, as no diſeaſe incident to mankind is in its na-
" ture more terrible and deſtructive, ſo none is more dif-
" ficult to obſerve. Its ſymptoms are ſcarcely in all re-
" ſpects alike in any two perſons, and even vary extreme-
" ly in the courſe of an hour in the ſame ſubject. The
" diſeaſe, attended in the beginning with ſymptoms not
" highly alarming, often ends fatally in a few hours ;
" while the moſt formidable attacks, by a ſudden and
" unexpected alteration, ſometimes terminate happily.

" The firſt complaints of thoſe ſeized with this diſtem-
" per, were, in general, a coldneſs or ſhivering ; ſickneſs ;
" a vomiting of large quantities of porraceous bile, which
" often had a very offenſive ſmell ; anxiety, or an inex-
" preſſible uneaſineſs about the pit of the ſtomach ; pain
" in the back or loins ; an intenſe head-ach ; uncom-
" mon giddineſs, and a ſudden loſs of ſtrength. Some
" were ſenſible of a ſharp ſhooting pain darting at inter-
" vals into the parotid, axillary or inguinal glands. To
" theſe ſymptoms ſucceeded a violent fever ; in which,
" while the ſick complained of extreme inward heat,
" their ſkin, externally to the touch felt little hotter
" than uſual. Sometimes this heat became general and
" intenſe ; at other times particular parts only were af-
" fected ; but it ſeldom continued long in the ſame de-
" gree, having ſeveral unequal remiſſions and exacerba-
" tions in a day. In theſe exacerbations the face became
" florid, but would often from a deep ſcarlet change to
" a livid colour, like that of a perſon almoſt ſtrangled,
" and, again ſuddenly changing, it would aſſume a ca-
" daverous paleneſs. The eyes, ſoon loſing their natural
" luſtre, acquired a kind of muddineſs ; and the coun-
" tenance of moſt of the ſick was ghaſtly and confuſed
" beyond deſcription. The pulſe at the beginning was
" ſomewhat quicker and lower, but in other reſpects va-
" ried little from the natural ſtate. Within a few hours
" it commonly increaſed in quickneſs and ſtrength, but

" ſeldom

" ſeldom remained the ſame for an hour, nay ſcarcely " many minutes together; inceſſantly varying, both as " to ſtrength and quickneſs, and without any manifeſt " correſpondence with the other febrile ſymptoms.

" In ſuch as complained of pains darting either into " the parotids, the arm-pits, or the groins, a ſmall hard, " deep-ſeated tumour, with external diſcoloration of " the ſkin, was diſcovered by the touch in the part, and " theſe were the incipient peſtilential buboes.

" The appearances now deſcribed were thoſe of the " diſtemper on the firſt day, till evening, when the ſick " always ſuffered a ſevere exacerbation, in which the " heat both internal and external became exceſſive; " and, as they generally were by that time delirious, it " was often with difficulty that they would be kept " within doors; they were greatly diſpoſed to talk, but " faltered ſo in their ſpeech, that what they ſaid was " hardly intelligible, the tongue having ſhared with the " other organs in the general debility. The exacerba- " tion laſted the moſt part of the night; but the heat, " delirium, and inquietude abated towards morning, and " a manifeſt remiſſion took place. Some recovered their " ſenſes entirely, ſome partially, and then complained of " intenſe head-ach, or of pains from the buboes; it was " uſual in this interval alſo that thoſe who had carbun- " cles began to complain of *burning* pain in theſe *fiery* " eruptions. The morning remiſſion was commonly of " very ſhort duration; the rigours, anxiety and delirium " ſoon returning more violent than before, attended with " a ſtrong and frequent ſubſultus tendinum. Theſe fe- " brile ſymptoms did not increaſe regularly as the day " advanced; but went away and returned at intervals " leaving ſhort but alarming intermiſſions; for each " exacerbation ſurpaſſed that which preceded it either " in violence or duration. In the evening the pulſe " could hardly be counted, by reaſon of its depreſſion " and quickneſs; the patient became comatoſe, and the " reſpiration was quick, laborious, and interrupted. " The buboes which, ſome hours before, ſeemed mani- " feſtly to advance, often ſubſided, and ſometimes al-

" moſt

" moſt entirely diſappeared ; the carbuncles, mortifying " at the top, reſembled a *great eſchar made by a cauſ-* " *tic :* and at this period alſo livid or black ſpots, of " various dimenſions, often were found ſcattered univer- " ſally on the body.

" Under theſe circumſtances, dreadful as they ſeem- " ed, ſome hope of recovery ſtill remained ; for, though " many of the ſick died on the third day, ſeveral had a " favourable criſis on that day, by a profuſe ſweat ; ſome " ſtruggled to the fifth day, a few to the ſeventh, and, " here and there one, even to the eleventh ; before " any critical alteration took place. Where a copious " ſweat happened on the third day, if it did not prove " perfectly critical, it at leaſt always conſiderably abated " the fever ; which, in that caſe, was generally to- " tally removed by a ſecond, though leſs profuſe ſweat, " on the fifth : and then beſides weakneſs the chief re- " mains of the diſeaſe conſiſted in the pain of the erup- " tions.

" Nothing could be predicted with reſpect to the " event of the diſeaſe from the manner of its invaſion ; " thoſe who had the moſt favourable eſcape having been " often in the beginning attacked with as alarming " ſymptoms as others were who died in a few hours. " Sometimes the febrile paroxyſm, which had ſet in " with ſuch formidable violence, diſſolved in a few " hours, and left the patient languid indeed, and weak " in an extreme degree, but free from other complaints " except the pain ariſing from the bubo, which from " that period increaſing in ſize, and advancing favoura- " bly to maturation, was, in many caſes, ready to open " in twelve or fifteen days : the patient all the while, " except the firſt day, walking about as uſual. Great " numbers happily eſcaped, not only in the manner juſt " deſcribed, but likewiſe where the buboes never ad- " vanced ; for theſe tumours, ſo far from coming always " to maturation in ſuch as recovered, very often diſ- " cuſſed without any bad conſequence. Carbuncles " often began to digeſt before the termination of the fe- " ver in a critical ſweat.

" All

" All the infected had buboes, except ſuch as expired " ſuddenly, or ſurvived the firſt attack a few hours only. " Inſtances of this dreadful kind were more particularly " obſerved in March 1743. The ſick were ſeized in the " uſual manner; but the head-ach, vomiting, and pain " about the præcordia, increaſing every moment, proved " ſuddenly mortal, or terminated within a few hours in fa- " tal convulſions." Dr. Patrick Ruſſel obſerves, that ſuch inſtances of ſudden death were very rare in the plague of 1760, 1761 and 1762; and in theſe they happened only in the winter, or early in the ſpring. In ſuch ſudden deaths few had any appearance of buboes; but in general the armpits and groins, or the inſide of the arms and thighs, became livid or black, and the reſt of the body was covered with confluent petechiæ, livid puſtules being here and there interſperſed: but all theſe appearances were more eſpecially obſerved after death.

In the plague of 1760, vibices as well as livid and black ſpots were frequently found on the corpſe, but not conſtantly. They were always ſuſpicious in conjunction with other circumſtances, but their abſence was no proof, though frequently urged as ſuch, that the diſtemper was not the plague. The vibices ſometimes appeared ſeveral hours before death, but the livid ſpots ſeldom or never.

The tongue in ſome was quite moiſt, and continued to be like that of a healthy perſon throughout the diſeaſe; in others, white at firſt, then yellow; at laſt black, and covered with a dry, foul ſcurf or fur. The thirſt was generally very great, but never conſtant; returning at regular intervals, and never appearing to correſpond with the danger of the fever. Sometimes it was ſo little that the patient could not be prevailed upon to drink a ſufficient quantity. The appearance of the urine was equally variable, and afforded no certain prognoſtic; being ſeldom alike in any two patients in the ſame ſtage of the diſtemper, and varying in the ſame patient every day. The vomiting commonly ceaſed after a few hours, excepting where the ſick were induced by thirſt to load their ſtomach, in which caſe it always

always returned. Sometimes the patients were coſtive, in others a diarrhœa took place, but in moſt the diſcharges were natural. No critical ſolution by urine or ſtool ſeemed ever to take place. A few caſes of hæmorrhages from the noſe and uterus were obſerved; and if they happened after the ſecond day, were ſoon followed by a plentiful ſweat, which commonly proved critical; "a circumſtance different from what has been uſually "obſerved in the plague at other places.

"From the preceding account of the plague it will "readily be conceived that nothing can be more diffi- "cult than to form any judgment or prognoſtic of the "event of the diſeaſe; in which, as it is juſtly remarked "by Morellus, our ſenſes and our reaſon deceive us, the "aphoriſms of Hippocrates are erroneous, and even "Hippocrates (as I am inclined to think) might have "erred in his judgment."

Innumerable other hiſtories of the diſtemper might be given, but the following, it is hoped, will be ſufficient, along with what has been already detailed, to ſhow that the plague in former ages was the ſame as at this day. In the terrible plague which broke out in the time of Juſtinian, the diſtemper ſometimes began with delirium, and the patient inſtantly deſpaired of life; but more generally people were ſurpriſed by the ſudden coming on of a ſlight fever; ſo ſlight that no danger was apprehended either from the ſtate of the pulſe or colour of the body. This, however, was quickly followed, ſometimes even on the ſame day, ſometimes on the ſecond or third, by buboes or parotids (ſwellings behind the ear) which when opened were found to contain a black *coal*, or *eſchar*, of the ſize of a lentil. If theſe ſwellings ſuppurated kindly, the patient recovered, but if not, a mortification enſued, and death was the conſequence, commonly on the fifth day. Black puſtules or carbuncles, covering the body, were ſigns of immediate death, as was likewiſe a vomiting of blood in weak conſtitutions; for this terminated in a mortification of the bowels. Pregnant women generally periſhed, but women were leſs ſuſceptible of the infection than men;

and

and young perſons were in more danger than old. Many, who recovered, loſt the uſe of their ſpeech, and ſuch were not ſecure from a relapſe.

In the laſt plague at Moſcow, the ſymptoms were various, according to the perſons, conſtitution and the weather; in general, head-ach, giddineſs, ſhivering, loſs of ſtrength, ſlight fever, ſickneſs and vomiting, redneſs of the eyes, white and foul tongue, with a dejected countenance, buboes and carbuncles appearing on the ſecond or third day, but ſeldom on the fourth. The buboes were ſeated chiefly in the glandular parts, the armpits and groin, but ſometimes made their appearance in the neck, cheeks, &c. Sometimes theſe ſuppurated perfectly, and then they proved beneficial, but not otherwiſe. Sometimes they ſuddenly diſappeared, after having attained the ſize of walnuts; and this retroceſſion was always ſuppoſed to be a ſign of approaching death. Sometimes they neither ſhowed any ſign of inflammation nor were painful, and in ſuch caſes afforded no relief. Similar ſwellings ſometimes occured in the parotid glands, but they were never equally beneficial with the buboes. *Carbuncles* were gangrenous ſpots on the ſkin, reſembling a burn, with black, livid or red veſicles, bordered with an inflammatory ring, and ſoon terminating in a hard, black eſchar. The *anthrax* is more prominent, penetrating deeper into the adipoſe membrane, and attended with more pain and inflammation. The diſeaſe was likewiſe attended with petechiæ ſimilar to thoſe in putrid fevers, but larger; alſo with vibices, which reſembled the mark of a whip, and were conſidered, as well as the petechiæ, as mortal ſigns. No diſtinct account of the pulſe could be given; as, after the diſeaſe became general, phyſicians did not chooſe to feel the pulſes of their patients but through a glove or tobacco-leaf. Worms called *teretes* were frequently diſcharged both upwards and downwards. Women with child generally ſuffered abortion, and were carried off by an uterine hæmorrhage.*

According

* Bonetus relates, that in 1676 in a malignant fever at Borgo di Saſia, the patients diſcharged live worms by the mouth, and adds that they were ſooner killed by wine than any thing.

According to Sydenham, the plague begins with chillineſs and ſhivering, like the fit of an intermittent, ſucceeded in a little time by violent vomiting and oppreſſion at the breaſt, accompanied with its common ſymptoms. Theſe continue till the diſeaſe proves mortal, or the kindly eruption of a bubo or parotis diſcharges the morbific matter. Sometimes, though rarely, the diſeaſe is not preceded by any fever; the purple ſpots, which denote immediate death, coming out even while perſons are abroad about their buſineſs. But this hardly ever happens but in the beginning of a very fatal plague, and never while it is on the decline, or in thoſe years in which it is not epidemic. Sometimes ſwellings appear without having been preceded either by a fever or any other conſiderable ſymptom; but he conceives that ſome ſlight and obſcure ſhivering always precedes the ſeizure.

Mariti, in his travels through Cyprus, &c. ſays that the plague of 1760 began with loſs of appetite, pain in the ſhoulders, head-ach extremely violent, delirium, vomiting, with a moſt excruciating pain in that part where the tumour by which the plague is characteriſed, is about to break forth. Death often took place on the third day, and very few lived beyond the thirteenth.

The Abbe's definition of what he calls the plague, and which ſeems to be the *peſtilential bubo* of the phyſicians, is ſomewhat ſingular. "The plague (ſays he) is an ob-
"long tumour, ſhaped like a pumpkin, which is at firſt
"of a fleſh colour; but it gradually becomes red, and
"at length blueiſh; and this is a ſign that the diſeaſe
"is incurable. If it continues red, and a little after in-
"clines to yellow, it is a ſign that a ſuppuration will
"take place: the ſwelling is then opened, and the pa-
"tient is ſometimes cured."

According to our author, the ſymptoms of the plague do not appear till fifteen days after the infection is received; and this is the reaſon of a law which ſubjects to a proof of twenty days every perſon ſuſpected of being diſeaſed. In this plague it was obſerved that people of the ſoundeſt conſtitutions were the moſt ſubject to it,

and

and the leaſt capable of reſiſting it. On the other hand, it appeared to ſpare weak and delicate perſons, whoſe cure, in caſe of an attack, was much leſs difficult. A greater number of Moors than of any other nation were attacked by it; and when once they were ſeized, their caſe was abſolutely deſperate. Thoſe who had recovered from the diſeaſe were leſs liable to a ſecond attack, but were not abſolutely ſafe. "I have known ſome (ſays "our author) who have been ill ſeven times, and have "died of it at laſt."

Dr. M'Bride informs us that in the plague which raged at Marſeilles and the adjacent places in 1720, people on their firſt ſeizure ſeemed as if intoxicated with drink; they loſt the power of their limbs entirely, and became ſo dejected that they gave themſelves over to deſpair from the very firſt attack. Along with the bilious vomitings and purgings which generally took place on the ſecond day, quantities of ſmall worms like aſcarides were thrown off. The more plentiful theſe evacuations were, the more ſalutary; for thoſe who vomited and purged but little ſunk down, oppreſſed with the diſeaſe, and died before the fourth day, covered with livid blotches and petechiæ; thoſe who had the largeſt evacuations had alſo the moſt plentiful eruptions of buboes and parotid abſceſſes. When theſe appeared, the patients roſe, walked about, and became remarkably hungry; the heat and thirſt ſubſided, but the face continued pale and languid, the pulſe hard and frequent. On the ſixth, ſeventh, or eighth day, if the ſuppuration ſtopped, and the humours went back, then came on oppreſſion, difficulty of breathing, furious delirium and convulſions, which ended in death. When carbuncles, or biles, with mortified ſloughs, appeared in different parts of the body, either alone or accompanied with the glandular ſwellings, the patients ſcarcely ever eſcaped. In great numbers of people tumours appeared without any previous febrile ſymptom, and, in a few caſes, went off by reſolution; in others they continued in a ſchirrous ſtate; but it was beſt when the tumours came to ſuppuration.

Theſe

Theſe are the moſt remarkable ſymptoms of this fatal diſeaſe, which have been recorded by the phyſicians of greateſt eminence who have written upon the ſubject. It remains ſtill to give ſome particular deſcription of the buboes and carbuncles, which are ſuppoſed to conſtitute in a particular manner the characteriſtic ſigns of the diſtemper. Of theſe the following account, given by Dr. Alexander Ruſſel, ſeems to be ſufficiently clear and explicit.

Only a very few, and ſuch as died ſuddenly, were exempted from buboes, but only about one half had carbuncles. In the latter plagues their proportion was ſtill ſmaller; but they ſeldom appeared earlier than in the months of April or May. In 1742 and 1743, the buboes often appeared on the firſt commencement of the diſtemper, ſometimes not till twelve hours after; in a few inſtances not till two or three days; but in 1744 they were ſometimes the firſt ſymptoms of the diſeaſe. The buboes were generally ſolitary, the inguinal and axillary more frequent than the parotid. "The in-
"guinal bubo for the moſt part was double; that is,
"two diſtinct glands ſwelled in the ſame groin. The ſu-
"perior, which in ſhape ſomewhat reſembled a ſmall
"cucumber, lay obliquely near the large veſſels of the
"thigh, lower than the venereal buboes are uſually found,
"and it was that which commonly came to ſuppuration;
"the inferior was round, and in ſize much ſmaller. I
"once met with a caſe in which an axillary bubo divided
"in like manner into two parts, one of which got under
"the pectoral muſcle, the other ſunk deeper into the
"armpit: both grew painful and inflamed, but that in
"the armpit only ſuppurated."

The bubo was at firſt a ſmall hard tumour, painful but not inflamed externally. Theſe indurated glands were deeply ſeated, ſometimes moveable, at others more or leſs fixed, but always painful to the touch. Sometimes they would increaſe to a conſiderable ſize in a few hours, with intenſe pain, then ſuddenly ſubſide; and theſe changes would take place ſeveral times in twenty-four hours. "An exacerbation of the peſtilential ſymp-
"toms

" toms immediately upon the decreaſe of the bubo, ſome-
" times prompted me to imagine it owing to the retro-
" ceſſion of the tumour; but this did not happen ſo
" conſtantly as to make me think it was ſo in reality.
" The buboes, as far as I could learn, never advanced
" regularly to maturation till ſuch time as a critical
" ſweat had carried off the fever. In ten, twelve, or
" fifteen days, from the firſt attack, they commonly
" ſuppurated; having been all along attended with the
" uſual ſymptoms of inflammatory tumours. But I
" have known them ſometimes, nay, frequently, diſappear
" ſoon after the critical ſweat, and diſcuſs completely
" without any detriment to the patient. At other
" times, though grown to a pretty large ſize, the tumour,
" about the height of the diſeaſe, would ſink and morti-
" fy, without any fatal conſequences; for, as ſoon as
" the criſis was complete, the mortification ſtopped, and
" the gangrened parts ſeparating gradually, left a deep
" ulcer, which healed without difficulty. I met with
" no inſtance of a bubo in which fever did not either
" precede or follow the eruption."

On the ſubject of carbuncles, Dr. Patrick Ruſſel obſerves, that " there are certainly varieties in them, but
" perhaps theſe varieties have been unneceſſarily multi-
" plied, from the ſame eruption having been viewed in
" different ſtages of its progreſs; for all of them ſooner
" or later are covered with a black eſchar." Dr. Alexander Ruſſel deſcribes them as follows: " The carbun-
" cles were commonly protruded the ſecond day of the
" diſeaſe; and though the muſcular and tendinous parts
" were more eſpecially affected, no part whatever could
" be ſaid to be free of them. The carbuncle at firſt re-
" ſembled an angry confluent pock in its inflammatory
" ſtage, but was attended with intenſe, burning pain,
" and ſurrounded by a circle of a deep ſcarlet hue, which
" ſoon became livid. By a progreſs very rapid, it then
" ſpread circularly, from the ſize of a ſilver penny to an
" inch and an half, two inches, nay, even three inches,
" diameter; and the ſupervening gangrene often pene-
" trated deep into the ſubſtance of the parts affected.

" In

" In ſuch of the ſick as recovered, the gangrene uſually " ceaſed ſpreading on the third day; and, a day or two " after, ſigns of ſuppuration were obſerved at the edge of " the black cruſt, the ſeparation of which, advancing " gradually, was completed rather in leſs time than that " of the eſchar in iſſues made by cauſtic. In caſes where " the patient died, I was informed (for I ſaw none of " thoſe caſes myſelf) that a quantity of ichorous matter " oozed from beneath the eſchar, which remained itſelf " ſhrivelled and hard, without any favourable ſigns of " ſeparation or digeſtion."*

Dr. Alexander Ruſſel alſo deſcribes another kind of puſtule, which he ſays appeared in a ſmall number of the ſick, but which his brother Dr. Patrick had no opportunity of obſerving in 1760. It had no livid or diſcoloured circle ſurrounding it, but was filled with laudable pus; and, when dry, the cruſt fell off, as in the diſtinct ſmall-pox. This was looked upon as a favourable ſymptom, all who had it happening to recover.

We have now detailed, at conſiderable length, the ſymptoms of the plague as mentioned by authors of great eminence. To give a detail of *all* that has been ſaid upon

* " Dr. Gotwald, formerly quoted, deſcribes four varieties of carbuncles, the " differences between which ſeem to be pretty diſtinctly marked. 1. " One " kind riſes pretty high, is of a dark brown colour, the cuticle appearing as " if it were burnt, and it is ſurrounded with a lead-coloured circle. In the " beginning it is no bigger than a pea, but, if not prevented, ſoon grows to " the ſize of a crown piece; inwardly it is moiſter than the reſt, and may be " more eaſily ſeparated. Its ſeat is generally in the fleſhy parts, as on the " ſhoulders, neck, hips, arms and legs. 2. The ſecond lie a little deeper, " and do not riſe ſo high; the eſchar in the middle is entirely dark and " aſh-coloured, full of ſmall chops, as if it would burſt by too great dryneſs: " it has a ſtrong lead-coloured circle, behind which the ſound fleſh looks red " and ſhining. It eats into the fleſh round about it, and takes deep root: it " generally fixes in the moſt fleſhy parts, as the buttocks, calves, &c. 3. The " third is not very large at firſt; it appears like a blood ſwelling, not ſo dark " as the former, with a wrinkled ſkin; as it increaſes, ſmall bliſters ariſe in " the middle, and form an eſchar, in little cluſters, which, as an ingenious " phyſician obſerved, were ſmall carbuncles. They commonly are ſituated " in membranous and tendinous parts about the knees, toes, and behind the " ears, &c. 4. The fourth is the moſt curious, as Purman, in his treatiſe on " the plague, has well obſerved. Sitonius calls them pale, livid, ulcerous " papulae: they appear with a high, yellowiſh bliſter, which ſeems full of cor- " ruption: the circle round it is firſt red, then of an aſh colour: the bliſter " ſoon falls, and, with the carbuncle, appears ſcarce ſo big as a pepper corn, " continually eating deeper and wider. They are ſeated upon the cartilaginous " or griſtly parts. Gotwald found them near the pit of the ſtomach, upon " the cartilago enſiformis and ſhort ribs. All the four take root and burn " very violently at firſt, but the two former moſt of all."

upon this ſubject would be impoſſible; neither indeed can it be thought neceſſary in the preſent treatiſe. Whatever may have been omitted or too ſlightly mentioned in this ſection, will naturally be conſidered when we come to treat of the cure. It now therefore only remains to ſay, whether the approach of a plague may be known by any viſible ſigns, ſo that people might in ſome meaſure prepare themſelves for the enſuing calamity.

Were we in poſſeſſion of an accurate and authentic hiſtory of the world, this queſtion might be very eaſily decided; but the uncertainty of ancient records, the mutilated ſtate of thoſe which we do poſſeſs, the diverſity of opinions among mankind, and the unhappy diſpoſition to *miſrepreſent*, ſo common in all ages, render it very difficult to ſay any thing upon the ſubject. If the theory hinted at in this ſection (that plagues ariſe from ſome commotion in the electric fluid) can be allowed to have any foundation in nature, then it ought to follow, that the forerunners of peſtilence would be ſome electric phenomena; and, from a peruſal of the firſt and ſecond ſections of this work, it will appear that ſuch an opinion is not altogether unfounded.*

The appearance of immenſe numbers of inſects has likewiſe been accounted a ſign of approaching peſtilence; but if we ſuppoſe their appearance to be a *ſign*, we can ſcarce imagine their putrefaction to have been a *cauſe*, of peſtilence. In the eaſt we are informed by Dr. Ruſſel that the inhabitants of Aleppo account the appearance of inſects, and even *eclipſes*, as preſages of the plague. They ſuppoſe alſo that the ſtillneſs of frogs is a ſign of peſtilence; but the ſame author informs us that all theſe ſigns failed in 1760. Violent earthquakes and famines ſeem to be more certain ſigns, though even theſe are not always to be depended upon; it being evident from hiſtorical accounts that peſtilence has ſometimes preceded, and ſometimes followed, earthquake and famine. Mr. Gibbon, however, aſcribes to the abovementioned cauſes, viz. inſects, earthquakes, and even *comets*,

* See p. p. 61, 62.

comets, the dreadful plague which took place in the reign of Juſtinian. At leaſt, all theſe preceded it; but perhaps the *inſects* were only meant to be accounted the cauſe of the plague. The cauſe of the *inſects* muſt remain in obſcurity. According to him, "In a damp but "ſtagnating air, this African fever is generated from "the putrefaction of animal ſubſtances, and eſpecially "from the ſwarms of locuſts, not leſs deſtructive to mankind in their death than in their lives."

This dreadful plague was preceded by comets and moſt violent earthquakes. A remarkable comet appeared in 536, ſuppoſed to be the great one obſerved by Sir Iſaac Newton in 1680. This, we are told by aſtronomers, revolves round the ſun in a period of 575 years; but the failure of aſtronomical predictions in the return of the expected comets of 1759 and 1789, ſhew the futility of ſuch calculations. Another comet appeared in 539, and theſe comets were attended with an extraordinary paleneſs of the ſun. Mr. Gibbon obſerves, that earthquakes, which he calls a fever of the earth, "raged with uncommon violence during the reign of "Juſtinian. Each year is marked by the repetition of "earthquakes of ſuch character, that Conſtantinople has "been ſhaken above forty days; of ſuch extent, that "the ſhock has been communicated to the whole ſur-"face of the globe, or at leaſt of the Roman empire. "An impulſive or vibrating motion was felt; enormous "chaſms were opened, huge and heavy bodies were diſ-"charged into the air, the ſea alternately advanced and "retreated beyond its ordinary bounds, and a mountain "was torn from Liburnia, and thrown into the waves, "where it protected as a mole the new harbour of Bo-"trys in Phenicia."

According to Dr. Sydenham the plague at London in 1665 was preceded by a very cold winter; the firſt continued till ſpring and went off ſuddenly towards the end of March. Peripneumonies, pleuriſies, quinſies, and other inflammatory diſorders, then made their appearance, along with an epidemic fever of a particular kind, which did not yield to the remedies ſucceſsful in other epidemics.

epidemics. About the middle of the year the plague began, and increaſed in violence till the autumnal equinox, when it began to abate, and by the enſuing ſpring was entirely gone. Our author ſays that the plague ſeldom rages violently in England but once in thirty or forty years; but ſince his time, which is upwards of a century, no plague hath appeared. He ſuppoſes the plague and other epidemics to depend on ſome ſecret conſtitution of the air, but pretends not to ſay what that conſtitution is. But, beſides this conſtitution, he is of opinion that there muſt be another circumſtance, viz. the receiving the effluvia or ſeminium from an infected perſon. Thus he ſuppoſes that a ſingle infected perſon is ſufficient to poiſon a whole country; the general maſs of atmoſphere being infected by the breath of the diſeaſed and the effluvia of the dead bodies. "Thus (ſays he) "the way of propagating this dreadful diſeaſe by infec- "tion is rendered entirely unneceſſary; for though a "perſon be moſt cautiouſly removed from the infected, "yet the air received in by breathing will of itſelf be "ſufficient to infect him, provided his juices be diſpoſed "to receive the infection. I much doubt, if the diſpo- "ſition of the air, though it be peſtilential, is of itſelf "able to produce the plague; but the plague being al- "ways in ſome place or other, it is conveyed by peſtilen- "tial particles, or the coming of an infected perſon from "ſome place where it rages, to an uninfected one, and "is not epidemic there, unleſs the conſtitution of the air "favours it. Otherwiſe I cannot conceive how it ſhould "happen, that, when the plague rages violently in one "town in the ſame climate, a neighbouring one ſhould "totally eſcape it, by ſtrictly forbidding all intercourſe "with the infected places; an inſtance of which we had "ſome few years ago when the plague raged with ex- "treme violence in moſt parts of Italy; and yet the "Grand Duke, by his vigilance and prudence, entirely "prevented its entering the borders of Tuſcany." As to the nature of the diſeaſe, when once produced, Dr. Sydenham is of opinion that it is altogether inflammatory; for which he gives the following reaſons: 1. The

colour of blood taken away that reſembles that in pleuritic and rheumatic diſorders. 2. The carbuncles reſemble the mark of *an actual cautery*. 3. The buboes are equally diſpoſed to inflammation with any other tumours that come to ſuppuration. 4. The ſeaſon of the year may be adduced in proof of this; for between ſpring and ſummer, inflammatory diſorders, as pleuriſies, quinſies, &c. are common.

Before we put an end to this ſection, it may now be proper to ſay a few words by way of apology for the many apparent digreſſions from the ſubject which have appeared in it. In the firſt place, then, the work being intended for general inſpection, and not merely for medical readers, it became abſolutely neceſſary to introduce a number of things which for medical readers would have been totally ſuperfluous. It was to be ſuppoſed that the book might come into the hands of ſome who had not read any thing concerning the ſtructure of the body, who had not heard of any of the ſyſtems of medicine now prevalent, or the different doctrines they contain. It was impoſſible to write in an intelligible manner for ſuch people without giving ſome few hints concerning all theſe ſubjects: the ſame conſideration made it neceſſary to enter pretty largely into the diſcoveries concerning the compoſition of the atmoſphere and various kinds of elaſtic fluids, concerning heat, &c. In doing this the writer was under a neceſſity either to adopt ſome of the doctrines he took notice of, or to animadvert upon them. If he has ventured freely to give his ſentiments, it is not with a view to eſtabliſh a theory of his own, but to direct the attention of the reader to thoſe natural agents which ſeem to be at preſent too much overlooked, principally becauſe they are leſs acceſſible to our ſenſes, and of conſequence leſs ſubject to experiment, than others. If therefore in this treatiſe it is ſuggeſted that the atmoſphere acts on the human body by its internal or latent heat, and by its electricity, as well as by its other properties; if the writer is inclined to believe that theſe are in fact the moſt powerful parts of it; that we never can act without

out them, and that in ſhort our life and health are in immediate dependence upon them; I ſay, that none of all theſe things are in oppoſition to any fact hitherto diſcovered, either of the medical kind or any other. On the other hand, in all ages phyſicians have ſought for ſome conſtitution in the air, inexplicable, and perpetually unknown, to which diſeaſes might be aſcribed that could not be ſuppoſed to originate from any of its ordinary properties. To explore this conſtitution is as great a deſideratum at the preſent moment as two thouſand years ago; and any attempt to inveſtigate it, or a conjecture relating to it, cannot be ſuppoſed inconſiſtent with any thing already diſcovered and aſcertained. There are many things which lead us to think that electricity is very much concerned in diſeaſes, and and among the reſt we muſt account the new diſcovery of Dr. Perkins's metallic conductors a very notable proof of it. Theſe, when firſt uſhered into the world, were made by many a ſubject of ridicule; but the evidence in favour of their efficacy, both in America and in various parts of Europe, ſeems now to be deciſive in their favour; and, if they act at all, it is almoſt impoſſible to ſuggeſt any other principle than that of electricity to which their efficacy can be owing. No doubt it is difficult to draw the line properly betwixt credulity and ſkepticiſm, but where credible teſtimony determines any thing to have actually happened, or where ſolid reaſoning gives room to ſuppoſe any thing to be probable, it never can be invalidated by any argument *a priori* formed againſt the *poſſibility* of ſuch a thing taking place.

In page 128 it is ſaid, that M. Lavoiſier, by introducing the new chemical nomenclature, "has entailed the greateſt curſe upon the ſcience it ever met with." An apology for this bold aſſertion is abſolutely neceſſary, and the quotation made from Dr. Ferriar may be deemed inadequate, or perhaps miſapplied. In paſſing this cenſure on the nomenclature I wrote from experience. The new nomenclature, inſtead of promoting *my* improvement in chemiſtry, hath had a direct contrary tendency. An inſtance of the inconvenience and ambiguity ariſing from

from it is given p. 135, when ſpeaking of Dr. Girtanner's theory. But a much more remarkable example is to be met with in the review of Dr. Monro's Chemical Treatiſe, where we find him cenſured for the very ſame ambiguity taken notice of with regard to Dr. Girtanner. "He might have obſerved (ſay the reviewers) "the diſtinction between the hydrogen and inflammable air, and between the oxygen and pure air, as well "as between the azote and impure air: he has mentioned theſe as ſynonimous, whereas they are terms "that expreſs baſes, or ſubſtances in a concrete ſtate "(what I have called the condenſable part) and the compounds of theſe ſubſtances and heat, when they aſſume the form of gaſes or elaſtic fluids." (Monthly Rev. for 1790, p. 26.)

That the terms invented by Lavoiſier and others have not been received with perfect unanimity by the chemiſts of the preſent day, is evident from Dr. Pearſon's "Tranſlation of the New Chemical Nomenclature," which is not only a *tranſlation*, but a *vindication* of it. In the courſe of his work he quotes the tranſlator of the Chemical Dictionary ſaying, that, "from the zeal of "reforming language, ſuch a number of reformers may "ariſe, that our ears will not be leſs ſtunned, nor our "underſtandings leſs perplexed, than if we were expoſed to the clamour of Babel, or the *thaw of words* of "Sir John Mandeville." To this Dr. Pearſon replies, that there is no reaſon to fear any ſuch bad conſequences. "The diſtinguiſhed ſuperiority of a ſyſtem produced by "a *De Guyton*, a *Lavoiſier*, or a *Bergman*, would ſurely "ſupercede the work of perſons of *inferior ability*." It is impoſſible to know the perſons here deſignated, unleſs the Doctor points them out. If he chooſes to call *himſelf* one of them, we can have no objection. He certainly has diſſented, in one article, from "the ſyſtem produced by De Guyton, Lavoiſier and Bergman," and this is with regard to the word *azote*. This is the term announced to us as the moſt proper for denoting a certain kind of air. But Dr. Pearſon determines *nitrogen* to be more proper. Even this has not given entire ſatisfaction,

tion, for Dr. Mitchell has adopted the word *ſepton* in preference to both *azote* and *nitrogen*. Thus, inſtead of the original phraſe *phlogiſticated air*, uſed by Dr. Prieſtley, we have four; for as long as the works of Dr. Prieſtley remain, the original term will be uſed by ſome, while with others it will be ſo much diſuſed that perhaps they will not underſtand it when it happens to occur. Nor are corrections of this kind all that we have to fear. Profeſſor Wiegleb, who has written a Syſtem of Chemiſtry in quarto, has therein changed almoſt all the nomenclature invented by Lavoſier. Inſtead of it he gives a nomenclature of his own, in which he makes very much uſe of the termination *cratia*, from a Greek word ſignifying ſtrength; thus, inſtead of ſaying the *acid of fluor*, we are to ſay *fluoricratia*. I muſt confeſs that to me the perpetual repetition of this termination has a very ridiculous appearance; but the misfortune is, that in the caſe of nomenclatures we have no choice. We cannot chooſe one and reject another: good or bad, we muſt take both; and were an hundred new ones to ariſe, we muſt be condemned to learn them all. Nor is even this the worſt. Wiegleb's ſcholars, for inſtance, accuſtomed to the language of their teacher, will be apt to put it into their writings, perhaps without proper explanation; and thus ſuch writings muſt be unintelligible both to old and new chemiſts: and thus it will be with as many others as chooſe to invent new chemical terms.

Were this a proper place for entering into a diſcuſſion of Lavoiſier's nomenclature, it might eaſily be ſhown that the terms are not more proper than thoſe which preceded them; but no real inconvenience can ariſe from the propriety or impropriety of a mere name. It is the *reſemblance* of the terms to one another, and the facility with which miſtakes may be made, that gives juſt ground of complaint. Nor is it any juſt reaſon to accuſe a perſon of want of judgment or careleſſneſs becauſe he hath miſtaken theſe terms. We ſee that even Dr. Monro has not attended to every circumſtance; and if a man of his experience and accuracy hath been inaccurate in this reſpect, what is to be expected from others? How

eaſily

eaſily may the words *ſulfate*, *ſulfite*, *ſulphuret* and *ſulphure*, be miſtaken for one another, either in writing or converſation! Yet a miſtake of this kind would totally pervert the meaning of the perſon who uſed it. The ſcripture finds fault with thoſe who make people offenders for a *word*; but here we are in danger of being made offenders for a *letter*. In ſhort, taking into account the inconveniences ariſing from this nomenclature itſelf, the numberleſs corrections and amendments (no matter whether real or imaginary) to which it may be ſubjected, and the number of others totally different from it which may ariſe, I cannot help looking upon the introduction of it into chemiſtry as an evil of the firſt magnitude; an evil which cannot be remedied by any art, but muſt continually become worſe and worſe.

SECTION IV.

Of the beſt Methods of Preventing the Plague.

THESE methods may be claſſed in the following manner: 1. Thoſe moſt proper for avoiding the infection, ſuppoſing the diſeaſe to be infectious. 2. The proper mode of reſiſting or removing thoſe local cauſes which may give riſe to it, or may co-operate with the infectious matter in giving greater force to the diſeaſe, ſhould it happen to be introduced; and, 3. The beſt method of preparing the body for reſiſting peſtilential attacks, ſhould we happen to be ſo ſituated that no external method of defence could be uſed.

With regard to the firſt of theſe intentions the flying from places infected has been ſo univerſally recommended, and ſo generally received, that the precept has been made up into the following proverbial Latin diſtich:

> "Hæc tria tabificam tollunt adverbia peſtem
> "Mox, longe, tarde, cede, recede, redi."
>
> *Theſe words prevent the plague's infectious pain,*
> *Go* quick, *fly* far, *and* ſlow *return again.*

This maxim hath been put in execution in all ages, but often with ſo little regard to humanity that it cannot

not by any means be recommended without very conſiderable limitation. The ſeparation of the ſick from all promiſcous intercourſe with the ſound, in times of peſtilence, ſeems to be dictated by common ſenſe; but this may be done without killing them, or leaving them to expire in the miſerable ſtate to which they are reduced by the diſeaſe. Mr. Howard informs us that in ſome places ſhips which have the plague on board are chaſed away and burnt; and inſtances of cruelty with regard to infected individuals have been formerly mentioned. Dr. Mertens is of opinion that cutting off all the communication between the infected and healthy is the only means of preventing the diſeaſe from ſpreading. The good of this practice was obſerved in one of the hoſpitals at Moſcow. All the avenues to it were ſhut up, but one which was ſtrictly guarded, and every ſuſpected article prohibited from entering. Infected clothes and utenſils were burned, and the houſes where the ſick had lived were purified by the fumes of vinegar and gun-powder.

In this mode of prevention it is of the utmoſt conſequence to aſcertain the diſtance to which the contagion extends; in the next place to know whether by means of clothes, cotton or other kinds of merchandiſe it may be imported from one place to another; and in the third place how long the infection may remain in theſe kinds of goods; ſo that people may know when the danger is over. As to the diſtance, it ſeems to be generally agreed, that it is but ſmall. Some of the anſwers to Mr. Howard by the phyſicians of whom he inquired, have been already related. Of the infection of the plague he ſpeaks in the following manner:

"In my opinion this diſtemper is not generally to be "taken by the touch, any more than the gaol-fever or "ſmall-pox; but either by inoculation, or by taking "in with the breath the putrid effluvia which hover "round the infected body; and which, when admitted, "ſet the whole maſs of blood into fermentation, and "ſometimes ſo ſuddenly and violently as to deſtroy its "whole texture, and to produce putrefaction and death "in 48 hours. Thoſe effluvia are capable of being

"carried

" carried from one place to another, upon any ſubſtance " where what is called *ſcent* can lodge; as upon wool, " cotton, &c. and in the ſame manner that the ſmell of " tobaco is carried from one place to another."

" The infection in the air does not extend far from " the infected object, but lurks chiefly (like that near " carrion) to the leeward of it. I am ſo aſſured of this, " that I have not ſcrupled going, in the open air, to " windward of a perſon ill of the plague to feel his pulſe. " The rich are leſs liable to the plague than the poor, " both becauſe they are more careful to avoid infection, " and have more large and airy apartments, and becauſe " they are more cleanly, and live on better food, and " plenty of vegetables; and this I ſuppoſe is the reaſon " why Proteſtants are leſs liable to this diſtemper than " Catholics during their times of faſting, and likewiſe " why the generality of Europeans are leſs liable to it " than the Greeks, and particularly Jews.

" It is remarkable that, when the corpſe is cold of a per- " ſon dead of the plague, it does not infect the air by " any noxious exhalations. This is ſo much believed " in Turky, that the people there are not afraid to han- " dle ſuch corpſes. The governor of the French hoſ- " pital at Smyrna told me, that, in the laſt dreadful " plague there, his houſe was rendered almoſt intolerable " by an offenſive ſcent; eſpecially if he opened any of " thoſe windows which looked towards the great burying- " ground, where numbers every day were left unburied; " but that it had no effect on the health of himſelf or " family."

It is likewiſe a matter of the utmoſt importance to aſcertain the time at which the diſeaſe is introduced into any town or diſtrict. Dr. Caneſtrinus, in a treatiſe on this diſtemper, publiſhed at Saltzburg, complains greatly of the diſſenſions among phyſicians concerning the nature of the diſtemper, owing to which its exiſtence is frequently denied, and thus its ravages are propagated immenſely beyond the limits which might otherwiſe circumſcribe them. Of this he gives the following remarkable inſtance: " In the year 1770 a diſeaſe with

" uncommon

" uncommon ſymptoms prevailed at Bodrogh in Up-
" per Hungary, which carried off a number of perſons
" in a ſhort time. A phyſician of the county of Zem-
" plin was ſent to inquire into the nature of the malady.
" He reported that the diſeaſe was of a ſuſpicious na-
" ture, having a great reſemblance to the plague. His
" report was received by the nobility and health-officers
" with indignation, as if untrue. Another was ſent,
" who, without heſitation, pronounced the diſeaſe an
" epidemic ſcurvy. In the mean time the diſeaſe, be-
" ing left to itſelf, ſpread wider, and raged with ſuch
" violence as to carry off ſeventeen perſons in one houſe.
" The nature of the diſeaſe now becoming apparent,
" proper meaſures were taken, and the infected ſepa-
" rated from the ſound, by which means the diſeaſe was
" confined within a ſmall diſtrict.*" With regard to the infection of the diſeaſe, or *contagion*, as it is commonly called, he expreſſes himſelf as follows: " The air
" is not capable of diffuſing the contagion to any con-
" ſiderable diſtance from the infected ſubject unimpaired
" in its power, but, like other poiſonous matter, it is
" capable of dilution in the atmoſphere, ſo as to be
" rendered at length innoxious. The contagion of the
" plague will be entirely prevented from ſpreading if all
" acceſs to, and all intercourſe with, the ſick be ſtrictly
" prohibited: whence the following forms a ſafe and
" infallible prophylactic of the diſeaſe:

" Mox, longe, tarde, cede, recede, redi.

" *Go* quick, *fly* far, *and* ſlow *return again.*"

" No change in the habit takes place previous to the
" action of the contagion, but the body is from the firſt
" equally ſuſceptible of it as of the itch, or any other
" infectious diſeaſe. Whilſt the plague ceaſes in the
" civilized parts of Europe ſpontaneouſly, or by human
" precautions, its revival is prevented, from the care that
" is beſtowed in purifying or deſtroying every infected
" ſubſtance. In the eaſt, on the contrary, this precau-
" tion is totally neglected; whence it is probable that
" the diſeaſe is not reproduced anew, but that it is per-
" petuated

* Medical Review, vol. iii, p. 257.

" petuated by the former fomes, as happens with us in " the ſmall-pox. The matter producing the ordinary " epidemics is widely diffuſed in the atmoſphere, and " capable of infecting through a widely extended ſpace. " The peſtilential poiſon, on the contrary, is confined to " the vicinity of the affected body, and becomes ſo dilute " at the diſtance of a few paces only as to be incapable of " further action. Hence it appears that the plague is " much eaſier avoided than epidemic diſorders. The " more abundant the contagious matter is, the further " probably is the power of its infection carried. This " is the reaſon that the mere ſeparation of the ſick and " ſuſpected from the healthy is ſo much more efficacious " in deſtroying it at its commencement than at a later " period. To reſtrain epidemics within bounds is impoſ- " ſible; but with the contagion of the plague, it is cer- " tain that it can be confined by art to a narrow ſpot."

Of the truth of this laſt aſſertion our author gives a remarkable, inſtance in his own practice about the time that the plague ſtopped at Bodrogh. Having been ſent into Caſſovia, along with two other phyſicians, they were informed by the ſurgeon of the lazaretto, that an unuſual diſeaſe had broken out in the diſtrict of Zboina, which had ſuddenly proved fatal to many. On inquiry it was found that it had come from Bodrogh in the following manner: Two young men, returning from the vintage at Tokay, ſlept a night in an infected houſe, and ſtole ſome clothes belonging to thoſe who had died of the plague. He who carried the clothes died by the way: his father carried home the bundle, kept them unpacked for ſome weeks, but having at laſt worn them, he and all his family fell victims to the ſame diſeaſe. The peſtilence began to ſpread, and ſhewed an appearance of great malignity. Our author did not heſitate to declare its true nature, and in conſequence of his declaration all communication was cut off between the adjacent countries and the infected ſpot, by a cordon of the military. The infected were ſeparated from ſuch as were only ſuſpected, and theſe laſt from the ſound: three infected houſes were deſtroyed by fire, and other means

means (to be afterwards related) were uſed with a view to deſtroy the contagion itſelf. Thus the diſeaſe was prevented from ſpreading; and none but ſuch as had been previouſly ſuſpected were ſeized.

To the ſame purpoſe the Abbe Poiret thinks it an eaſy matter to extinguiſh the plague entirely. He was a witneſs to the ravages of the diſeaſe in Barbary, and thinks it the moſt eaſily avoided of any diſtemper; but the misfortune is, that there are many things in their own nature very eaſily accompliſhed, which the inattention or perverſeneſs of mankind render utterly impracticable. Such, it is to be feared, is the extinction of the plague by the means juſt mentioned; for though theſe means might be enforced in a country diſtrict or ſmall town, yet, where the peſtilence enters a large and populous city, there are ſo many modes of concealing its exiſtence, and the unknown intercourſe of the ſick with the ſound muſt be ſo frequent, that it ſeems ſcarce poſſible to prevent the malady from ſpreading.

In London, whether it aroſe from a neglect of uſing the precautions for too long a time, or from any other cauſe, cannot well be known; but the attempts of the magiſtrates to ſeparate the ſick from the ſound certainly were not attended with any good conſequence. "The conſternation (ſays Dr. Hodges) of thoſe who "were thus ſeparated from all ſociety, unleſs of the in-"fected, was inexpreſſible, and the diſmal apprehenſions "it laid them under made them but an eaſier prey to the "devouring enemy. And this ſecluſion was on this "account much the more intolerable, becauſe, if a freſh "perſon was ſeized in the ſame houſe but a day before "another had finiſhed the quarantine, it was to be per-"formed over again; which occaſioned ſuch tedious "confinements of ſick and well together, as ſometimes "cauſed the loſs of the whole. Moreover, this ſhut-"ting up of infected houſes made the neighbours fly "from theirs, who might otherwiſe have been a help to "them on many accounts; and I verily believe that "many who were loſt might have been alive, had not "the tragical mark upon their doors driven proper aſſiſ-

"tance

" tance from them. And this is confirmed by the exam-
" ples of other peſtilential contagions, which have been
" obſerved not to ceaſe until the doors of the ſick were ſet
" open, and they had the privilege of going abroad."
The Doctor ſets forth alſo the arguments on the other ſide; but whatever *might* have been the advantages of a ſeparation of the ſick from the healthy, if conducted in a manner leſs capable of hurting the feelings of humanity, it is evident that in the London plague the methods attempted to prevent the diſeaſe at leaſt did no good.

In countries where the plague generally prevails, and the Europeans are *united* in the opinion that it is neceſſary to ſeparate themſelves from the natives, the method of ſhutting up is attended with the moſt ſalutary effects, as has been atteſted by almoſt every traveller who has reſided there for any time. Accidents among them are very rare, though not altogether without example. At Alexandria in Egypt, M. Volney tells us, that as ſoon as the plague makes its appearance the European merchants ſhut themſelves up in their *khans* and have no communication with the reſt of the city. Their proviſions are depoſited at the gate of the khan, and received there by the porter, who takes them up with iron tongs, and plunges them into a barrel of water provided for the purpoſe. If it is neceſſary to ſpeak to any one, they keep at ſuch a diſtance as to prevent touching with their clothes, or breathing on one another; by which means they preſerve themſelves from this dreadful calamity, unleſs by ſome accidental neglect of theſe precautions. Some years ago a cat, which paſſed by one of the terraces into the houſes of the French merchants at Cairo, conveyed the plague to two of them, one of whom died. This ſtate of impriſonment continues for three or four months, during which time they have no other amuſement than walking in the evening on the terraces, or playing at cards.

The doctrine of predeſtination, and ſtill more the barbariſm of the government, have hitherto prevented the Turks from attempting to guard againſt this deſtructive diſeaſe:

diſeaſe: the ſucceſs, however, of the precautions taken by the French, has of late begun to make ſome impreſſion upon many of them. The Chriſtians of the country who traffic with the French merchants, would ſhut themſelves up like them; but this cannot be done without permiſſion from the Porte. A lazaretto was ſome years ago eſtabliſhed at Tunis; but the Turkiſh police is every where ſo wretched, that little can be hoped for from thoſe eſtabliſhments, notwithſtanding their extreme importance to commerce and the ſafety to the Mediterranean ſtates. The very laſt year afforded a proof of this; for as violent a plague as ever was known broke out there. It was brought by veſſels coming from Conſtantinople, the maſters of which corrupted the guards, and came into port without performing quarantine. Water carriers have never been attacked by it.

Mariti ſays, that in the iſland of Cyprus, and on the continent of Syria, every European, on the ſlighteſt appearance of the plague, after taking the neceſſary precautions, ſhuts himſelf up with his family. The Mahometans alone, more intrepid, go abroad as uſual, converſe with each other, give ſuch aſſiſtance to each other as may be neceſſary, and often fly to the relief of a Chriſtian when deſerted by his friends. This ariſes from their belief in predeſtination. The Mahometans of Syria, however, leſs familiarized with this ſcourge, make uſe of ſome precautions, which were augmented in 1760. They publiſhed an ordonnance forbidding every veſſel attacked by the plague to enter their ports: but their vigilance in this reſpect was ſo remiſs, that it was not ſufficient to prevent the contagion. The governor of Acre checked the progreſs of this plague, by giving the inhabitants the means of retiring from its ravages; and theſe means, though abſolutely contrary to the dogmas of the Mahometan religion, were eagerly embraced. The Europeans became their models; and the governor, after deriving from them every neceſſary information, ſhut himſelf up, after their example, together with his numerous family. The mufti alone, being the protector of the Mahometan law, cannot imitate a conduct which that

that law condemns. Inſtead of ſhutting himſelf up in a prudent confinement, he thundered forth againſt this new method, reproached the governor for his conduct, and, having treated him as an impious perſon, threatened him with all the vengeance of Heaven. The governor, however, only laughed at this pious folly of the mufti, and ſent a detachment of ſoldiers to impoſe on him a fine of two hundred and fifty ſequins, for having dared to aſcribe to him, in matters of religion, an ignorance, from every ſuſpicion of which his age ought to have ſecured him.

In the time of plague, the proper precautions are, to ſhut one's ſelf cloſely up, and to receive no proviſions or other things, except thoſe on which the plague has no influence. The people of Syria, however, in 1760, admitted every kind of proviſions without fear, but not without uſing certain precautions. They did not receive warm bread; fleſh of every kind was thoroughly waſhed, and milk was ſtrained through a linen cloth, in order to free it from the ſmalleſt particle of animal hair. All kinds of pulſe were ſoaked in water, and they abſtained from peaches, apricots, and other fruits which are covered with a downy rind. Fowls were cooked out of the houſe, for fear that ſome ſmall feather might adhere to them. Flowers were altogether proſcribed. Letters were opened by the perſon who brought them; and they were never read until they had been ſteeped long enough in vinegar to be purified without effacing the writing. Every thing was received into the houſe by means of a rope of herbage ſuſpended from a window. The governor employed every precaution which he thought likely to guard him from the contagion; and, by ſhutting himſelf cloſely up, he ſet an example which the reſt of the Mahometans did not neglect to follow. Beſides this he cauſed the ſtreets to be cleanſed; and carried his vigilance ſo far as to forbid the caravans which arrived from Damaſcus, where the plague ſwept off four or five thouſand people every day, to enter the city. He obliged them to ſubmit to a proof of eight days without the walls, and eſtabliſhed regulations of the ſame kind reſpecting veſſels coming

coming from Alexandria or Damietta. One precaution taken in the time of plague is, to prevent *cats* from entering houſes: an open war is therefore declared againſt theſe animals; and, wherever they are found, they are knocked on the head with large clubs. This is a cruelty abſolutely neceſſary; for there is no vehicle that will convey the infection with more certainty or rapidity than the hair of cats. Rats and mice multiply in conſequence of their deſtruction; but there is no inſtance of their ever having propagated the plague. This diſeaſe, when it attacks men, ſpares quadrupeds and birds. The furs of the one, and the feathers of the other, however, attract and communicate the infection. People ought particularly to keep from goats and ſheep; from horſes and oxen little is to be apprehended.

All theſe precautions were ſometimes ineffectual. The French at Acre, who there, as well as throughout Syria, are collected into one quarter, uſed every precaution that could be thought of, yet, on the 30th of March, 1760, five of them were infected. They belonged to the hoſpital of the Holy Land, and the monks were inſtantly ordered to ſhut themſelves up. They did ſo; and eight of them died, one only eſcaping.

Mr. Howard likewiſe gives particular accounts of the precautions uſed in ſeveral different countries through which he travelled. In Malta two kinds of quarantine are performed; one for ſhips with clean bills, the other for thoſe with foul. The former laſts 18 days.* The crews and paſſengers are allowed to buy proviſions, and converſe by means of encloſures with ſtone poſts and paliſadoes. A letter received from a Turkiſh ſhip was taken by a pair of iron tongs, dipped in vinegar, put into a caſe, and laid for about a quarter of an hour on a wire grate under which ſtraw and perfumes had been burnt; after which the letter was taken out and opened by one of the directors. In this iſland ſhips with foul bills muſt perform quarantine eighty days; but, at the end of forty, may change their ſtation. The different kinds of goods are ſeparated and placed in proper order under cover.

* At Aleppo 20. (Ruſſel.)

cover. The cottons are taken out of the bags containing them, and placed on rows of piles on boards, laid on ſtone pillars about 18 inches from the floors; and, in repacking them they are flung over a man who gets into the bags, and treads down the cotton; the conſequence muſt be the expoſing him to great danger, ſhould any infection remain.

Mr. Howard took a voyage to Venice in a ſhip with a foul bill, on purpoſe to know every thing relative to the performance of quarantine. "A meſſenger (ſays "he) came in a gondola to conduct me to the new "lazaretto. I was placed, with my baggage, in a boat "faſtened by a cord ten feet long to another boat in "which were ſix rowers. When I came near the land-"ing place the cord was looſed, and my boat was puſh-"ed with a pole on the ſhore, where I was met by the "perſon appointed to be my guard. Soon after un-"loading the boat, the ſub-prior came and ſhowed me "my lodging; a very dirty room, full of vermin, and "without table, chair or bed. That day and the next "morning I employed a perſon to waſh my room; but "this did not remove the offenſiveneſs of it, or prevent "that conſtant head-ach which I had been uſed to feel "in viſiting other lazarettos and ſome of the hoſpitals "in Turky. My guard ſent a report of my health to "the office, and, on the repreſentation of our conſul, I "was removed to the old lazaretto. Having brought "a letter to the prior from the Venetian ambaſſador at "Conſtantinople, I hoped now to have had a com-"fortable lodging. But I was not ſo happy. The "apartment, conſiſting of an upper and lower room, was "no leſs diſagreeable and offenſive than the former. I "preferred lying in the lower room, on a brick floor, "where I was almoſt ſurrounded by water. After ſix "days, however, the prior removed me to an apartment "in ſome reſpects better, and conſiſting of four rooms. "Here I had a pleaſant view; but the rooms were "without furniture, very dirty, and no leſs offenſive than "the ſick wards of the worſt hoſpital. The walls of my "chamber, not having been cleaned perhaps for half a

"century,

" century, were ſaturated with infection. I got them " waſhed repeatedly with boiling water, to remove the " offenſive ſmell, but without any effect. My appetite " failed, and I concluded I was in danger of the ſlow " hoſpital fever. I propoſed whitewaſhing my room with " lime ſlaked in boiling water, but was oppoſed by " ſtrong prejudices. I got this, however, done one " morning through the aſſiſtance of the Britiſh conſul, " who ſupplied me with a *quarter* of a buſhel of freſh " lime for that purpoſe. The conſequence was, that " my room was immediately rendered ſo ſweet and freſh, " that I was able to drink tea in it in the afternoon, and " to lie in it the following night. On the next day the " walls were dry, as well as ſweet, and in a few days I " recovered my appetite. This room was lime-whited in " November, and in a very rainy ſeaſon. In the fol- " lowing March, in complaining to the under ſheriffs in " Newgate of their inattention to the clauſe which or- " ders this in the act of parliament for ſecuring the " health of priſoners, their excuſe was, that they were " afraid of dampneſs."

An health-office was eſtabliſhed at Venice in 1448, in the midſt of a very deſtructive peſtilence. The old and new lazarettos are both built on little iſlands, ſurrounded not only by canals, but high walls. They have only a ground floor, and one over it, and are divided and ſubdivided into a great number of apartments, each having an open court in front, with plats of graſs, which is not ſuffered to grow too high; nor are any trees ſuffered to grow within this diſtrict, or a good way from it. The internal government is managed by a prior, who muſt not be related to the magiſtracy nor any of its miniſters. He muſt have no intereſt nor concern in ſhipping nor in trade. He muſt ſee all the gates and doors of the apartments locked every evening by ſunſet; he takes the keys into his poſſeſſion, and ſuffers them not to be opened before ſunriſe; and, in caſe of any ſuſpicion of infection, the gates muſt be kept conſtantly locked, and opened only for neceſſary occurrences in preſence of the prior. He muſt not ſuffer

dogs, cats, &c. to lodge in the lazaretto. He muſt neither buy nor ſell, nor ſuffer others to do ſo, within the lazaretto. No fiſhing boats or other ſmall craft to come within a certain diſtance, or keep communication with thoſe performing quarantine. Proviſions are received by poles ſeven or eight feet long, and the money dipped in vinegar and ſalt water before it is received. The prior and his ſubſtitute muſt carefully avoid touching either goods or paſſengers in quarantine, and for this purpoſe they keep a cane to make thoſe who approach them keep their proper diſtance; but if by an unfortunate accident they ſhould be contaminated, they muſt perform quarantine. Any perſon maliciouſly touching them is liable to puniſhment.

Ships are ſtrictly forbid to uſe any ropes but ſuch as are tarred. Wool, ſilk, cotton-wool, woollen and linen clothes, and furs eſpecially, are accounted the moſt dangerous goods. Animals with long hair are ſubject to full quarantine; but ſhort haired ones purged by ſwimming aſhore; feathered animals, by ſprinkling with vinegar till wet.

The celebrated Dr. Mead, though an enemy to the cruel mode of abandoning the ſick, or treating them with any kind of harſhneſs, was perfectly ſenſible of the neceſſity of uſing every precaution for preventing peſtilential contagion from being imported. In his opinion it is not ſufficient that ſhips ſhould perform quarantine, "the only uſe of this being to obſerve whether any die "among them. For infection may be preſerved ſo long "in clothes among which it is once lodged, that as "much, nay, more of it, if ſickneſs continues in the ſhip, "may be brought on ſhore than at the beginning of the "forty days, unleſs a new quarantine be begun every "time any perſons dies; which might not end but with "the deſtruction of the whole ſhip's crew." He is therefore of opinion that lazarettos ought to be eſtabliſhed on ſmall iſlands near the ſea-coaſt; and in this Mr. Howard agrees with him. The latter recommends the lazaretto at Leghorn as the beſt in Europe. Dr. Mead alſo very much inſiſts on the utility of deſtroying the clothes

of

of the ſick, becauſe, ſays he, they harbour the very *eſſence of the contagion.* He quotes in favour of this opinion what Boccacio ſays he *ſaw* at Florence in 1348; viz. that two hogs, finding in the ſtreets the rags which had been thrown out from off a poor man dead of the diſeaſe, after ſnuffling upon them, and tearing them with their teeth, fell into convulſions, and died in two hours. This is one of the things which Dr. Moſeley looks upon to be incredible. It is indeed very marvellous, and ſeems to be contradicted by M. Deidier's account of the dog at Marſeilles who ſwallowed with impunity the filthy pus and peſtilential matter adhering to the dreſſings of plague ſores: but, when a perſon of credit informs us that he *ſaw* any thing, we ſcarce know how to contradict him. The evidence of peſtilential contagion adhering to clothes, does not depend on ſuch accounts. That lately quoted from Dr. Caneſtrinus is deciſive on the ſubject; and he informs us that one of the methods uſed by himſelf to ſtop the plague in Zboina, above mentioned, was, the burning of the clothes of infected perſons. He ſays that the peſtilential contagion reſembles that of the ſmall-pox, in being of a fixed nature; and that all who ſtudiouſly avoided communication with the ſick, or with whatever fomes might carry the contagion, eſcaped it altogether. "That the contagion of the plague (ſays he) "may lie dormant for a conſiderable time, and be car-"ried to a great diſtance by the medium of packages, &c. "and again revive with its former violence, is proved by "various circumſtances. *Chenot* relates, in his treatiſe "on the plague which raged in Tranſylvania, that the "infection was revived a whole year after it had diſap-"peared; and other ſimilar inſtances are adduced." If this revival happened from infected clothes or ſoft goods, it ſhows them to be dangerous in the extreme; but of this we have not any direct proof, neither indeed is ſuch a belief quite conſiſtent with what takes place in all plagues, viz. that the clothes of the infected are worn by the ſound, without producing any reinfection. In the great plague at London, for inſtance, where an hundred thouſand probably periſhed, and a much greater number muſt have been

been infected, we cannot ſuppoſe that all the clothes belonging to ſuch an immenſe multitude were burned, or never made uſe of again. It is of neceſſity therefore that we ſuppoſe the peſtilential contagion to become effete, and to loſe its virulence, after ſome time; and this ſeems to be very much haſtened by expoſure to the atmoſphere. The doing of this, however, by obliging people to put their naked arms into bales of ſuſpected goods, has ſuch an appearance of cruelty, that Dr. Mead has propoſed to judge of the preſence or abſence of infection by allowing little birds to fly about among them; "becauſe (ſays he) it has been obſerved, in times of "the plague, that the country has been forſaken by "the birds; and thoſe kept in houſes have many of "them died." But, though he ſays this upon very great authority, no leſs than that of Diemerbroeck, yet we can by no means look upon the fact to be abſolutely determined. Dr. Ruſſel indeed ſays that the deſertion of the birds is looked upon by the Turks to be the *ſign* of an approaching plague; but this failed in 1760. Thucydides ſays that birds of prey deſerted the territory of Athens during the great plague in his time; and he ſuppoſes them to have been poiſoned by feeding upon the bodies of ſuch as died of the diſeaſe. It is poſſible that ſuch food might be diſagreeable to them, but no proof is brought of any of them having been actually poiſoned by it. As for birds kept in houſes, it is poſſible that in a time of general calamity they might have been neglected, and died for want of proper food, &c. Dr. Mead alſo quotes an inſtance which cannot be credited in a conſiſtency with undoubted teſtimonies that peſtilential contagion does not extend but for a very little way. Upon opening an infected bale of wool in the field near Cairo, "two Turks employed in the work were immediately killed, and ſome birds which happened to fly over the place dropped down dead." Such accounts have ariſen from a ſuppoſition that the whole maſs of atmoſphere was violently infected; but this would be totally inconſiſtent with the life of any human creature, and we may well put down this, as that of peſtilential infection

fection arifing from cities like a cloud, as merely chimerical.* It is too well known that peſtilential contagion, inſtead of ſoaring in the air, keeps very near the ground.

We now come to the ſecond mode of prevention, viz. removing theſe local cauſes which, in the opinion of ſome, may produce a plague in any country, and, in that of others, may increaſe or ſet in action the contagion previouſly exiſting. Theſe cauſes have been enumerated by the late Dr. Smith,† in a Diſſertation on the peſtilential Diſeaſes which at different times appeared in the Athenian, Carthaginian and Roman armies, in the neighbourhood of Syracuſe. They are, 1. The climate and ſeaſon. 2. The ſituation of the armies; and, 3. Their condition. The climate of the iſland of Sicily in general he obſerves is extremely pleaſant at ſome ſeaſons of the year; in the neighbourhood of Syracuſe particularly ſtorms are ſo infrequent during the former part of the year, that the ſun is never obſcured for a whole day. Even in the month of January, however, the weather is warm, and as the ſeaſon advances the heat becomes inſupportable. In autumn it is rendered ſomewhat unpleaſant and unhealthy by the frequent rains and chillneſs of the evenings. But, in particular places, during the hotteſt ſeaſon, nothing can exceed its unhealthineſs. According to Barichten, "the leaſt ſtagnant water is ſuffi-"cient, in the heats of ſummer, to poiſon the atmo-"ſphere: its effects on the countenances of the poor "people who live in its vicinity are evident; and a "ſtranger who travels through the iſland in this ſeaſon "ought to avoid ever paſſing a night near them." De Non ſays, that "as ſoon as the ſun enters the Lion, this "country becomes the houſe of death: fevers of the "moſt

* About the mouth of the river Gambia in Africa, after the annual inundation of the river, the putrefaction of the mud, mixed with animal and vegetable ſubſtances, becomes ſo great, that the birds manifeſt their diſguſt by ſoaring to an immenſe height in the air. This is a natural conſequence of the levity of putrefactive vapours compared with the common atmoſphere. As theſe vapours, however, are compoſed of ſeveral kinds of gaſes, it is poſſible that ſome may deſcend, while others aſcend; and thus the contagious part, tending to the earth, may violently affect the people who are confined among it, while the birds eſcape; but there is ſtill wanting ſome poſitive evidence that ever the true plague did ariſe from this cauſe.

† Med. Repoſitory, vol. ii, p. 367.

" moſt malignant kind ſeize on the imprudent or un-
" fortunate wretch that ſpends a night near them (ponds
" and marſhes) and few eſcape with life when attacked
" by ſo virulent a diſorder."

To the poiſonous effluvia of theſe marſhes the Doctor attributes, in an eſpecial manner, the plagues which took place in the armies. In the ſecond year of the Peloponneſian war, the Athenian army was encamped, as we are told by Thucydides, " upon marſhy and unwholeſome ground;" and that ſuch kind of encampments will produce diſeaſes in an army is well known. In the time of Dionyſius, when the Carthaginian army under Imilco ſuffered ſo dreadfully, or rather was totally deſtroyed, his camp was ſituated on an eminence between two moraſſes, the heat at that time being exceſſive. Hannibal, the predeceſſor of Imilco, had alſo loſt great part of his army by a plague, though he had been encamped in a healthy ſituation; but, in order to raiſe a wall which ſhould overlook the city, he had taken the materials of the tombs found in the common burial place, the city at that time containing two hundred thouſand inhabitants. " From the uncovering and diſturbing of
" ſo many dead bodies (ſays our author) aroſe a terrible
" peſtilence, which carried off immenſe numbers of the
" Carthaginians, and amongſt the reſt the general him-
" ſelf." To the unhealthy ſituation of the armies alſo the Doctor aſcribes the plague which took place in the Roman and Carthaginian camps in the time of the ſecond punic war; and the Carthaginians ſuffered moſt, by reaſon of their being nearer to the marſhes. The ſtate of mind, the cleanlineſs of the perſon, &c. alſo muſt be taken into account; and our author ſhows that neither of theſe could be ſuppoſed favourable to the Carthaginians.

That perſonal cleanlineſs, and breathing pure air, ſhould contribute to the health of individuals, or to any number of them collected into camps or cities, ſeems to be agreeable to reaſon and common ſenſe; nevertheleſs we find that this has been denied, and even Dr. Caneſtrinus ſays that " in the plague of Lyons and Marſeilles
" it

" it was obſerved, that the moſt populous parts of theſe " cities, *where the ſtreets were narrow and filthy*, ſuffered " *leſs* from the diſeaſe than thoſe which were more airy " and clean. At the time of the plague in London in " the time of Charles II, the phyſicians adviſed that all " the *privies* ſhould be opened and expoſed; the fetid " odour from which having pervaded the city, the plague " was ſtopped! Is it from this cauſe (the author aſks) " that the plague has ſeldomer viſited Spain, the towns " of which are intolerably offenſive from their want of " cleanlineſs?"*

This certainly ſeems a very ſtrange doctrine, nevertheleſs the fact that Spain is but little ſubject to the plague ſeems undeniable, and as it is no leſs certain that the towns are exceſſively filthy, it would ſeem that cleanlineſs is not effectual in preventing it. But, however agreeable the ſmell of human excrements may be to the Spaniards, or to the Engliſh phyſicians in former times, it ſeems to be leſs ſo at preſent. "I am perſuaded " (ſays Dr. Ferriar) that miſchief frequently ariſes from " a practice common in narrow back ſtreets of leaving " the vaults of privies open. I have often obſerved " that fevers prevail moſt in houſes expoſed to the efflu- " via of dunghills in ſuch ſituations." In Spain the opinion ſeems to have been but lately eradicated; for ſome years ago, an order having been iſſued by government that the ſtreets of Madrid ſhould be kept ſomewhat cleaner, the people were ſo much exaſperated at being threatened with the loſs of the ſavoury odour, that a rebellion had almoſt enſued, and the phyſicians declared the ſmell of human excrements to be the moſt wholeſome thing in the world.†

That

* Medical Review, vol, iii, p. 260.

† It ſeems, however, of late, that at leaſt the city of Madrid is kept clean. Swinburne ſays, ſpeaking of the palace at Madrid, " To the weſt it has the " town, the three principal ſtreets of which terminate in the Pravo. Theſe " are three noble openings, excellently paved, and clean even to a nicety; " indeed ſo are moſt of the ſtreets of Madrid ſince the edict for paving and " cleaning them.* The foreigners that reſided here before that time, ſhudder " at the very recollection of its former filth. Some of the natives regret the " old ſtinks and naſtineſs; as they pretend that the air of Madrid is ſo ſub-

" til

* Dillon has a like remark in his "Travels through Spain."

That the confinement of human effluvia, along with heat and want of water, will produce a malignant fever, is certain from the example of the unfortunate people confined in the Black Hole at Calcutta. In this caſe the diſtemper ſeems to juſtify the opinion that plague may be artificially produced, perhaps more than any other upon record; for Dr. Ferriar informs us that it was attended with eruptions reſembling thoſe of the true plague. In this caſe, however, the confinement was beyond example in any ſituation which can be ſuppoſed incident to a city or camp. There is no country in the world where the inhabitants are equally numerous with thoſe of the empire of China, its population at preſent being eſtimated by Sir George Staunton at *three hundred and thirty-three millions*, a number equal to *one third* of the ſuppoſed inhabitants of the whole globe; of conſequence the cities muſt be immenſely crowded with inhabitants; yet it remains free from plagues. Human effluvia therefore, in the moſt populous ſtate in which mankind can exiſt in ſociety, *are not* able to taint the atmoſphere of a country or city. The following is Dr. Clark's account of that celebrated empire: "The "whole empire of China is repreſented to be extremely "delightful; the ſoil rich, the air pure, and the induſ-"try of the inhabitants aſtoniſhing. As it produces "every luxury and neceſſary of life, it is juſtly eſteemed "one of the moſt fertile countries in the world. As the "Chineſe prohibit emigration, and ſeldom or never en-"gage in war, their country is extremely populous. "Every river maintains a proportion of inhabitants ade-"quate to the land, whoſe families live continually in "boats, without having any other place of reſidence. "Their number of people lays them under the neceſ-"ſity

"til as to require a proper mixture of groſſer effluvia, to prevent its pernicious "effects upon the conſtitution. The extremes of cold and heat are aſtoniſhing "in this place, and the winds ſo ſearching, that all the Spaniards wear lea-"thern under waiſtcoats, to preſerve their cheſts; for they pervade every "other kind of clothing."

The former filthineſs of Madrid, together with its being ſituated in a climate expoſed to the viciſſitudes of extreme heat and cold, and its exemption from the plague under thoſe circumſtances, certainly preſents a moſt ſolid objection to the theory of the domeſtic origin of plague. To the ſame purpoſe ſee below the remarks on the climate of China.

" ſity of carrying induſtry to the greateſt height; for " otherwiſe their country, fertile as it naturally is, would " be inſufficient to maintain the inhabitants. Every " inch of land is cultivated; no foreſts nor woods, nor " even a ſingle tree, is ſuffered to obſtruct the labours " of the huſbandman. Canals are cut every where to " water the fields, and marſhes are manured for the " cultivation of rice. By theſe means health and plenty " are, in a great meaſure, the portion of its inhabitants " through all the ſeaſons of the year. The only terrible " and fatal diſeaſes to which they ſeem to be ſubject " are the ſmall-pox and leproſy.

But, though our author determines in general that the air of China is pure, this cannot apply to every part of it without exception. On the contrary he deſcribes in the following manner Wampoa, a village about fourteen or ſixteen miles below the city of Canton, on Canton river: " It is the uſual ſtation of all European " ſhips in this river. On one ſide the land is low, " marſhy, and covered with water, forming ſwamps fit " only for the cultivation of rice. The extent of theſe " ſwamps is conſiderable; the tide riſes high, and over- " flows great part of them; but the interſection of the " rivers renders them more pure than they would other- " wiſe be, and conſequently the air is much healthier " than one could expect from the unfavourable aſpect."

In like manner Canton city he ſays " is built on a " very extenſive plain, and is large and populous. Here " the government allow the Engliſh, Dutch, French, " Danes and Swedes ſeparate factories on the banks " of the river. The city, though paved, is very wet in " rainy weather; and the water makes its way under " the factories of the different nations every tide. The " houſes are built with bricks; the apartments are in " general ſmall, and not very lofty, and the ground " ſtories are very damp. When the buſineſs of the ſea- " ſon is over, the ſupercargoes remove to Macao, a " Portugueſe iſland, ſubject to the Chineſe government. " The city of Macao is ſituated on a riſing ground; " the whole iſland is dry, rocky and barren; it is, how-

" ever, plentifully ſupplied with proviſions by the Chi-
" neſe; and, though the air is very ſultry, yet it is to-
" lerably healthy."

From the preceding account it is plain, that the cauſes which operate in the production of plagues and epidemic diſeaſes in other countries, though they exiſt in China, do not act there with equal efficacy. At Wampoa the marſhes in the neighbourhood muſt, in the hot ſeaſon, emit noxious effluvia as well as any where elſe, and there can be no certainty that the overflowing of the tide is ſufficient to put a ſtop to their malignant influence. At Canton the water penetrates below the floors of the houſes, and we have ſeen from Dr Fordyce* that *in other countries* the ſprinkling of a floor with clean water, and the encampment of an army upon ground where water was found at a ſmall depth below the ſurface, were ſufficient to produce fevers; yet here it is not ſo. In this city alſo the inhabitants are numerous, and the apartments ſmall; ſo that neither the perſpiration of multitudes, nor the moiſt exhalations from water ſtagnating in the ſtreets, nay, under the houſes themſelves, are able to produce the diſeaſes in queſtion. Again, at Macao the ſultry heat of the air has as little effect as the reſt.

Laſtly, in Pekin, the capital, the population and the crowd are immenſe. According to Sir George Staunton,† the city is about one third larger than London; but, as he ſuppoſes‡ it to contain three millions of inhabitants, the population muſt be twice and a third-part as great as that of London in proportion to its bulk. " The low
" houſes of Pekin (ſays he) ſeem ſcarcely ſufficient for ſo
" vaſt a population; but very little room is occupied by
" a Chineſe family, at leaſt by the middling and lower
" claſſes of life. In their houſes there are no ſuperfluous
" apartments. A Chineſe dwelling is generally ſur-
" rounded by a wall ſix or ſeven feet high. Within
" this encloſure, a whole family of three generations,
" with all their reſpective wives and children, will fre-
" quently

* See p.p. 171, 172. † Authentic Account of an Embaſſy, &c, vol. ii, p. 34.
‡ Ib. p. 39.

" quently be found. One ſmall room is made to ſerve " for the individuals of each branch of the family, ſleep- " ing in different beds, divided only by mats hanging " from the ceiling. One common room is uſed for " eating."

Where diſeaſes are prevalent, circumſtances of the kind juſt mentioned would certainly be urged as evident *cauſes* of them; but in China we ſee that *ſomething* diſarms ſuch cauſes of their power. People, however, ſeldom want a ſalvo for any thing. " The crowds of " people, at Pekin (ſays our author) do not prevent it " from being healthy. The Chineſe indeed live much " in the open air, increaſing or diminiſhing the quan- " tity of their apparel according to the weather. The " atmoſphere is dry, and does not engender putrid diſ- " eaſes; and exceſſes productive of them are ſeldom " committed." But, if the dry air at Pekin contributes to the health of the people, why does not the moiſt air of Canton produce diſeaſes? Beſides, in this empire there are multitudes of people who live entirely upon the water, in a kind of houſes conſtructed upon *junks*, employed in carrying grain from place to place, or for other purpoſes.* Sir George Staunton computes the number of inhabitants on a branch of a ſingle river to be no leſs than an hundred thouſand. What then muſt they be throughout the whole empire! Yet theſe people, though continually expoſed to moiſture, as well as to an almoſt inconceivably crowded ſituation, are yet no more ſubject to epidemics than others. Our author does not ſpecify the *exceſſes* which produce diſorders. Intemperance in drinking no doubt is one of them; but Dr. Patrick Ruſſel expreſsly ſays, that he never ſaw an inſtance of the plague being brought on by intemperance.

Laſtly, with regard to living in the open air, Mr. M'Lean has aſcribed to the viciſſitudes of this element the principal if not the *only* cauſe of epidemics. " A fact worthy of notice (ſays he) is, that aged perſons " and children are both ſeldomer and leſs ſeverely at- " tacked

* Authentic Account, &c. vol. i, p. 230.

" tacked by epidemics and peſtilential diſorders than " the young and middle aged, and women ſeldomer and " leſs ſeverely than men. Now, if contagion was the " ſource of theſe diſeaſes, the caſe would be exactly re- " verſed. Old people, women and children, being more " in the way of contagion, would be more frequently " and more ſeverely attacked. But the young and mid- " dle aged, being more expoſed to the *viciſſitudes of the* " *atmoſphere*, the principal ſource of thoſe diſeaſes, they " are conſequently more ſeverely attacked. It has been " a puzzling queſtion to ſolve why old people and chil- " dren are leſs expoſed to plague, &c. but the ſolution " will be no longer difficult if it ſhould be proved that " theſe diſeaſes are *always* produced by certain ſtates or " viciſſitudes of the atmoſphere, together with the appli- " cation of other powers co-operating in the production " of indirect debility." In the country we ſpeak of, however, this ſolution fails in a manner almoſt as evident as can be imagined. " The removal of the embaſſy, " (ſays Sir George Staunton) was a diſappointment to " ſeveral perſons belonging to it, who had made arrange- " ments for paſſing the winter at Pekin. Judging of its " temperature by the latitude of the place, a few minutes " under 40° north, they were not aware of the violent " effect of the great range of high Tartarian mountains, " covered perpetually with ſnow, upon that capital, " where the average degree of the thermometer is under " twenty in the night during the winter months, and " even in the day time is conſiderably below the freezing " point. The uſual inhabitants were guarded againſt " cold, not only by habit, but by an increaſe of clothing " in proportion to its intenſeneſs, conſiſting of furs, wool- " len clothes and quilted cottons. They are not accuſ- " tomed to the preſence of fire. They have no chim- " neys, except to kitchens in great hotels. Fires, on " which Engliſhmen chiefly depend againſt ſuffering by " the ſharpneſs of the atmoſphere, could not well anſwer " that purpoſe in houſes which are ſo conſtructed as to " admit the external air almoſt on every ſide. Stoves " are, however, common in large buildings. Theſe

" ſtoves

" ſtoves are ſituated frequently under the platforms on " which the inhabitants ſit in the day time, and reſt at " night. The worſt weather experienced in that capi- " tal might be conſidered as mild by the Tartars, com- " ing from a climate ſtill more rude ; but other foreign- " ers are ſaid to feel themſelves leſs comfortable at Pekin " in the winter than in the ſummer, though the heat is " then raiſed to the oppoſite extreme. In both they " ſeem to require a ſeaſoning. *Several individuals of the* " *embaſſy fell ill during their ſtay ; and all did not recover.* " The human frame ſeems calculated for the hotteſt " rather than the coldeſt atmoſphere, and to exiſt at " the equator rather than the pole."

Here we are involved in difficulties much greater than before. It appears that even the fine climate of China is healthful only to its own inhabitants. They can bear the *viciſſitudes* of the air, which Europeans cannot. The prevention of plagues or mortal diſeaſes then muſt conſiſt in ſome mode of living by which people can accommodate themſelves to the country which they inhabit, and without which every other precaution will be ineffectual. The diſeaſes with which the attendants of the ambaſſador were ſeized could not be owing to any ſlovenlineſs or dirtineſs in their lodgings or food, or to want of apparel ; nor were they more expoſed to the inclemencies of the air than others ; only they were in a ſtrange country, where that inexplicable conſtitution of the elements acted upon them in a manner different from what it did on the natives, and, while it was friendly to the latter, proved pernicious to the former. But there was a time when even China was as unhealthy as other countries ; for the great plague in 1346 began in the northern part of it. We have ſeen, in a former ſection, that this was preceded by the moſt dreadful and violent wars throughout the whole Aſiatic continent. Since the ceſſation of theſe violent wars the Chineſe have ſtaid at home, and applied themſelves to the arts of peace, particularly to agriculture, which they have carried, we may ſay, to its utmoſt perfection. This ſeems therefore to be the true method of removing all thoſe local cauſes which

which produce epidemics, or at leaſt of preventing them from doing hurt; and, without attention to the natural duties and occupations of man, it is to be feared that all artificial modes of prevention will be found not only precarious but ineffectual.

Dr. Smith in the diſſertation above mentioned obſerves, that "it may be doubted whether any *moral* "cauſe would be ſufficient to protect, for a long period, "an unaccuſtomed reſident in a marſhy ſituation from "the uſual conſequences." This is no doubt very probable; but, from the example of Lord Macartney's attendants in China, it appears equally probable that it makes little difference whether the country be marſhy or not. Dr. Lind has many excellent obſervations upon the ſubject of unhealthy countries, and gives particular directions for ſtrangers how to act, when obliged to expoſe themſelves to the inclemencies of the weather; but none of theſe being effectual in preventing the acceſs of the true peſtilence, we muſt ſtill adhere to the old Latin adage already quoted, p. 302. Flight ſeems to be the moſt effectual method. To avoid migrations to thoſe countries where it uſually rages, and, if it were poſſible to perſuade the inhabitants of ſuch countries, to imitate the example of Chineſe induſtry, inſtead of allowing the greater part of the territories they poſſeſs to lie waſte, would in all probability gradually leſſen both the frequency and violence of this terrible diſeaſe. Migrations of large bodies of people, eſpecially for the purpoſes of war, are greatly to be dreaded. If a few Engliſhmen, poſſeſſed of every thing neceſſary, could not keep their health at Pekin, what muſt have been the probable conſequence of landing an army of an hundred thouſand, with a view to conqueſt? Or what could we expect if the Chineſe were to "pour forth by millions" into other countries in order to conquer them? Dr. Lind takes notice that even of the firſt Portugueſe adventurers to Africa, ſuch as eſcaped the firſt ſickneſs continued afterwards to enjoy good health. He likewiſe obſerves that many who left Britain, after being ſeaſoned to the countries to which they went, choſe rather

rather to remain abroad for life, than to run a new riſk by going back to their own country. It is not therefore ſo much the greater unhealthineſs of the country to which we go, as the *change*, which is to be dreaded. If therefore great bodies of men will employ themſelves in conſtant rambling from one country to another, no wonder that diſeaſes break out among them, unknown, either in the countries they have left, or thoſe to which they go.

We come now to the third mode of prevention, viz. that of deſtroying the infection after it has begun to exiſt. This is varied according to the nature of thoſe things which we ſuppoſe to be infected. The general notion of infection taking place in the atmoſphere has been already ſpoken of; but the uncertainty of this hypotheſis, and the apparent impoſſibility of altering a conſtitution of the atmoſphere, muſt certainly leave very little room for hope in this caſe. It hath, however, been attempted by various methods. Hippocrates adopted the opinion that *all* diſeaſes were produced by the air, and from him it was borrowed by Lucretius, as we are informed by the annotator on Creech's Tranſlation of that author. "In his book *de Flatibus* (of "winds) ſays the annotator, after a long narration of "the effects that the air produces, he at length falls on "the ſubject of diſeaſes, all of which he affirms to be "bred and generated in the bodies of animals by means "of the air. Firſt (ſays he) I will begin with the moſt "common ſevorous diſeaſe, which accompanies, in a "manner, all diſeaſes whatever. For there are two ſorts "of fevers, one that is promiſcuous, and common to "all, and is called the *plague*; the other, by reaſon of "unhealthful diet, is peculiar only to ſuch as uſe that "diet; but of both theſe kinds of fevers the air is the "ſole author and cauſe, for the common fever or plague "happens alike to all, becauſe they all breathe the ſame "air: and it is certain that the like air, being alike min-"gled in like bodies, muſt beget like fevers." In conſequence of his theory, this great phyſician adviſed to have recourſe to fire as a purifier of air in times of peſtilence.

But

But experience doth not warrant the ſucceſs of this method; neither indeed can we ſuppoſe that it could be ſucceſsful, unleſs people were able to kindle ſuch fires as would abſorb the whole atmoſphere of a country. This method was tried in London without the leaſt ſucceſs; nay, ſeemingly with bad effect; for, the very night the fires were lighted, more than four thouſand people died; and, a few days after, an end was put to the experiment by ſuch violent rains as extinguiſhed all the fires at once.

The burning of infected clothes has already been taken notice of; but though this muſt certainly prevent any new infection from ariſing from *theſe* clothes, it will not prove that the infection may not evaporate during the time of burning, and, being volatilized even beyond its natural pitch, by the heat, may do miſchief at a greater diſtance than could have happened had they been let alone. The inſtance, formerly quoted from Dr. Huxham, of the ſmall-pox being diſſeminated by the ſmoke of burning infected clothes, if not a *proof*, affords at leaſt a ſtrong preſumption, of the danger of ſuch a practice. The only way of perfectly enſuring ſafety in ſuch a caſe would be to burn them by the ſea-ſide, when the wind blows from the ſhore. Were the ſmoke allowed to paſs over land, and great piles burnt at once, it is impoſſible to ſay how far the contagion might be carried.*

Another mode of purification is by expoſing ſuſpected goods to heat, to the vapour of vinegar, &c. fumigating with gun-powder, ſulphur, &c. and on this principle various powders of fumigation have been invented, ſome of which are ſaid to have been very ſucceſsful in Ruſſia; and the compoſition of one is given by Dr. Alexander Ruſſel in his Natural Hiſtory of Aleppo; but all theſe are undervalued by Dr. Guthrie,† who calls the practice of fumigation or ſmoking, an "inadequate and ineffectual ceremony." Dr. Mitchel, alſo diſcommends them, ſaying that they are adviſed "without any "proof that theſe deſtroy peſtilential matter, and while, "at

* In the time of the great fire at London, in 1666, aſhes are ſaid to have been carried to ſixteen miles diſtance.

† Duncan's Med. Comment. vol. viii, p. 350.

" at the ſame time, it is certain that they diminiſh more " or leſs the wholeſomeneſs of the atmoſphere with " which they are mingled."* Of late the vapours of pure nitrous acid (the *nitric*, according to the new nomenclature) has been recommended, with the boldeſt appeal to experience; but the conſideration of this naturally belongs to the ſecond part of this work, where we ſhall have occaſion alſo to conſider the theory of the ſeptic acid. In the mean time we muſt go on with ſome farther account of the different modes of fumigation.

" There is no better corrective (ſays Allen from Die- " merbroeck†) of a peſtilential air, than fire; as much " experience has taught us. Hippocrates ſubdued and " extinguiſhed that famous plague, which came amongſt " the Grecians from Ethiopia; for he commanded great " fires to be kindled throughout the whole city, eſpe- " cially in the night time, to purge away the pollutions " of the air. It is believed that a fire made with juni- " per-wood or aſh, tends much to correct the venomous " corruptions of the air. The kindling of ſulphur and " gun-powder purify the air, and drive away its corrup- " tions; ſo does the burning of amber, pitch, frankin- " cenſe, &c. ſo do the fumes of vinegar raiſed with red- " hot irons, or bricks." According to Etmuller, " Hip- " pocrates drove away *that famous plague* in Greece by " the uſe of ſulphur; the fumes of it are very much " commended to correct the air, and make drink more " wholeſome; it prevents all manner of corruptions and " alterations, as well as the putridinous alteration of the " blood. In a great degree of malignity, the ſhirt and " clothes may be impregnated with the fume of " ſulphur."

Here we have accounts of a diſeaſe, called *that famous plague*, driven away by two different methods; and, to complete our dilemma, Dr. Caneſtrinus tells us that the *plague at Athens* is ſaid to have been ſtaid " by ſprinkling the ſtreets with wine." What an expenſive remedy, when the odour of *privies* was afterwards found to anſwer

* Med. Repoſ. vol. ii, p. 435. † Synopſis, vol. i, p. 80.

ſwer as well! "Whilſt the plague was raging at Ocza-
"kow, an *earthquake** happened on the very day that it
"began to decline. In this caſe did any vapour iſſue
"from the earth deſtructive of the peſtilential conta-
"gion? or did former noxious exhalations ceaſe in
"conſequence of the convulſion of the earth?† Sor-
"bait relates, that, in the time of the vintage in the
"neighbourhood of Moſelle, the plague ceaſed like a
"miracle, while the muſt was in a fermenting ſtate.
"At Vienna likewiſe it was obſerved that, during and
"at the cloſe of the vintage, the diſeaſe manifeſtly de-
"clined; which may have been owing to the great
"quantity of fixed air in the atmoſphere."

To this our author adds, that "places adjoining to
"ſpice-ſhops have generally remained free from infec-
"tion; and, in the plague of London, all thoſe em-
"ployed in ſhipbuilding eſcaped the diſeaſe. Smiths
"alſo and cooks remained uninfected." M. Volney tells us that, in Egypt, water-carriers are exempted; and Baldwin, that oilmen are in the ſame happy predicament; while on the other hand Allen quotes Boerhaave ſaying, that "Foreſtus, Diemerbroeck, the French,
"Engliſh, and Germans, obſerved, that all dealers in
"ſoap, waſhers, and all who by their buſineſs uſed ſoap,
"nay, *who only wore ſhirts waſhed with ſoap*, preſently
"died of the plague."

From ſo many and ſo diſcordant opinions, the only concluſion we can draw is, that, when once a peſtilence has invaded a country, there is not any poſſibility of operating upon the contagion in ſuch a manner as to deſtroy it. If the plague ceaſes, it muſt do ſo naturally, and

* Earthquakes, as we have already ſeen, might be accounted rather a *ſign* or *cauſe* of the beginning of peſtilence, than of its departure. A great quantity of electricity in the atmoſphere has accordingly been enumerated among the ſigns of an approaching peſtilence. Thus in Burnet's Theſaurus, p. 699, we find among the previous ſigns of a plague, "plurima et fere continua nocturna fulgora, ſine pluviis et tonitruis, cœlo non nubiloſo exiſtante." Very much and almoſt continual lightning at night, without rain or thunder; the ſky in the mean time not being covered with clouds.

† Before we can attach any degree of probability to either of theſe ſuppoſitions, it muſt be proved that plagues ariſe out of the earth. But this, though as plauſible as many other hypotheſes, is not yet ſupported by any direct proof.

and we *cannot* accelerate this ceſſation. This is entirely conformable to the opinion of Dr. Patrick Ruſſel. Speaking of the decline of the plague at Marſeilles, and the vigorous exertions of the magiſtrates to put a ſtop to it, he ſays, "The cauſes now enumerated might no "doubt have ſome effect, but a more powerful and "general cauſe had begun long before to reſtrain the "havock of the peſtilence, which had declined viſibly "in the month of September, and in thoſe of October, "November and December declined with a rapidity "not aſcribable to the exertions of the moſt vigorous "police. This cauſe is generally ſuppoſed to be ſome "change in the conſtitution of the air; but which has "hitherto been defined with no better ſucceſs than that "peculiar ſtate of the atmoſphere which, in conjunction "with contagion, is abſolutely neceſſary to render the "plague epidemical."

Dr. Ruſſel takes notice of the methods of extinguiſhing contagion already mentioned, by kindling fires, &c. and diſapproves of them. We ſhall not therefore ſpend more time in conſidering whether or not there is any probability of eradicating or mitigating the violence of a plague when once it is introduced. However this may be impracticable in ſo large a ſpace, it ſeems that it certainly may be done in ſmaller ſpaces, ſhips for inſtance; or, if not with the true plague, at leaſt with malignant and infectious fevers. Dr. Trotter, in his Medicina Nautica, has laid down methods for accompliſhing this, and expreſſes the higheſt confidence in their ſucceſs. He adopts the doctrine of *contagion*, of which he gives the ſame definition that in this treatiſe is given of *infection*, viz. "Something propagated from diſeaſed "bodies, or from ſubſtances that have been in contact "with them, producing a ſimilar diſeaſe in other per-"ſons*—the propagation of contagion, as well as its "reception into the healthy body. A more aggravated "degree of malignity will generate a greater quantity of "infection, and, as it may be confined in a larger or "ſmaller ſpace, it will be leſs or more noxious. A fe-

"ver

* Medicina Nautica, p. 173, *et ſeq.*

" ver may be called malignant, when, with the ſymptoms " of debility, there is a cadaverous ſmell ariſing from the " body, an unuſual fœtor of the breath, ſtools, and other " excretions, the tongue black and parched, the eye " duſky or yellow, the countenance bloated and dejected, " and the ſkin ſallow. In approaching a ſick bed of this " kind, a perſon not much accuſtomed to ſuch viſits " will be very liable to receive the infection; and the " unpleaſant ſmell will be much ſooner perceived than " by the phyſician or other attendants. We conclude " that a malignant typhus is more apt to generate con- " tagion, becauſe ſlight caſes are found not to extend " to others, even though no mode of precaution has been " uſed. The diſeaſe itſelf is incapable of generating in- " fection, till after a certain period; but this period is " uncertain: it ſeems to depend on the nature of the " ſymptoms, whether they are mild or malignant. *We* " *are aſſured of this fact, from a timely ſeparation having* " *prevented the farther progreſs; and by this means* ALONE, " *I apprehend, we eradicate contagion in* SHIPS, *or* ANY " WHERE ELSE. In the ſmall-pox* the diſeaſe ſeems " incapable of infecting another perſon before the ſecond " or third day of the eruption. With the meaſles it is " otherwiſe. The diſeaſe may be propagated at the " moſt early ſtage of the eruption; and, if I was to be al- " lowed to conjecture on the ſubject, I would ſay, that " the contagion is the offſpring of the catarrh (the cough " and hoarſeneſs reſembling a cold) which accompanies " the meaſles.

" Subſtances imbued with the exhalations from in- " fected bodies, if not expoſed to the air, have their pow- " ers of communicating the diſeaſe increaſed; or, in " other words, the infection from *fomites* (infected cotton, " clothes, &c.) is ſaid to become more virulent than it " was when firſt ſeparated from the body. " I am

* In the plague, Dr. Ruſſel has obſerved, that thoſe who die in a very ſhort time are much leſs ready to communicate infection, than thoſe who live longer. He alſo takes notice, that " the plague, though a contagious diſeaſe, is " not equally contagious in every period of the peſtilential ſeaſon. In the " beginning thoſe frequenting the ſick often eſcape unhurt, or one only, out " of ſeveral, is infected. The eſcape of perſons employed about the ſick, " proves a frequent cauſe of miſleading the popular opinion of the diſeaſe, and " has in many inſtances occaſioned much miſchief, by encouraging the neglect " of due precautions till too late."

" I am of opinion, with others, that the exhalations or " excretions of the ſick are the vehicles of contagion. It " is theſe which impregnate the atmoſphere with nox- " ious matter: they affect in like manner bed-clothes, or " apparel, and every thing that can imbibe them, when " in contact with the diſeaſed body. When bed-clothes, " or body-linen, but particularly ſilk or woolen cloth, " have been expoſed to theſe exhalations, and then heap- " ed together for a length of time, the noxious efflu- " via are, as it were, multiplied, and will more certainly " infect others than they did at firſt. The bales of goods " which brought the plague to Marſeilles, and affected " the people that opened them ſo ſuddenly, had their " virulence increaſed by not being duly ventilated. " When the jail-fever was brought into court by the " priſoners at Oxford aſſizes, and more lately at the " Old Bailey, the fever was propagated from the clothing " of the priſoners; no doubt, from being confined in " impure, ill-aired cells, this infection became more vi- " rulent. The highly concentrated ſtate of contagion, " in the bales of goods, could only have been brought " to that degree of virulence from the cloſeneſs of the " package: it cannot be ſuppoſed that human beings " could have put them together otherwiſe. The nurſes " of hoſpitals know well, as Dr. Lind tells us, that there " is moſt danger of catching a fever when they pile " heaps of bed-clothes or body-linen together for a " few days, before it is carried to the waſh-houſe. The " waſher-women at Haſlar have alſo told me the ſame " thing. They know when a dangerous fever is in the " hoſpital by the bad ſmell of the clothes: this makes " them air them abroad, till the ſmell is gone, and then " they can waſh them with ſafety. But, if it happened, " from the hurry, that this could not be done, or if it " was neglected by deſign, many of them were ſeized " with the ſickneſs. The porters and people employed " in cleaning and fumigating the blankets and beds at " Haſlar are well acquainted with this fact, and they " meaſure the danger by the badneſs of the ſmell. This " ought to inſtruct every body to ſtand to windward of

theſe

" theſe infected ſubſtances when they are opened; as " the current of air would then carry it the other way. " In one of the courts of juſtice, the people who ſtood " between the priſoners and a window, into which the " wind blew, eſcaped the infection, while thoſe on the " other ſide were ſufferers.

" In the ſummer of 1793, while the Oreſtes brig, com- " manded by Lord Auguſtus Fitzroy, lay at Plymouth, " ſhe was anchored very near and to leeward of an " army tranſport, which had on board a very malignant " fever among the ſoldiers. While the ſoldiers were " moved on deck, to go on ſhore to the hoſpital, the " crew of the Oreſtes, from curioſity, walked on deck to " look at them. Such was the concentrated ſtate of " the contagion among the clothing and bedding of " theſe troops, on bringing them from below, that " eighteen people belonging to the brig were quickly " ſeized with the ſame fever, the infection of which " had been conveyed by the current of wind. It did " not, however, extend much farther in the Oreſtes, " from the attention of her commander. But this " ought to be a caution for ſhips to keep clear of thoſe " that have fevers on board, as a *virulent* CONTAGION " *may be conveyed to a conſiderable diſtance.*

" Dr. Lind is inclined to think that waſhing the " bed-linen in hot water, even when firſt ſhifted, is at- " tended with much riſk; and that the noxious matter " may be volatilized by the heat of the water, and affect " the woman. For this purpoſe he has recourſe to his " favourite proceſs, of *fumigation*, to inſure the waſher- " woman. The heat of his fumigating furnace would " no doubt dry the linen, and exhale any moiſture; but " our practice in the Charon (the hoſpital ſhip) was, to " plunge every thing as it came from the bed into a tub of " hot water kept ready on purpoſe. The linen was waſh- " ed and dried immediately after. We had in that hoſ- " pital many malignant caſes of typhus, and ſome deaths, " yet no infection was ever ſpread there."

Our author next proceeds to inquire into the cauſe of this exceſſive concentration of the infectious matter in *fomites*,

fomites, or clothes, bed-clothes, bale-goods, &c. The moſt plauſible reaſon, he ſays, that could for ſome time be aſſigned for this, "was, the generation of animalcula; "the cotton or woollen clothing was ſaid to ſerve as a "neſt for the corpuſcles to multiply; and thus the con- "tagion was thought to increaſe ſeven fold." This theory had an effect on the practice of phyſicians, both as to the prevention and cure of fevers ſuppoſed to proceed from thence. Our author looks upon the hypotheſis to be chimerical, becauſe none of theſe animalcules have ever been made viſible by the beſt microſcopes. But there is no neceſſity for ſuppoſing the animalcules to be inviſible to the naked eye. They may creep on the ground, or fly in the air, without being obſerved by us. Mr. Baker's diſcovery of the inſect which not only poiſoned *eleven hundred thouſand* times its bulk of water, but infected a much greater bulk of air, with its effluvia,* ſhows that ſuch a thing may be *poſſible*; and in dubious matters bare poſſibility ought always to produce inquiry. If the perſpiration of human bodies when confined becomes noxious, why may not that of a multitude of inſects be ſo too? There is no neceſſity for ſuppoſing that an inſect muſt be ſwallowed, or inhaled by the breath, before it can do hurt. What Dr. Trotter ſays of the variolous contagion emitted from the human body will apply equally to inſects. "What has "been called the inſenſible perſpiration (ſays he) which "ariſes from the ſurface and the lungs, we have a right "to believe carries with it in ſolution a portion of the "variolous matter which charges the atmoſphere with "the contagion of ſmall-pox, even in ſuch quantities as "to impregnate the clothing of attendants and viſitors; "by which means it has been frequently carried to fa- "milies and villages many miles diſtant from its ſource." The ſmallneſs of ſize of inſects can be little objection here. A ſkunk is but a ſmall animal, yet it ſpreads its odour farther than an hundred diſeaſed human bodies could propagate the plague.† On

* P. 189.

† Here, I hope, it will not be thought unreaſonable to digreſs a little in favour of the ſenſations of humanity, which on all occaſions ought to predominate

On this ſubject, however, we may remark, that though the nurſes and attendants on hoſpitals meaſure the degree of infection by the ſmell, yet people are by no means ſafe in approaching patients about whom no ſmell can be perceived. We have already ſeen, from Dr. Fordyce, that what may be called the *pure* infection of fevers is not perceptible by any of our ſenſes; and there are examples of very offenſive ſmells iſſuing from diſeaſed bodies without any contagion enſuing. Dr. Trotter tells us, that "a patient in typhus was ſent from the "Venerable to the hoſpital ſhip, with a fœtor about "him, that exceeded any thing of the kind that ever "came within the Doctor's knowledge. After being "waſhed and ſhifted, it ſtill continued, and was per-"ceived at a conſiderable diſtance. He died in a few "days, yet nobody was infected from him, either in his "own ſhip, or in our hoſpital. There was probably "ſome peculiarity of conſtitution here." In M. Deidier's experiments, above related, the dog which eat the dreſſings of the plague ſores, after being infected with the diſeaſe, emitted a very diſagreeable odour, but we do not find that the odour was in any way infectious. In the Encycloped. Britan. art. Med. *Hydrophobia*, we find an account of an hydrophobic patient (and a patient who recovered) in whom the blood drawn from a vein was as black as ink, and ſtunk abominably, yet this ſtench was attended with no bad conſequence. There is therefore no eſſential connexion between offenſive ſmells and contagion; yet, as they are ſometimes united, the abſence of the ſmell ought not to encourage us raſhly to go into ſuſpicious places, neither ought the preſence of it to deter us from venturing where we have otherwiſe good reaſon to do ſo. Having

minate in our minds. Birds are the natural enemies of that hateful claſs of beings we call *inſects*, and which in general are the natural enemies of man. In proportion to the havock we make among the former, the latter will multiply upon us whether we will or not. The wanton, indiſcriminate, and I may add *provoking*, deſtruction exerciſed among this uſeful as well as beautiful and agreeable part of the creation, muſt certainly be ſometimes attended with bad conſequences. Though birds feed on many different kinds of inſects, yet there are exceptions. If then we totally exterminate a ſpecies of birds, is it not probable that a ſpecies of inſects might appear, the miſchief done by which we could not be able to counteract? *Quere*. Is it not poſſible that the *Heſſian fly* may have made its appearance from this cauſe?

Having given up the doctrine of animalcula, the Doctor goes on to explain the doctrine of concentrated contagion in a manner very similar to that given in this treatiſe, viz. from the decompoſition of ſome kind of gas. "The fœtor of the breath (ſays he) perſpirable "matter, &c. evidently demonſtrate that they differ from "the healthy ſtate. The ſmell, to our ſenſes, comes very "near what is called *ſulphurated-hydrogenous gas*. Some "of the fluids within the body would ſeem to be in ſome "degree in a ſtate of actual decompoſition; unleſs we can "ſuppoſe the mucous glands of the lungs ſecreting a fluid "that taints the expired air in this manner. The decom-"poſition of the fat, which ſometimes diſappears very ſud-"denly in fevers, may give ſome ground for the ſuppoſi-"tion that a large portion of theſe exhalations are com-"poſed of hydrogenous gas. But, whether we can go thus "far or not, what is ſeparated from the body, it is plain, "is more diſpoſed to decompoſition than when the "body is in health. Now this proceſs will ſtill go on, "whether expoſed to the atmoſphere or not, with this "difference, that, by expoſing ſubſtances which have "imbibed the exhalations of the diſeaſed to a free air, "the noxious gaſes will be diſſipated as quickly as they "are evolved; while, on the other hand, by laying the "clothes in a heap, packing them firm in a cheſt, or "making up cloth into ſmall bales, the gaſes are con-"centrated into a ſmall ſpace; and woe to the man "who firſt inſpires them. . . . Now this does not hold "out an idea that the powers of contagion are multiplied, "as by generation; for that would be to ſay, that theſe "gaſes are *themſelves* what we call the matter of infec-"tion. I would only go ſo far as to aſſert that they are "the vehicles of it, till more certain experience ſhall "determine farther."

With reſpect to fumigations with nitrous acid, our author repeatedly declares that he has no confidence in them; nay, he brings inſtances where they ſeemed to have bad effects. But as the diſpute about fumigation has no connexion with the true plague, nitrous acid having never been uſed as a preventive for it, we ſhall defer any

farther conſideration of it to the ſecond part of this treatiſe, to which it naturally belongs.

We come now to the fourth and laſt mode of prevention, viz. a conſideration of thoſe means by which an individual, without ſeparating himſelf from ſociety, and who is daily obliged to have communication with the ſick, may yet ſecure himſelf againſt infection. Here the means recommended are extremely various, and ſome of them ſo oppoſite, that we can ſcarce avoid ſuſpecting them all. The misfortune is, that though a perſon ſhould go, without fear, among the ſick, though he ſhould conſtantly take a medicine, and ſhould never have the diſtemper, yet we cannot ſay whether the medicine did preſerve him or not. Were it poſſible to know the particular conſtitution of the body which diſpoſed ſome to reſiſt the attack of the diſeaſe, attempts might be made to bring the conſtitutions of others to the ſame ſtandard; but unfortunately our ignorance here is ſo great, that any attempt to alter the conſtitution of the body has generally proved unfortunate even in other diſeaſes. Dr. Lind informs us, that the firſt Portugueſe adventurers in Africa, having obſerved, that "ſuch as had "the good fortune to eſcape a fit of ſickneſs or death, "ſoon after their arrival, enjoyed afterwards a pretty "good ſtate of health, thence concluded, that the blood "of ſuch perſons had been entirely changed by the diet "of the country. Upon this erroneous principle they "adopted a moſt fatal method of ſeaſoning people to "theſe unhealthy climates. They, by ſmall quantities, "frequently repeated, took away as much blood as they "ſuppoſed to be contained in the body, and thus they "reduced the patient to a ſtate of extreme weakneſs."

From its being obſerved that people of delicate conſtitutions are leſs liable to the plague than others, ſuch a miſtake probably has alſo been made with regard to this diſtemper, but with equally bad ſucceſs. Allen tells us from Diemerbroeck, "*Phlebotomy*, though migh-"tily cried up by many of the ancient and modern "phyſicians, yet we reject it altogether, *as very dangerous* "*and detrimental*; for it appeared by experience that "thoſe

" thoſe who made uſe of it for prevention's ſake were " ſeized with the plague ſoon after bleeding, wherefore " we forbad it to all." This may ſeem ſurpriſing, as we find bleeding ſo much recommended by Sydenham as a remedy; but by others it is equally reprobated; nay, Dr. Hodges tells us that he never knew but one who recovered from the diſeaſe after the uſe of it. Iſſues ſeem more likely, if not to prevent, at leaſt to render the diſeaſe more mild if it ſhould attack. They are recommended by Diemerbroeck, and Ruſſel ſpeaks of them as, " by ſome authors, repreſented as almoſt infallible." He cannot, however, recommend them from his own experience, having never ſeen them opened for the purpoſe of preventing the plague; and he juſtly obſerves, that when habitual on any other account, they may perhaps loſe their effect in this. " Multitudes (ſays he) of " both ſexes at Aleppo had iſſues in their arms, it being " there a very common remedy in a variety of chronic " diſorders: but, notwithſtanding thoſe outlets, num- " bers periſhed; and I did not remark that thoſe who " had them were in any degree leſs liable than others to " be infected."

Tobacco has been recommended as an excellent preſervative, particularly by Diemerbroeck, who writes with a kind of enthuſiaſm in its favour. " Being called " (ſaid he) to viſit a patient afflicted with the plague, as " ſoon as I entered his chamber I felt a moſt offenſive " ſmell of excrements (for he had a diarrhœa) with " which I was greatly affected. Leaving the houſe " after a very ſhort viſit, I inſtantly found myſelf ſeized " with giddineſs, naufea, and uneaſineſs at the heart; ſo " that I had no doubt of my having caught the peſtilen- " tial contagion. Laying aſide all buſineſs, therefore, I " immediately returned home, and ſmoked five or ſix " pipes of the beſt tobacco; by the uſe of which all the " above-mentioned ſymptoms ſo totally vaniſhed, that " I felt not the leaſt uneaſineſs any more. Then, being " again deſirous to go abroad and viſit other ſick peo- " ple, I took a drachm of theriaca, and from thence- " forward was in perfect health. The ſame thing hap-

" pened

" pened to me three or four times during the time of " this peſtilence; and without loſs of time, according " to the quantity of infection I ſuppoſed that I had " taken in, I had recourſe to the more plentiful uſe of " tobacco, by which my health was reſtored. I always " looked upon tobacco to be an excellent preventive " remedy, and its ſmoke I have ſometimes found uſeful " to myſelf even in an incipient attack of the diſeaſe.*" He then proceeds to inform us of a report that in a violent plague at London all the dealers in tobacco were exempted. At Nimeguen, however, they were not ſo fortunate; yet of the family of the principal tobacco merchant (Thomas Peters, an Engliſhman) which was very large, none were infected, excepting only one ſervant maid, and ſhe quickly recovered.

On this remedy Dr. Ruſſel makes the ſame remark as on the iſſues. " The cuſtom of ſmoking (ſays he) is " univerſal among both men and women at Aleppo. " This too, from its being habitually practiſed, might " perhaps loſe part of its prophylactic virtue: at the " ſame time thoſe who uſe it as a preſervative muſt " always be ſuppoſed in ſome degree accuſtomed to it, " otherwiſe the violence of its operation on moſt per- " ſons, on their firſt beginning to ſmoke, might prove " hurtful. It ſhould further be obſerved, that the to- " bacco commonly uſed in Syria is much milder than " the American, and that the oriental ſmokers ſeldom or " never ſpit."

It hath been obſerved that the plague is ſtopped either by great heat or great cold, but more readily by the former than the latter. " It has generally been ſuppoſed " (ſays Dr. Caneſtrinus) that the cold of winter was " deſtructive of contagious matter; but various inſtan- " ces of the contrary may be collected. The plague in " Tranſylvania continued through the very ſevere froſt " in 1709. On the contrary it has been found, that " exceſſive heat has extinguiſhed, or at leaſt diminiſhed, " peſtilential diſeaſes. During the plague at Aleppo " the weather was unuſually hot in the beginning of " July,

* Diemerbroeck, Hiſt. 17, lib. 4.

" July, and it was remarked that the diſeaſe declined " conſiderably; and in general Dr. Ruſſel obſerved, " that the plague ceaſed at the hotteſt ſeaſon of the " year. The plague at Ockzacow, which raged in the " years 1738 and 1739, began in the month of April, " and continued with violence till July, when it de- " clined conſiderably, and entirely ceaſed in the month " of September; in February of the year following it " re-appeared, and totally ceaſed in July."

From theſe facts we might be led to ſuppoſe that a warm regimen, or occaſionally expoſing the body to great heat, might be advantageouſly uſed by way of prevention; but Dr. Ruſſel juſtly obſerves, that the human frame, " could it ſupport ſuch an application of fire " and ſmoke as is neceſſary to expel or deſtroy contagion " from infected ſubſtances, would probably receive little " benefit from it, if infected; nor could thoſe in health " ſuſtain, without prejudice, the heat and denſe ſmoke " which is probably required for the perfect extinction " of the infectious effluvia floating in the confined at- " moſphere of a morbid body." He is of opinion, however, that ſome kinds of fumigations may be of uſe, and he mentions ſome of theſe, but ſays that the perfumes ordered by the college are perhaps as proper as any, though their forms might be rendered more ſimple. Heat alone can ſcarce be thought very proper for prevention, and, when the diſeaſe is once begun, is ſaid to be detrimental. Dr. Guthrie quotes Baron Aſh ſaying, that " in heated rooms the diſeaſe is ungovernable: it is only in free air that it is to be treated." But of late a diſcovery has been made of a ſurpriſing power in heated oil of removing this diſeaſe, inſomuch that, if we can believe what has been publiſhed of it, we muſt ſuppoſe it to be little leſs than a ſpecific. So great indeed has been the confidence put in this method, that, by order of the Academy of Sciences at Liſbon, it has been tranſlated into Arabic, French and Portugueſe.* " The " method was firſt propoſed by George Baldwin eſq. " agent for his Britannic Majeſty, and conſul-general at " Alexandria.

* Annals of Medicine for 1797, p. 373.

" Alexandria. He communicated his method to Lewis " de Pavia, chaplain and agent to St. Anthony's Hoſ- " pital at Smyrna; who, after five years experience, " pronounces it to be the moſt effectual remedy hitherto " made uſe of in the hoſpital of which he has had the " management for twenty-ſeven years. Immediately " after a perſon is perceived to be infected with the " plague, he muſt be taken into a cloſe room; and, over " a brazier of hot coals, with a clean ſponge, dipped in " warm olive oil, his body muſt be very briſkly rubbed " all over; for the purpoſe of producing a profuſe ſweat. " During the friction, ſugar and juniper berries muſt be " burned in the fire, which raiſe a denſe and hot ſmoke, " that contributes to the effect. The friction ought " not to be continued more than four minutes, and a " pint of oil is enough to be uſed at each time. In ge- " neral the firſt rubbing is attended by a very copious " perſpiration; but, ſhould it fail of this effect, the ope- " ration may be repeated, firſt wiping the body with a " warm, dry cloth; and, in order to promote perſpira- " tion ſtill farther, the patient may take any warm ſu- " dorific drink, ſuch as elder-flower water, tea, &c. It " is not neceſſary to touch the eyes; and other tender " parts of the body muſt be touched gently. Every " poſſible precaution muſt be made uſe of to prevent " the patient from taking cold, nor muſt the linen be " changed till the perſpiration has entirely ſubſided. " The operation ſhould be repeated once a day, until " evident ſymptoms of recovery begin to appear. If " there are already tumours on the body, they ſhould be " gently and more frequently rubbed, till they appear " to be in a ſtate of ſuppuration, when they may be " dreſſed with the uſual plaſters. The operation ought " to be begun on the firſt appearance of the ſymptoms " of diſeaſe; if neglected till the nerves and the maſs " of blood are affected, or a diarrhœa has commenced, " little hopes can be entertained of a cure; but ſtill " the patient ſhould not be deſpaired of, as, by an aſ- " ſiduous application of the means propoſed, ſome few " have recovered, even after diarrhœa had com-

" menced.

"menced. During the firſt four or five days the pa-
"tient muſt obſerve a very abſtemious diet; the au-
"thor allows only a ſmall quantity of vermicelli, ſim-
"ply boiled in water. Nor muſt any thing be taken
"for thirty or forty days, except very light food, as, he
"ſays, an indigeſtion in any ſtate of the diſorder might
"be dangerous. He does not allow the uſe of wine
"till forty days. There is no inſtance of the perſon
"rubbing a patient having taken the infection. He
"ſhould previouſly anoint himſelf all over with oil, and
"muſt avoid receiving the infected perſon's breath into
"his mouth or noſtrils. The precaution to be uſed in
"all circumſtances is that of carefully anointing the
"body, and living upon light and eaſily digeſtible food.
"Mr. Baldwin obſerves, that among upwards of a
"million of people carried off by the plague in Upper
"and Lower Egypt, in the ſpace of four years, he could
"not diſcover a ſingle oilman, or dealer in oil." *Liſbon, July*, 1797. *By Royal Permiſſion.*

With regard to diet, and the uſe of ſpiritous liquors, opinions, as may well be imagined, have been very diſcordant. Allen quotes Diemerbroeck adviſing *poor people* to take two or three ſpoonfuls of the beſt white wine vinegar every morning, which he looked upon to be one of the beſt preſervatives: he recommends alſo the frequent application to the noſtrils of a ſpunge dipped in *treacle vinegar*. With regard to himſelf he ſays that his principal care was to avoid uneaſy paſſions of the mind; and that when he found himſelf any way diſturbed by theſe, he cheered his heart by three or four glaſſes of wine: his common drink was beer, and alſo white wine, ſmall, or moderately ſtrong, which ſometimes he drank to cheerfulneſs, but never to drunkenneſs. Dr. Patrick Ruſſel alſo ſays, that "a glaſs of generous wine, or any
"other cordial more agreeable to the choice, may be
"taken before dinner, in caſe of languor, or oppreſſion
"at the ſtomach, from fatigue, fœtor, or apprehenſion.
"*I found a rummer of old hock very agreeable on ſuch occa-*
"*ſions.*" Allen goes on to inform us from Diemerbroeck, that, "as to diet, it is adviſeable in a peſtilential diſpo-

"ſition

" ſition to uſe temperance, which very much contributes " to the preſervation of health; but all ſudden changes " are dangerous; wherefore it is moſt dangerous ſudden- " ly to alter the uſual rule of diet. It is very ill in the " plague to go abroad with an empty ſtomach: hog's " fleſh is looked upon to be very pernicious: all ſweet " things are to be avoided: wine moderately made uſe " of is good, but the abuſe of it very dangerous.—Mer- " curialis teſtifies, that among the Patavians and Vene- " tians, moſt of the tipplers died, who thought to drive " out the plague with ſtrong wines." Mr. Howard informs us, that a perſon in high ſtation at Conſtantinople, attributed his recovery entirely to the uſe of *green tea*, others to *brandy*. He alſo mentions a Mr. Hare, maſter of a merchant veſſel at Senegal, who, during the prevalence of a malignant fever there, was very much expoſed to the infection, and who out of humanity waited upon a negro, whom nobody would go near. He took no medicines, neither did he taſte either ſpiritous or fermented liquors, and was the *only* European that entirely eſcaped the contagion.*

Theſe accounts ſeem to evince that little or nothing is to be expected from a change of diet. This is an attempt to change the conſtitution of the body, and cannot be expected to ſucceed any more than bleeding. There is a certain quantity, and a certain ſpecies, both of food and drink, different in different perſons, neceſſary to preſerve health, and thoſe who require both in larger quantity or better quality than others, are no more to be charged with intemperance than thoſe who are ſupported by the ſmalleſt quantity of the coarſeſt fare. In times of danger, therefore, thoſe who have been accuſtomed to ſpiritous liquors ought not to give them over; neither ought thoſe to begin the uſe of them who have not uſed them before. From the account formerly given of the ſtructure of the human body, it appears to be furniſhed with an apparatus for *exhaling* or throwing out a perſpirable matter as well as for *inhaling* or taking in

* The opinion of thoſe phyſicians whom Mr. Howard conſulted upon this ſubject are given at large in the APPENDIX.

in one equally ſubtile. How far the ſkin may be able to *inhale* or rather *imbibe* ſurrounding effluvia, may be doubted; but with the lungs there cannot be any doubt; and the effluvia taken into them muſt unqueſtionably affect the blood, and of conſequence the vital principle, almoſt without any medium. To deprive the body of its due portion of nouriſhment therefore is to *throw a temptation in its way* (if I may uſe the expreſſion) to abſorb *any thing*; and the ſame effect muſt enſue from any other mode of debilitating it, either by intemperance, terror, or the like; and hence to viſit infected places while under any ſuch debility muſt be very imprudent. Dr. Ruſſel agrees that it is a general and rational precept, never to go abroad faſting. For thoſe who cannot eaſily bear fatigue without eating between breakfaſt and dinner, ſome light food may be proper, at an intermediate hour, in order to avoid going into the chambers of the ſick with an empty ſtomach in the forenoon. "In ſuch circumſtances (ſays he) after a long and "fatiguing morning, I have often found myſelf diſagree-"ably affected in my latter viſits, and have been ſenſi-"ble of ſlight giddineſs, and of the appetite flagging at "dinner, as if ſomething lay on the ſtomach. I have "known others much more ſtrongly affected in this "manner, and conſequently much more alarmed. In "ſuch caſes much no doubt may depend on the fancy; "but in thoſe times the power of the imagination "requires management. So intimately is it connected "with the accidental ſtate of the body, that the ſame "riſk, from which a man ſhrinks in a ſtate of languor "and fatigue, he will encounter undauntedly after a "temperate meal: the ſtrange, unuſual ſenſations, which "amount almoſt to a perſuaſion of having caught the "infection, will often, like the phantoms of a viſion, "vaniſh after a few glaſſes of wine.* Whether any "ſlight

* This *doctrine* of *fancy*, or *imagination*, ought undoubtedly, as Dr. Ruſſel ſays of the imagination itſelf, to be under ſome management. The indiſcriminate uſe of the word has been carried to ſuch a length as in a manner to ſuperſede all evidence, teſtimony, argumentation or reaſon. With ſome it is ſufficient to diſcredit the moſt poſitive teſtimony (even upon oath) if they take

" ſlight degree of real infection can be thus diſſipated, " I ſhall not take upon me to determine; is is ſufficient " for the preſent purpoſe to indicate the means of re- " ſtraining thoſe alarming ſenſations which, when aggra- " vated by imagination, are apt to depreſs the ſpirits, " and, according to the general opinion, to reduce the " human body to that *relaxed*, *inhaling* ſtate peculiarly " ſuſceptible of contagion."

As to other modes of precaution, the Doctor adviſes that ſuch as are about the ſick " ſhould guard the mouth " and noſtrils with vinegar, avoid drawing in the breath " while cloſe to the bed ſide, or ſwallowing their ſpittle " while in the infected chamber. Before they approach " the bed in order to examine the eruptions, the bed- " clothes ought to be removed, to give time for the " diſperſion of a confined ſteam which immediately diſ- " covers itſelf to the ſenſes; and it will be adviſable " to dip the hands in vinegar before examining the " parts. On coming out of the chamber it will alſo " be proper to rinſe the mouth, and waſh the hands, " with vinegar, plain or camphorated." He adviſes alſo to

take it into their heads that ſuch a thing *cannot be*; which by the bye is as ſtrong an evidence of *ignorance* as any man can give. If imagination is given as a *cauſe*, the extent and nature of its powers ought to be aſcertained; but who has done this? On the contrary I may ſay that not one in five hundred who makes uſe of the word would be able to define it. But the moſt curious mode of reaſoning uſed by theſe *imaginary* gentlemen is, if they are aſked, " How do you prove that ſuch a thing is the effect of imagination?" they are ready to anſwer, " I can indeed bring no proof that it is ſo, but how do you prove that it is not?" Here the *imaginaries* have not *reaſon* ſufficient to ſhow them that *they* ought to bring a proof, and not thoſe who ſay they ſaw or felt any thing. But, waving this, *ſenſe* is the higheſt faculty in our nature; *imagination* as well as *reaſon* are inferior to it; becauſe neither the one nor the other can be converſant except about the objects of ſenſe. If any perſon therefore ſays that he *ſees* or that he *feels* any thing, nobody can, with any ſhadow of reaſon, ſay that he neither *ſaw* nor *felt* any thing. If one man ſees what another cannot ſee, while the ſuppoſed object is eaſily within reach of the eyes of either, then the one who cannot ſee it has a right to ſuſpect that the object is imaginary; but, if the perſon himſelf feels any ſlight pain or uneaſineſs, and that ſhould go off in a ſhort time, after drinking a glaſs of wine, there is as little reaſon to ſuppoſe that the pain was imaginary, as that the drinking of the wine was imaginary. In Dr. Ruſſel's caſe, though his ſtrength was in general ſufficient to reſiſt the contagion in which he was immerſed, yet, when that ſtrength began to decay, it was no wonder that he found the contagion beginning to invade: a few glaſſes of wine gave vigour to the ſyſtem, and enabled it to repel the attack. Had he been much fatigued with bodily labour, and found himſelf greatly relieved by a few glaſſes of wine, ſurely he would not ſuppoſe that his former fatigue was merely imaginary. Juſt ſo muſt it be in the former caſe; the one has no more to do with imagination than the other.

to fumigate the clothes with nitre, ſulphur, and juniper berries, burnt on a red-hot iron.

" Upon returning home it may be adviſable to ſhift " clothes immediately, hanging thoſe taken off upon " lines in a ſmall chamber, to be again ſmoked, and af- " terwards aired. The mouth and hands ought once " more to be well waſhed, and the hair might be fumi- " gated with a little nitre and ſulphur, by means of a " pipe, ſo as not to incommode the lungs.

One other mode of prevention, not of the diſeaſe, but of incurring danger from it, is inoculation. This is greatly recommended by Baron Aſh above mentioned, and not only for the plague among the human ſpecies, but for that among cattle, which frequently deſtroys great numbers of thoſe neceſſary animals. The caſe of Mathias Degio related p. 272, ſhows the practicability and the ſafety of it. The only ſolid objection that can be made to it is, that thoſe who have once had the plague are not ſecure from having it a ſecond time, or oftener. Yet, if we conſider the extreme fatality of the diſeaſe when it attacks in the natural way, and that the number of thoſe who have the plague only once is much greater than of thoſe who relapſe, this practice will certainly be found to merit conſideration, and, unleſs ſome objection to it be diſcovered greater than any that has yet appeared, ſeems likely to be advantageous to the human race in general.

SECTION V.

Of the Cure of the Plague.

FROM what has already been laid down in a former ſection concerning the nature of this diſtemper, it appears, in its worſt and moſt deadly form, to conſiſt in the ſudden breaking forth of a kind of hard mortifications, or rather eſchars, like thoſe made by fire, in different parts of the body. When theſe happen to fall upon

upon any of the vital parts, it is evident that no cure can be applied. When ſuch eſchars diſcover themſelves in abundance on the external parts, it is likewiſe obſerved that the patient certainly dies; whether from the ſame taking place inwardly, or from nature not being able to bear the loſs of ſubſtance, and to ſeparate ſo many deep eſchars, is uncertain: but this kind, which attacks without fever, has always been reckoned abſolutely incurable. When the tendency to internal mortification is leſs, and the fiery blaſts, if we may ſo call them, approach the ſurface, ſo that buboes or carbuncles begin to appear, there is then ſome hope that the patient may recover. Even here, however, the caſe muſt be conſidered as very doubtful, and we have ſeen that in Dr. Ruſſel's three firſt claſſes of patients not one recovered; nevertheleſs, as we are not always able to diſtinguiſh with certainty whether the patient is altogether beyond the power of medicine or not, excepting where the *tokens* formerly mentioned appear, this kind only is here diſtinguiſhed by the name of the *fatal* or inevitably mortal kind of plague. In all caſes, where there is time allowed, medicine ought to be employed; but, as in other diſeaſes, different theories have bred ſuch a contradiction of opinions, that it is with no ſmall difficulty we can judge which has any *probability* of ſucceſs. In this uncertainty, however, we muſt look upon thoſe who have recently had an opportunity of ſeeing the diſeaſe as ſuperior not only to thoſe who have only *read* of it, but even to the moſt celebrated ancient phyſicians who have written upon the ſubject. Thoſe who have had the beſt and lateſt opportunities of ſeeing the diſtemper are Drs. Alexander and Patrick Ruſſel at Aleppo, and the phyſicians to the Ruſſian army when the plague raged in it in 1770, &c.

Dr. Alexander Ruſſel begins with obſerving that "the diſcordant opinions of medical writers concerning "the method of treating the plague are innumerable. "In regard to bleeding and other evacuations, they "maintain opinions diametrically oppoſite; ſome recommending them as indiſpenſably requiſite, others decry-

"ing

" ing them as invariably pernicious; while both parties, " with equal confidence, appeal to experience. But, in " a diſeaſe wherein reaſon is often perplexed, and expe- " rience itſelf fallacious, it is greatly to be lamented that " nature is not more, and opinion leſs, conſulted.

" No traces of any ſatisfactory method of cure are to " be met with among the natives at Aleppo. The Ma- " hommedans, holding the plague to be a penal curſe in- " flicted by Almighty God on a ſinful people, have leſs " faith in the efficacy of medicine in that diſeaſe than " any other: and, as the chief of thoſe who practiſe " phyſic are either Chriſtians or Jews, not armed with the " doctrine of predeſtination, and conſequently apprehen- " ſive of contracting the infection, they (the phyſicians) " endeavour to confirm the vulgar notion of the inuti- " lity of their art in the plague, with a prudential view " of evading the danger of being forced to viſit the ſick. " Hence the greateſt part of the infected are either left " to ſtruggle with the diſeaſe without any aſſiſtance " from medicine, or are under the neceſſity of ſubmit- " ting to the direction of the meaneſt and moſt ignorant " of mankind."

The whole practice of the native phyſicians conſiſts in bleeding, let the ſtage of the diſtemper be what it will, and afterwards attempting to raiſe a ſweat with the inſignificant remedy of a few grains of bezoar mixed with the diſtilled water of ſcorzonera. On the ſubject of evacuations our author remarks, that bleeding, even very plentifully, was always uſeful in the beginning, but as conſtantly prejudicial after the firſt day. Vomiting was equally uſeful at the ſame period; with mere warm water, if that would anſwer the purpoſe, but if not, ſmall drops of ipecucuanha or ſal vitrioli might be added. Violent cathartics were hurtful, but an emollient clyſter or laxative of manna and cream of tartar were not only ſafe but ſerviceable. " On the ſecond day of the diſ- " eaſe (ſays the Doctor) where the remiſſions of the " ſymptoms were tolerably diſtinct, I have frequently " and ſucceſsfully given an infuſion of ſenna with manna " and cream of tartar; and it is a fact confirmed to

" me

" me by repeated experience, that a purgative of this " lenient kind, given after the critical ſweat, was the " moſt effectual means of promoting the ſuppuration of " the buboes.

" The natural criſis of the diſeaſe was always by the " ſkin. When a copious ſweat could be procured by " art, it was likewiſe of ſervice; but the attempt, if " made the firſt day, was attended with two material " inconveniences: the firſt, that the common diapho- " retic medicines, if given in the uſual doſe, if they " failed in their operation, threw the patient into a " flame, and greatly augmented all their ſymptoms; " the ſecond, that, though they produced the deſired " effect, it was neceſſary to keep up the ſweat a much " longer time than moſt people of that country could " be perſuaded to endure; and, if the ſweat was prema- " turely checked by expoſure to the air, all the ſymptoms " were either exaſperated, or (what was often the caſe) " a diarrhœa was induced, which, though at firſt it might " ſeem to relieve, yet generally proved fatal in the " end."

Contrayerva and valerian, ſaffron, the compound powder of contrayerva of the Edinburgh College, are recommended as ſudorifics; given in ſmall doſes every four hours, with acidulated diluent drinks. Theſe medicines were occaſionally joined with anodynes, among which ſyrup of poppies was reckoned preferable to opium. In caſes of diarrhœa, Venice treacle or diaſcordium were joined with the diaphoretics. Neither bark nor ſnakeroot could have a fair trial, on account of the prejudices of the people: and on this occaſion our author obſerves, that " the phyſician who would obtain a " ready compliance with his directions, in that country, " muſt as ſeldom as poſſible offend the palates of his " patients with nauſeous remedies; for, whatever may " be the conſequence, they will often rather chooſe to " incur diſtant though great riſks, than avoid them by " ſubmitting to preſent inconveniences." Nitrous medicines were found ineligible on various accounts: 1. They did not, as in other diſeaſes, allay heat. 2. The

ſick

ſick could not bear them in ordinary doſes without languor and dejection. 3. They were apt to bring on a diarrhœa.—The following is an epitome of our author's practice:

1. Bleeding from ten to twenty ounces as ſoon as poſſible after the ſeizure. The quantity ſeldom exceeded ſixteen ounces, and even this is greatly above what is taken in any other diſeaſe in that country.

2. After bleeding, where the nauſea was conſiderable, the ſtomach was cleanſed with warm water; or, if that failed, with ipecucuanha or ſalt of vitriol. It was of ſuch importance to have both theſe evacuations performed early, that our author inſtructed moſt of his acquaintance how to act if they ſhould be infected.

3. A gentle anodyne ſucceeded the vomit. If by it the ſtomach was not quieted, an ounce of diaſcordium, or 15 drops of laudanum, were added to the ſaline draught of Riverius.

4. Small doſes of cordial and diaphoretic medicines, with a very ſmall quantity of antimoniated nitre, were exhibited every four hours; the ſick were encouraged to drink freely of a decoction of ſcorzonera roots and barley, or ſpring water moderately acidulated with ſpirit of vitriol. A mixture of the acid with ſyrup of violets was kept ready to be added to plain water. All the drink was given warm if the patient would be prevailed upon to take it ſo.

5. In the winter the ſick were removed into more airy lodgings than thoſe in which they uſually ſlept, and the air of the room was warmed or corrected by a moderate fire. In ſummer only the windows oppoſite to the patient's bed were ordered to be ſhut; but even this reſtriction was not univerſally complied with; many inſiſting upon ſetting all the windows open in the day time, and ſleeping on the houſe top at night.

6. In caſe of faintneſs and uneaſineſs, a cordial, compoſed of ſome of the ſimple diſtilled waters, tinctures of ſaffron and valerian, alkermes, and ſpirit of vitriol, was uſed with advantage and great refreſhment to the ſick. This with plenty of acidulated drinks was the chief preſcription for infected children. Under

Under the above treatment, a ſweat often broke out on the ſecond or beginning of the third day; after which the ſick were covered up, and the ſweat encouraged as long as they could be perſuaded to bear it. By this firſt ſweat, eſpecially if it happened on the ſecond day, the patient was never freed from the fever, though greatly relieved. It was therefore neceſſary to continue the ſame medicines, in order, by a more plentiful ſweat, to procure a perfect criſis. Where the ſweat was ſuppoſed to be ſufficiently copious, and had greatly mitigated the ſymptoms, a mild cathartic was given in the morning, though ſome degree of fever ſtill remained; the other medicines not being intermitted during its operation. An anodyne was given in the evening.

In caſe of an exacerbation of the ſymptoms or the depreſſion of the buboes, as ſometimes happened on the ſecond or third day, it was uſeful to apply a bliſter juſt below the tumour. A bliſter to the head was uſeful in caſes of coma and debility of the tongue. The natives were exceedingly averſe to the uſe of bliſters; but, having obſerved that ſome who had been judged paſt recovery had nevertheleſs ſtruggled through, apparently from the uſe of bliſters, they at laſt came into ſome degree of credit. Cataplaſms, compoſed of garlic, bread and vinegar, were advantageouſly applied to the ſoles of the feet. Theſe, as well as bliſters, were uſeful in caſes of coma; alſo emollient laxative clyſters. The doſe of the alexipharmics was increaſed, and acidulated drinks, in ſmall quantities at a time, given frequently.

To the buboes it was cuſtomary to apply ſuppurative cataplaſms; but, as theſe could not, where the patient was deſirous of walking, be eaſily kept on, a diachylon gum plaſter was ſubſtituted, with the addition of a few cantharides, or a little euphorbium, if a greater ſtimulus was judged neceſſary. In moſt caſes the buboes were left to open of themſelves; the natives being afraid of the lancet or cauſtic, and ſometimes operators being wanting. No bad conſequence enſued on their being left to open of themſelves, nor was any particular treatment neceſſary. Where they mortified, the treatment

was

was the ſame as in carbuncles, and though, after the ſeparation of the gangrened parts, the ulcer often remained wide and deep, yet they healed kindly and in a ſhort time.

Sometimes the carbuncles were ſcarified, but oftener not. The beſt dreſſings were pledgits of yellow baſilicon, with a ſmall proportion of oil of turpentine, or ſometimes tincture of myrrh, with an emollient cataplaſm over all.

Dr. Patrick Ruſſel complains that, in Turky, phyſicians are laid under ſuch reſtraints, by popular prejudices, that they are ſometimes obliged to remain almoſt paſſive ſpectators of the diſeaſe. The natives are fond of bleeding, and will at any time let blood in the hot ſtages, when the febrile ſymptoms run high. About two thirds of the infected were bled at the arm; but from the rapid progreſs of the diſeaſe, and the quick tranſition to the low, languid ſtate, few were bled more than once, and that uſually within the firſt forty hours. The time of bleeding was uſually the firſt night, or ſome time on the ſecond day; but ſometimes not till the third. Where the operation was repeated, it was uſually on the third, ſometimes on the fifth, and even on the ſixth; he has even met with inſtances wherein the patient was three or four times bled, the laſt being as late as the ſeventh day. In his own practice he uſually adviſed one bleeding at the beginning, except in the very young, aged, or infirm. On the firſt day, if not forbid by circumſtances, bleeding was ordered by way of precaution; but on the ſucceeding days it was regulated by the ſtate of the pulſe, and other ſymptoms. Where the infection was ſlight, and the febrile ſymptoms moderate, or did not come on till ſome days after the eruptions, it was wholly omitted. The quantity of blood taken away ſeldom exceeded eight or ten ounces. Cupping was uſed by the natives, but never ordered by Dr. Ruſſel. Children were ſcarified in the legs. He ſeldom had an opportunity of examining the blood drawn from a vein; but, in ſuch caſes as occurred, the general appearance was little different from that of healthy blood; the craſſamentum

was ſometimes of a darkiſh colour, but never fizy or reſolved.

With regard to the propriety or impropriety of bleeding, or at leaſt the ſucceſs attending it, we can beſt judge from the hiſtories of caſes given by Dr. Ruſſel at the end of his work. Of theſe there are an hundred and twenty, with ſome ſupernumeraries, giving an account of the caſes of the attendants, &c. Of theſe, ſixty-five were bled; forty died, and twenty-five recovered.

Of theſe hundred and twenty caſes at large, fifty-ſeven recovered, as many died, and the event of ſix was unknown. This would tend to give us ſome conſiderable idea of the Doctor's ſucceſs; but, when we take into account the time of the year in which theſe caſes were treated, the matter will appear in a quite different light. Twenty-ſeven took place moſtly in the earlier part of the ſeaſon, and were of conſequence more violent than the others; and, of theſe, twenty-one died, five recovered, and the event of the other caſe was uncertain. Of the reſt only thirty-ſix died, and fifty-four recovered. Such an exceſſive diſproportion cannot be aſcribed to the medical treatment, but to the nature of the diſeaſe itſelf, growing milder as it extended wider. In many of theſe caſes it is not mentioned whether the patients took any medicines or not; nevertheleſs, as it muſt always be ſuppoſed that a phyſician would preſcribe ſomething for his patient, it muſt alſo be ſuppoſed that all took medicines, excepting where we are expreſsly told that they did not. The caſes in which he mentions the medicines employed were the following:

1. A young man of 20, ſuddenly ſeized, was bled largely; had a vomit of ipecacuanha, which brought off a quantity of bile, but without putting a ſtop to the natural retchings. Some diaphoretic medicines were given, which did not remain on his ſtomach, and he did not ſweat. Theſe were ſtopped by a draught of juice of lemons and alkaline ſalt taken in the act of effervescence. Sinapiſms were applied to the feet, and he died the third night at midnight.

2. A widow lady about 40, of a thin, delicate habit, in whom the diſeaſe came on gradually, was bled on the third day, and took diaphoretic medicines and acidulated cordials till the 9th. She died on the 11th.

3. A Jewiſh rabbi, between 30 and 40, of a thin, ſpare habit, was bled on the 2d day, and died early on the morning of the 4th.

4. A Jewiſh boy, between ſeven and eight years old, of a pale, unhealthy complexion, was repeatedly purged, and had ſuppurative cataplaſms applied to the buboes without effect. He recovered ſlowly. Dr. Ruſſel was not called till the ſeventh day of the diſeaſe, and we are not informed when the purgatives were adminiſtered.

5. A Jewiſh lad of 14, healthy and florid, was viſited on the third day. He had already been ſcarified in the legs, and bleeding was ordered; but, as he became faint, only a ſmall tea-cupful could be taken away. The blood, after two hours, was found to have a ſoft and looſe texture, ſomewhat blackiſh on the ſurface; but the quantity of ſerum was not greater than uſual. It had appeared of a blackiſh colour at firſt. He had a vomit, draughts with ſpiritus mindereri; afterwards a diaphoretic mixture and acidulated cordial, and ſinapiſms to the feet. On the ſeventh day he ſweated copiouſly, and was much relieved, but ſoon relapſed. On the 10th he ſweated early in the morning, and had a temporary relief, but ſoon became worſe than ever. On the eleventh he had three ſtools of black blood. One of theſe, kept for the Doctor's inſpection, conſiſted of about three tea-cupfuls, without any fœtor; the others were "inconſiderably ſmall." Some tincture of bark was now added to his uſual mixture. On the 15th he had a purging potion which operated five times, had an opiate at night, and tincture of bark with elixir of vitriol was ordered twice a day. Next day he was quite free of fever, and quickly recovered.

6. A Jew of a thin, ſpare habit, who took no medicines, died on the ſixth day. His wife, of a delicate frame, and ſix months gone with child, was bled in the arm, had "proper drinks" directed for her, brought forth

forth a child in the agonies of death, and expired on the ſixth day. They were extremely poor, and Dr. Ruſſel ſays of the houſe they inhabited, that it "was one of thoſe miſerable dwellings which he had always conſidered as one of the receptacles of contagion." It did not, however, appear to be ſo; for, though there were other ſix in the family, only one of them was infected, who died in ten days.

7. A youth of a delicate conſtitution, a French native of Aleppo, was viſited on the morning of the third day. He had a carbuncle on his neck, which had been miſtaken for an ordinary inflammation, and a phyſician who had previouſly viſited him applied a galbanum plaſter, ordering alſo ſome nitrous medicines; but the plaſter giving much pain, it was changed for a common poultice. Live pigeons were applied to the feet. On the fourth he had a diaphoretic medicine, and his drinks were acidulated with ſpirit of vitriol. The ſymptoms increaſing, ſinapiſms were applied to the feet, but without effect. Cataplaſms of garlic were applied next night; he had two copious black ſtools, not very fœtid, and two bilious ones in the morning of the ſixth. By theſe ſtools he was greatly weakened, and was ordered a cordial with diaſcordium. He had another ſtool, and became much worſe. Cataplaſms were applied without effect, and he died on the ſeventh day. This patient had a great number of eruptions; but, though ſix people attended him conſtantly, none of them were infected.

8. A Jewiſh girl of nine years old, of a delicate frame, and ſprightly diſpoſition, was viſited on the 4th day. The uſual regimen and medicines were ordered, but ſhe could not be prevailed on to take any thing beſides an acidulated cordial. Palm-oil was externally applied to a carbuncle near the corner of the mouth, about an inch long, and the third of an inch broad. This ſeemed to eaſe the pain, but did not prevent it from ſpreading. The face was alſo ſtrangely diſfigured by three or four ſtreaks of a pale red colour, ſhooting up on each ſide from the cheeks towards the temples. The gangrene

ſpread

ſpread rapidly, and ſhe died on the evening of the tenth day.

9. A ſtout, healthy Armenian youth, about 20, was viſited on the firſt day, and took a vomit of ipecacuanha, which brought up a good deal of bile. An anodyne was given at night, but without effect. He took no medicines afterwards but an acidulated cordial. On the third he eat a quantity of cherries, and drank ſome iced water. He died on the fourth. Here the infection ſpread violently, only one out of ſix in the ſame houſe eſcaping the diſeaſe. Three died.

10. An Armenian woman in the ſeventh month of her pregnancy. She was bled the firſt day, had afterwards diaphoretic boluſes, but did not ſweat. On the third day ſhe was delivered of a dead child, and ſeemed much better, but died at night. After death the body was entirely covered with purple marks.

11. A boy was bled and had an alexipharmic mixture the firſt day. A diarrhœa came on, and diaſcordium was added to the mixture without ſucceſs. He died the third night. The infection was violent, only one in the houſe eſcaping.

12. A Jew of middle age and groſs habit of body was bled on the ſecond day. He was viſited on the fifth, had diaphoretic powders, and ſinapiſms were ordered without ſucceſs. He died on the 6th.

13. A Chriſtian youth of 17, taken ſuddenly, was viſited on the ſecond day. A cataplaſm was applied to the groin; he had a vomit of ipecacuan, and a diaphoretic draught with nitre and diaſcordium at night, but did not ſweat. Next day he had acidulated drinks, a mixture with ſweet ſpirit of nitre, and a ſmall proportion of nitre itſelf. On the fourth, he had two ſtools, of a reddiſh colour like blood, after which he became much worſe. In the night he had two other ſtools, which ſeemed to lower him. Throughout the day a larger portion of nitre had been added to his mixture, and three tea-cupfuls of blood were taken away, without the Doctor's knowledge, by cupping. On the fifth the nitre was omitted; he was ordered an aſtringent cordial,

dial, but it was not given; however, the diaphoretic medicines were continued, and he had three looſe ſtools, which ſunk him greatly. Next day he ſeemed paſt recovery; lying motionleſs, inſenſible, his breathing quick, laborious and interrupted; the ſkin not cold, but the feveriſh heat gone, and his countenance ghaſtly. From this lethargic ſtate the women attempted frequently to rouſe him, by applying vinegar to his noſtrils, calling him loudly by his name, and ſuch like means, by which they ſometimes ſucceeded; but, though he opened his eyes, and gave ſigns of ſenſe, he could not be prevailed on to drink; and he remained ſilent. He would then, for ſome time, writhe his body as in mortal agony, and again relapſe into lethargy. This dreadful paroxyſm, however, began to wear off about noon; and at night he was leſs diſturbed than uſual. On the ſeventh day he was manifeſtly better; he had a looſeneſs, with gripes, for which the white decoction was ordered; and he had tincture of bark thrice in twenty-four hours. On the ſixteenth day the fever was entirely gone. The Doctor obſerves that this patient ſweated much leſs than was uſual with thoſe who recovered.

14. A Chriſtian boy about 17 was viſited on the 4th day, having taken ſome abſorbent powders on the 2d from another phyſician. The family would allow no other medicines to be given, except a few grains of bezoar, and he died next day.

15. An Italian, a man about 40, of a groſs habit of body, and addicted to drinking, but who, finding himſelf ſomewhat indiſpoſed, had for two or three days lived temperately, was viſited on the ſecond day of his illneſs, had a diaphoretic mixture, and a laxative medicine, without relief. In the night between the 5th and 6th he had ſome retchings to vomit. Next day he complained of a pain at the pit of the ſtomach, had a vomit of ipecacuanha, which brought off a conſiderable quantity of bile by vomit and ſtool, but without any apparent relief. He had two fœtid ſtools, and was ordered a cordial with volatiles. On the 7th his pulſe was exceedingly ſunk, and his extremities had been as cold as ice,

but

but with very little alteration in the eyes or countenance. The patient did not know that theſe parts had loſt their heat; and, notwithſtanding this change, the ſenſation ſtill remained in them. He died on the afternoon of the 8th day. This patient had no eruptions.

16. A Chriſtian merchant about 50, of an atrabilious habit, and ſubject to the hæmorrhoids, on being taken ill drank immoderately of cold water. He was viſited next day. In the afternoon about ten ounces of blood were taken away, and, as his pulſe roſe after the operation, he loſt, by Dr. Ruſſel's order, ſix ounces more. Three ounces were afterwards taken away by cupping, and about as much more was accidentally loſt by the looſening of the bandage of the arm; ſo that about 24 ounces were taken away in all. Next day he got a few drops of Carmelite water, a kind of ſpiritous cordial, which he vomited, had a bliſter and ſinapiſms applied, and died between 10 and 11 at night. He had no eruptions.

17. An Armenian youth was viſited on the morning of the third day, was bled, and had a ſaline draught every four or five hours. On the fifth he was removed into a more airy chamber, and had Huxham's tincture of the bark. He died on the ninth day.

18. A young lady of French extraction, of a thin, ſlender make, was viſited on the morning of the ſecond day. On the third ſhe had diaphoretic powders, and loſt a few ounces of blood by cupping, without the Doctor's knowledge; ſhe had a diaphoretic mixture, and died on the ſixth day.

From theſe accounts it is eaſy to ſee, that, in violent caſes of the plague, medicine can do little or nothing. Such caſes generally occur in the earlier months of the ſeaſon, though they may take place, and do take place in great numbers, at any time. In the beginning of the ſeaſon the patients are almoſt all attacked in this violent manner, and very ſeldom recover, whether they take medicines or not. It being then an eſtabliſhed fact, that as the epidemic ſeaſon advances the diſeaſe grows milder, and many more continue to recover of themſelves

themſelves than did ſo at firſt, we are naturally led to ſuppoſe that a multitude of thoſe who recovered after taking the medicines would have done the ſame without them. Little therefore needs be ſaid of the immenſe number of preſcriptions found in authors who have written upon the plague, as it may generally be ſuppoſed that at certain times theſe would have been ineffectual, and at others they were uſeleſs.—The following is an epitome of Dr. Patrick Ruſſel's practice:

1. Bleeding as early as poſſible, ſeldom repeated, except where manifeſtly indicated by circumſtances.

2. Vomiting, if ſpontaneous, was encouraged by warm water. If the patient was affected by nauſea, vomiting was provoked by warm water or camomile tea, aſſiſted by a feather. If a bitter taſte in the mouth was complained of, ten or fifteen grains of ipecacuanha were given. The times of remiſſion were laid hold of for thoſe remedies.

3. Where ſpontaneous vomiting continued too long, a ſaline mixture was given, ſometimes with opiates and external applications.

4. The ſtomach being ſettled, mild ſudorifics were given in ſmall doſes, every five or ſix hours. In the beginning, nitre was joined with contrayerva, but where it occaſioned looſe ſtools, was left off. Spiritus mindereri and ſaline mixture were alſo given as ſudorifics.

5. In caſe of diarrhœa, dilution was firſt preſcribed and then the white decoction. Laxative medicines were ſeldom admitted by the friends of the patient. Diaſcordium and opiates were uſed in caſes of obſtinate diarrhœa.

6. In the advance of the diſtemper it was found more eligible to give the ſudorifics at ſhorter intervals, when occaſion required, than to augment the doſe, which was apt to occaſion diſguſt, and a rejection of medicine entirely; conſequences which alſo attended an attempt to heighten the power of the medicines themſelves. The general deſign was to make their operation coincide with the periodical determination to the ſkin naturally occurring in the diſeaſe.

7. The

7. The ſudorifics exhibited having but ſmall power by themſelves, it was found neceſſary to aſſiſt them by dilution, as well as in every other method which could be attempted. If the patient was not naturally inclined to drink, he was encouraged to it by offering agreeable liquids, either hot or cold at the perſon's option.

8. The diet was the ſame as in other acute diſtempers. No animal food ſtronger than chicken broth was allowed; the reſt conſiſted of farinacea and leguminous vegetables. "It was certainly neceſſary (ſays our author) to a certain degree, to ſupport nature by proper food; but to "force it upon a nauſeating ſtomach ſeems to have been "irrationally recommended; and, where attempted, "which the over care of the nurſes frequently did, uſually excited vomiting. I ſometimes wiſhed to give "wine, but a religious bar lay in the way of Mahommedans, and a prejudice againſt it, in all fevers, rendered "it equally inadmiſſible among the Chriſtians and Jews."

9. For oppreſſion at the præcordia, mild cordials, acidulated drinks and cool air were found uſeful. Throughout the diſeaſe acceſs of cool air to the chamber was conſtantly allowed, and, where the chamber itſelf was not ſufficiently airy, the bed was removed to the houſe top. Towards the height of the exacerbations, however, when there happened to be the leaſt appearance of moiſture on the ſkin, the ſick were kept moderately covered up from the chin downward.

10. After the height, and through the decline of the diſeaſe, the bark in ſubſtance, or Huxham's tincture, were given inſtead of the ordinary ſudorifics.

In the plague which took place in the Ruſſian army, the greateſt confidence ſeems to have been put in vomits. The diſeaſe commonly began with a dull pain in the head, reſembling that produced by the fumes of charcoal, accompanied with ſhivering, univerſal weakneſs, &c.* On the firſt appearance of theſe a vomit was given, working it off with acid drinks. "If the nauſea "and bitter taſte in the mouth was not removed by "the

* Duncan's Med. Comment. vol. viii, p. 352.

" the firſt, they gave a ſecond, and ſometimes a third or " fourth ; nay, they ſometimes, if the ſymptoms were " very urgent, gave two or three in the ſpace of twelve " hours, as there is no time to be loſt in this diſeaſe ; for " they did not find this ſpecies of evacuation ſubject to " the ſame inconvenience with purges, which a man in " the plague is unable to ſupport ; nay, they are even " dangerous, though he bears briſk vomits, and a repe- " tition of them, when the nature of the caſe requires it.

" The ſtomach being thus cleanſed, they gave every " morning a powder compoſed of twenty grains of rhu- " barb, mixed with as much flower of brimſtone, and " three grains of ipecacuanha, exhibiting alſo, every " hour, five grains of pure nitre mixed with two grains " of camphor ; and, if coſtive, a laxative clyſter was " given every evening, compoſed of decoction of camo- " mile, wine vinegar, with or without ſoap, according " to circumſtances.

" The head, temples and buboes were frequently " waſhed with warm vinegar, and the laſt urged to ſup- " puration with emollient cataplaſms ; but, in caſe they " were found to baffle all attempts to bring them for- " ward, they were then ſcarified or extirpated, and the " patient ordered to drink plentifully of *lime-water*. " Bark was given after evacuation, joined to the flower " of brimſtone in the proportion of one ounce of the " former to a drachm of the latter, divided into ſixteen " powders, and taken in twenty-four hours. When de- " lirium came on, bliſters were applied to the legs and " arms, and camphor given largely. Vegetable and " mineral acids were given indiſcriminately ; but they " found the vegetable kind ſometimes remain on the " ſtomach when the other was thrown up ; and of the " latter they preferred the vitriolic. Acidulated drinks " were given in quantity through the whole diſeaſe, and " the food conſiſted of acidulated water-gruel, and fruit " when they could procure any. The air of the room " was kept charged with acetous vapours, as much as " poſſible, and it was remarked, that, while the bitter " taſte remained, there was little hope of the diſeaſe " abating.

According

According to Baron Aſh, "the plague does not depend upon any conſtitution of the air, but is communicated only by contact, and they had repeatedly ſucceeded in ſuppreſſing it in different diviſions of the army, by the immediate ſeparation of the infected with their attendants, and burning every thing belonging to them, or that they had touched. They found the greateſt advantage in keeping the ſoldiers ignorant of its exiſtence till ſuppreſſed; for by this means they preſerved their peace of mind, and health of body; and they found an exact military diſcipline the beſt preſervative againſt the diſeaſe. For the cure of thoſe infected they found the cold regimen, a free circulation of air, vegetable and mineral acids, ipecacuanha, rhubarb and bark, to be the propereſt remedies. That, to purify the air in hoſpitals appropriated for their reception, gun-powder was found moſt efficacious, probably from the commotion given to the air in exploſion, over and above its action in common with other fumes. To reſiſt infection, courage and fortitude of mind is neceſſary, as conſternation and terror ſeem to prepare the body for the reception of the diſeaſe."

Dr. Sydenham ſeemed to have as great an opinion of bleeding, as the Ruſſian phyſicians of vomits. Conſidering the plague as merely inflammatory, he lays the whole ſtrength of the cure upon bleeding, which he greatly prefers to any other remedy. The quantities he took away were very conſiderable; and he gives an inſtance of a patient who died from not having enough taken away. He alſo informs us, that, during the civil wars in England, the plague raged in ſeveral places. Being accidentally brought to Dunſtar caſtle in Somerſetſhire, a ſurgeon, who had travelled much in foreign parts, applied for leave to give the garriſon what aſſiſtance he could. This being granted, he bled them, every man as he ſtood, without diſtinction, till ready to drop down; the blood was ſuffered to flow down upon the ground, ſo that no account could be taken of the quantity. They were then ordered to lie in their tents; and,

and, though no kind of remedy was given after bleeding, every one recovered.* Notwithſtanding his opinion of bleeding, however, this celebrated phyſician was obliged to attempt the cure by ſweating, which he ſays he preferred to bleeding on account of its not weakening the patient ſo much, nor hazarding the reputation of the phyſician; yet he ſays it is prejudicial in young people where the powers of life are ſtrong. His improved method therefore was, firſt to bleed moderately, if no ſwelling had appeared, by which means a ſweat would be more ſafely and eaſily raiſed. The bleeding is to be performed in bed, after which the patient muſt be covered up with the bed-clothes, and a piece of flanel applied to the forehead. This laſt expedient, he ſays, contributes more to the raiſing of a ſweat than one would imagine. If no vomiting enſued, he adminiſtered ſudorific medicines internally. But, if the ſtomach cannot retain any thing, he propoſes to begin the ſweating merely by the weight of the clothes, and now and then throwing part of the ſheet over the face. The ſweat being thus begun, the vomiting, however violent, generally ſtops, and the medicines will be retained, ſo that as plentiful a perſpiration as we can deſire may be excited. An inſtance of his ſucceſs in this way he gives in an apothecary who applied to him in behalf of his brother. A ſweat being propoſed, the apothecary told him that he had given him ſeveral ſtrong ſudorifics, all of which had been thrown up; but the Doctor, having firſt ſweated him moderately by the bed-clothes, afterwards gave him a large doſe of Venice treacle; which operating powerfully, he recovered from the diſeaſe. He adviſes the ſweat to be kept up without intermiſſion for twenty-four hours; a ſmaller time being inſufficient to

* Dr. Power, who wrote, in 1732, the *Ancient Phyſician's Legacy*, had lodged his ſoldiers in a church in which thoſe who died of a plague had been buried. An hundred and eighty of the ſoldiers were ſeized either with petechiæ or buboes. He ordered them all to be bled in ſuch quick ſucceſſion, that the arm of the firſt was not bound up till the blood flowed from the laſt. Thus every one loſt about an hundred ounces (upwards of three quarts.) He then ordered them water acidulated with ſpirit of vitriol for their drink; and by this treatment all recovered excepting eight, who would not refrain from ſpiritous liquors. This was tranſacted in Peru: but in Europe the plague will ſcarce bear bleeding to a few ounces. (Sauvages.)

to remove the diſeaſe, and a ſtoppage of the perſpiration certainly attended with a return of the bad ſymptoms. On this occaſion he cenſures Diemerbroeck and others for adviſing to ſtop the ſweat on every ſlight occaſion. The linen is to be allowed to dry on the patient's body, he muſt take all his liquids warm, and continue the uſe of a diluting fluid. Sage poſſet drink is what he recommends. Next morning the cure was finiſhed by a purge of ſenna, tamarinds, &c. Where a ſwelling appears, he directs to forbear bleeding even in ſuch as are not apt to ſweat, leaſt the patient ſhould die ſuddenly from a return of the morbific matter into the veſſels. Bleeding, however, might be uſed with ſafety even in this caſe, provided a ſweat was inſtantly to be raiſed; and thus he thinks the ſwelling might be diſperſed perhaps with more ſafety than by waiting for its ſuppuration.

This may be accounted an epitome of the moſt approved modern practice in peſtilential caſes. The Ruſſian phyſicians above quoted ſeem to ſpeak with moſt confidence of their ſucceſs. They, however, "lay great "ſtreſs upon diſtinguiſhing the plague from the worſt "kind of malignant fever in hot countries; and it is "not without reaſon, as bad conſequences have attended "the confounding of them on the breaking out of the "plague. I am credibly informed that the great havock "made in Moſcow was principally owing to this cir-"cumſtance; for it obtained ſome time before it was "diſcovered by gentlemen unacquainted with the diſ-"eaſe, and before they would acknowledge its exiſtence, "although ſome veteran army practitioners recogniſed "its appearance under one of its forms, and endea-"voured to alarm their brethren, but in vain, for a "time."*

From this it is natural to conclude, that, when the diſeaſe was once fairly diſcovered and attacked by the powers of medicine, it could not make much reſiſtance; yet Dr. Mertens, ſpeaking of this very plague, ſays, that owing to the rapidity of the diſtemper, and many inducements

* Duncan's Med. Comment. vol. viii, p. 359.

ducements to conceal it, *little can be ſaid of remedies* in the plague. He divides the diſtemper into two kinds, the nervous and putrid; the former "comprehending "merely that degree of confuſion and diſturbance given "to the nervous ſyſtem on the firſt introduction of the "miaſma, and the latter commencing at the time the "miaſma begins to operate upon the blood and other "fluids by aſſimilating them to their own putrid na-"ture." In the nervous ſtate the miaſma has ſometimes been carried off by ſweat, gentle diaphoretics, camphorated emulſions, juleps of camphor and muſk. Gentle emetics, particularly ipecacuanha, were found uſeful; but James's powder (which was imported from England in great quantity) did not anſwer any good purpoſe. In the putrid ſtate, the bark and mineral acids were uſeful; purgatives were hurtful, blood-letting inadviſable, and ſcarifying the carbuncles, recommended by almoſt every writer, attended with no good effect.

Few of the modern travellers who have viſited the countries in which the plague is frequent, being verſed in medicine, have ſaid much about the cure of it. Mariti only ſays, that, in the iſland of Cyprus, infected patients were allowed no other diet than pure water, panada, rice, tea, &c. Some thought to ward off the diſeaſe by drinking ſtrong liquors, but theſe *almoſt always* fell victims to it. Whatever their methods were, indeed, they muſt certainly have been very ineffectual, ſince the ſame author informs us that, in the plague of 1759, in many parts of that iſland there were not a ſufficiency of inhabitants left to cultivate the ground.

Diermerbroeck, whoſe name juſtly ranks high among thoſe who have written on the plague, truſts moſtly to ſudorific medicines. Bleeding, according to him, is abſolutely to be avoided, as well as purging and vomiting. He directed firſt that the chambers of the ſick ſhould be kept clean, and the air purified three or four times a day by fumigations, and that the ſick ſhould take (in the beginning, the firſt, ſecond, or third day) a *ſweating draught*, and being well covered with blankets plentiful

plentiful ſweats were promoted for two or three hours or more (always having a regard to the patient's ſtrength.) If the patient did not ſweat eaſily, bags filled with hot, dry ſand were applied to the feet, armpits and groin. If the ſick were not eaſed by the firſt ſweat, it was repeated in a few hours; but if, after the ſecond ſweat, the fever and other ſymptoms ſtill increaſed, it was the worſt ſign. After ten or twelve hours, and on the following days, they were repeated four or five times as occaſion required. Beſides this he directed apozems, antidotes, &c. which, as it is moſt probable they had no effect in removing the diſeaſe, it is needleſs to trouble the reader with.* That

* As it might by ſome be deemed an affront offered to the wiſdom of antiquity, ſhould we paſs over in ſilence the opinions of the more ancient phyſicians, I ſhall in this note give a ſhort account of ſome of their moſt remarkable modes of practice, as they are recorded in Burnet's *Theſaurus*.

1. Foreſtus, in many reſpects a reſpectable author, recommends an *antidote* compoſed of equal parts of rue, figs and almonds, beat into a pulp in a ſtone mortar with a wooden peſtle till united (which is not very eaſily done) into an uniform maſs, adding as much ſyrup of citrons with vinegar as would render it ſoft, with a little powdered ſalt put in laſt. The efficacy of this he tells us he experienced in himſelf as well as all his family as a preventive; himſelf taking in the morning the bigneſs of a ſmall nutmeg of this, made up into a confection with the ancient theriac, mithridate, Armenian bole, terraſigillata, &c.

In his regular practice (for the above muſt be accounted quackery) he adviſes bleeding within the firſt twelve, or at moſt twenty-four, hours; ſuch as were bled afterwards he ſays died. If performed in ſeven or eight hours after the commencement of the diſeaſe the cure went on the better. Where bleeding was inadviſable he uſed cupping with ſcarifications, finiſhing the cure with ſweating and cordials. He remarks that where black tumours or eſchars, lenti ſhaped, appeared, the diſeaſe always proved mortal, without a ſingle exception. Theſe were ſmall, like a grain of black pepper, and therefore called by the vulgar *peppercorn*; undoubtedly the *tokens* of Dr. Hodges.

2. Hildanus, alſo a reſpectable writer, has an high opinion of iſſues as a preventive. He ſays he never knew but one or two (and thoſe of a very bad habit of body) who had iſſues in their legs and arms that periſhed in the plague, and ſays that he has known its efficacy as a preventive not only in himſelf but many others. He ſays he kept two iſſues in his own body, one in the left arm, the other in the right leg. (See above p. 339.) To the ſame purpoſe Mercurialis relates that he never knew but one, and he was a *prieſt*, who died of the plague having an iſſue. He ſays alſo that he had inquired of many other phyſicians, who all gave a ſimilar teſtimony. According to him, in the plague at Lauſanne, all who were attacked by vomiting or looſeneſs, and almoſt all who were bled, fell victims to the diſeaſe.

As preventives he adviſes amulets made up of arſenic, powder of *toads*, and *other things*. Theſe are to be hanged round the neck in times of plague, and are *undoubtedly* of great virtue (*maximam* ad *præſervationem vim habere, non eſt quod dubites!*) This remedy he ſays he had from his preceptor *Coſmas Slotanus*, a very celebrated ſurgeon.

Brine of pork is another preventive, which he never tried himſelf, but aſks Sennertus about it. It was recommended to Hildanus by a lawyer of his acquaintance. The brine is firſt to be boiled in a kettle, and well ſkimmed, till

That a free perſpiration is the natural cure of the plague, ſeems to be allowed by almoſt all writers of credit. Dr. Ruſſel ſays, "Of all excretions, *that* by the ſkin "would ſeem to be the moſt materially important in "the plague. Where the ſkin remains perpetually dry, "or where ſhort and precipitate ſweats are attended "with no favourable alteration, danger is always to be "apprehended. On the other hand, ſweats, at certain "periods

till it becomes clear, poured into earthen veſſels, and kept ſhut up from the air for a twelvemonth; after which it was fit for uſe. A draught of this was given to people infected with plague, and operated by ſweat, ſtool or vomit, or perhaps both by vomit and ſtool. The patient was to abſtain from drink for ſome hours after. The brine of *anchovies* is recommended by Sam. Formius, as uſeful in the plague at Montpelier in 1630.

3. The ſame author (Formius) tells us of a man and his wife and wife's ſiſter, in Montpelier, who, being taken with the plague, ſwallowed a ſolution of their own excrements in urine, *ſtrained through a linen cloth*, and thus got clear of the diſtemper. It produced exceſſive vomiting and purging. Dr. Ruſſel mentions one of his patients, who, he ſuſpected, had got a doſe of bezoar in urine.

4. Johannes Helmontius ſays, that *to his certain knowledge* (me conſcio) *Hibernus Butlerus* cured ſome thouſands of the plague, at London; though unhappily our author got only part of the ſecret, and which is to the following purpoſe. "He ordered me to ſuſpend by the legs before the fire, a large *toad* "taken in the afternoon in the month of June; putting below him a cake of "yellow wax. At length, after three days ſuſpenſion, the toad vomited "earth, and ſome *walking inſects* (inſectas ambulantes) viz. *flies* with ſhining "wings of a greeniſh colour, as if gilt: the toad died immediately after this "evacuation, nor did it take place, notwithſtanding his ſuſpenſion till the "third day. He (Butlerus) then told me that I had medicine enough for curing *forty thouſand* people infected with the plague, and promiſed to ſhow me "the myſtery of the matter (rei cardinem) but being ſuddenly ſent into baniſhment he departed." The beſt part of the ſecret being thus loſt, it is needleſs to trouble the reader with any further account of experiments made with other toads roaſted alive, powdered and made up into troches, &c. preſuming that theſe could not equal the value of the original receipt. I proceed therefore,

5. To the antidote of the celebrated Avenzoar, who drove away the plague by the ſmell of the *urine* of an *he goat*; and Mercurialis ſays that in the houſe of a moſt reverend canon in Hungary, he ſaw a large he goat kept for this purpoſe.

6. From ſuch horribly diſguſting remedies we certainly turn with pleaſure to the elegant tablets prepared for the Emperor Maximilian II. Theſe were compoſed of Armenian bole, prepared pearl, prepared coral, prepared emeralds, prepared jacinct, gold-leaves (ingredients in a medical view equally efficacious with chalk or oyſter ſhells) along with a little ambergreaſe and ſome other ingredients of little value, as medicines, and made into tablets with conſerve of roſes.——It is needleſs to ſpend time in commenting on ſuch ridiculous remedies; ſuffice it to ſay, that the intention of all rational practice both ancient and modern has been to effect a cure by ſweating. From the inſtance related by Sydenham, as well as that of Dr. Power above mentioned, it ſeems, that if the exact time in which the diſeaſe begins could be known, it might be carried off by profuſe blood-letting; but as this for the moſt part cannot be diſcovered, it is certainly better to wait, even though the event ſhould not prove favourable, than to run the riſk of killing the patient inſtantly by an ignorant effort to ſave him.

" periods of the diſeaſe, appeared clearly critical in a " greater or leſs degree. They were followed by a " manifeſt alteration for the better, and by their repeti- " tion the fever was carried entirely off, or reduced to " ſymptomatic exacerbations, ſeemingly dependent on " the eruptions." He adds, that he never obſerved blood exude through the pores, nor did he obſerve the ſweat to be remarkably offenſive; or in any degree ſo remarkable as in ſome eruptive fevers, particularly in the ſmall-pox before eruption. Dr. Hodges, however, ſays that in the plague of London ſweats were ſometimes extremely acrid and fœtid; and that they were met with of various colours, ſuch as purple, green, black, or blood-coloured. Sometimes it was cold, though the patient was tormented with intolerable inward heat and drought; and would continue even after death; but he was of opinion that ſweat is the natural criſis of the diſtemper.

Beſides thoſe ſymptoms of the plague which have been enumerated, there are others, particularly hæmorrhages and convulſions, with which it is ſometimes attended. Theſe it has in common with the yellow fever, and therefore are conſidered in the ſecond part of the work. I now conclude this part with a ſhort retroſpect of the principal facts which to me ſeem to be the reſult of the inveſtigation. 1. That the plague is of an unknown (I believe it of *divine*) original. 2. That in the countries on which it firſt was ſent, it ſtill remains, and from them has always been propagated to others, without a ſingle well atteſted inſtance to the contrary. 3. That the means by which the diſtemper uſually has been propagated are *war* and *commerce*. 4. That the diſeaſe differs from all others in having a more violent tendency to inflammation, inſomuch that it approaches to actual accenſion; nay, that the extraordinary inſtances of ſpontaneous burning we read of are to be accounted only the higheſt degree of this diſeaſe. 5. That the immediate or proximate cauſe of the plague is a tendency in the blood and other fluids to diſcharge upon certain parts the latent heat they contain, in ſuch quantity as to de-

ſtroy theſe parts entirely, and to convert them into a kind of coaly ſubſtance. 6. That this tendency depends on a certain inexplicable action of the external atmoſphere, particularly of the elementary fire contained in it, and of which it principally conſiſts.* 7. The approach of a plague cannot be foretold, either from the conſtitution of the atmoſphere, earthquakes, ſtorms, or any other natural phenomena. 8. The plague is an eruptive diſeaſe, and it is known to be ſo by the *certain death* of all in whom eruptions do not appear; a tendency to eruption being *always* obſerved where life remained long enough. 9. The contagion of the plague diffuſes itſelf from a ſmall ſpace all around, leſſening in violence the farther it is diffuſed. In its moſt concentrated ſtate it hath proved invincible by medicine; in its mild ſtate it requires none;† ſo that in the plague the medical powers are found of leſs avail than in any other acute diſtemper. 10. The natural cure of the plague is by perſpiration or ſweat, and this perhaps is the only evacuation which ought to be kept in view, as having a ſalutary tendency, by thoſe who attend the ſick.‡

* Theſe two laſt concluſions (though I believe them myſelf) are propoſed only as probable conjectures, which as yet I ſee nothing to contradict.

† See p. 282.

‡ The operation of oil ſo much recommended by Mr. Baldwin is ſaid to be by producing ſweat. (See above p. 341.)

END OF THE FIRST PART.

PART

A

TREATISE

ON THE

Plague and Yellow Fever.

PART SECOND.

Of the Yellow Fever.

WE now come to treat of a diſeaſe, leſs fatal indeed than the Aſiatic plague, but yet ſo deadly in its nature in the Weſtern World, that it has of late been confounded with the former, and attempts made to prove that they are both to be conſidered only as degrees of the ſame diſeaſe, and that both have been recorded by hiſtorians indiſcriminately under the common appellation of *plague* or peſtilence. To inveſtigate this matter candidly, and to ſhow that there is a real and eſſential difference between the two, as far as we can credit teſtimonies drawn from the moſt reſpectable writers, ſhall be the work of the following part of this treatiſe.

SECTION I.

Hiſtory of the Yellow Fever.

THE diſtemper now under conſideration has been commonly diſtinguiſhed by two different names; one of which is the *Yellow Fever*, the other the *Black Vomit*. Both of theſe are taken from ſymptoms ſo remarkable

markable (though not occurring in every caſe) that, had the diſeaſe exiſted in ancient times, we can ſcarce think but ſome of the hiſtorians of antiquity would have taken notice that in ſuch a plague thoſe who died generally became yellow, or that they had a continual vomiting of black matter, which could not be ſtopped. Black or bilious vomitings are indeed mentioned, though not as the principal ſymptom, but the yellow colour is not once taken notice of. Dr. Hodges indeed mentions a ſingle inſtance of a patient who became all over of a *green* colour; but as a change of colour is not taken notice of in the plague as a general ſymptom, either by him or by any other writer, we muſt conclude that this diſtemper (the yellow fever) has been obſerved only in modern times.

When Columbus firſt viſited the Weſt India iſlands, we hear nothing of his having found ſuch a diſeaſe exiſting there; nor does it appear that it was known among the many Spaniſh adventurers who ſucceeded him, and who ſubdued ſuch immenſe tracts on the Southern Continent. Soon after the ſettlement of ſome of the Weſt India iſlands, however, by other European nations, this diſeaſe began to make its appearance, though at what time is ſtill uncertain. Dr. Hillary ſays, that, "as we have no accounts of this diſeaſe in the ancients, nor even in the Arabian writers, who lived and practiſed in the hot climate, we muſt give it *ſome name*;" and he calls it the *putrid bilious fever*. "From the beſt "and moſt authentic account (adds he) that I can ob- "tain, as alſo from the nature and ſymptoms of the "diſeaſe, it appears to be a diſeaſe that is indigenous * "to the Weſt India iſlands and the continent of Ame- "rica which is ſituated between the tropics, and moſt "probably to all other countries within the torrid zone. "But I cannot conceive what were the motives which "induced Dr. Warren to think that this fever was firſt "brought from Paleſtine to Marſeilles, and from thence "to Martinique, and ſo to Barbadoes, about thirty-ſeven "years ſince (1721 or 1722.) A better inquiry would "have

* Naturally belonging to the climate.

" have informed him, that this fever had frequently ap-
" peared, in this and the other Weſt India iſlands, many
" years before : for ſeveral judicious practitioners, who
" were then, and are now, living here, whoſe buſineſs
" was, viſiting the ſick the greateſt part of their life
" time, ſome of them almoſt eighty years of age, remem-
" ber to have ſeen this fever frequently in this iſland,
" not only many years before that time, but many years
" before that learned gentleman came to it."

To the ſame purpoſe Dr. Moſely ſays, " Warren,
" though he lived at Barbadoes in 1739, ſuppoſes it never
" appeared in that iſland till about the year 1721, and
" that it was then brought from Martinique in the Lynn
" man of war. He ſays the ſecond appearance of it
" there was in 1733, and that it then came alſo from
" Martinique. He undertakes to ſhow, that it is a
" diſeaſe of Aſiatic extract ; and ſays, that a *Provencale*
" fleet arrived at Port St. Pierre in Martinique, from
" Marſeilles, on board which were ſeveral bales of Le-
" vant goods which were taken in at Marſeilles from a
" ſhip juſt arrived from St. Jean D'Acre (probably the
" Ptolemais of the ancients.) Upon opening theſe bales
" of goods at Port St. Pierre, this diſtemper immediately
" ſhewed itſelf ; many of the people were inſtantly ſeiz-
" ed, ſome died almoſt ſuddenly, others in a few days,
" and ſome lingered longer ; and the contagion, ſtill
" ſpreading, made great havock at the beginning. He
" ſays he had this account from Mr. Nelſon, an Engliſh
" ſurgeon, who was ſeized with the diſeaſe at Marti-
" nique, and died of it a few days after his arrival at Bar-
" badoes. He ſays, it is very probable that the ſame
" fever, or one of very near reſemblance and affinity,
" may firſt have been carried among the American Spa-
" niards (among whom it is now endemic) in ſomewhat
" a like manner ; and that poſſibly ſome peculiar quali-
" ties in the air and climate might have foſtered and
" maintained it there ever ſince."

Dr. Moſely at once concludes the whole of this ac-
count to be *fabulous*, but whether fabricated by Dr.
Warren or the ſurgeon, he does not ſay. He then ap-
peals

peals to Dr. Towne, who wrote before Warren, in 1776, but takes no notice of this *chimerical* origin of the yellow fever, but conſiders it as an endemical diſeaſe in the Weſt Indies. Hillary's opinion already given is alſo quoted.

The next evidence is that of Mr. Hughes, who, though not a medical man, has written on the firſt appearance of the yellow fever in Barbadoes in the following terms; Dr. *Gamble* remembers that it was very "fatal here in "the year 1691, and that it was then called the *new diſ-* "*temper*, and afterwards *Kendal's fever*, the *peſtilential fe-* "*ver*, and the *bilious fever*. The ſame ſymptoms did "not always appear in all patients, nor alike in every "year when it viſited us. It is moſt commonly rife and "fatal in May, June, July and Auguſt, and then moſtly "among ſtrangers; though a great many of the inhabi- "tants, in the year 1696, died of it; and a great many "at different periods ſince."

As to the firſt appearance of the diſeaſe in the Weſt India iſlands we have no accounts which have been deemed ſufficiently authentic, though indeed it muſt be confeſſed that the doubts ſeem to be derived as much from an attachment to theory as to the inveſtigation of truth. "The *endemial cauſus*, or *yellow fever*, (ſays Dr. "Moſely) which is the terror of Europeans newly arri- "ved in the Weſt Indies, is called by the French *la maladie* "*de Siam*. Monſieur Pouppe Deſportes, who practiſed "phyſic at *St. Dominique* ſtom 1732 to 1748, and who "had more experience, and has written from better in- "formation on the diſeaſes of that colony, than any of "his countrymen, ſays that this fever was ſo called from "its being firſt taken notice of in the iſland of Mar- "tinique at a time when ſome veſſels were there from "Siam. This account, though probably true enough "as to the time of its being firſt obſerved in the French "colonies, is extremely incorrect in other reſpects: for "M. Deſportes has not only admitted a ſuppoſition that "the diſeaſe originated among theſe Eaſt Indian ma- "riners, but calls it peſtilential, and ſays that the Euro- "peans are almoſt the only victims to it.

"The

" The generality of the French writers ſay that it was " brought directly from Siam, in a merchant ſhip, and " communicated to the people of Martinique, whence " the contagion was carried to St. Dominique, but that " ſailors were the only people attacked by it, whence it " was called *la fievre matelotte*."

This account ſeems to carry no improbability in it; nevertheleſs Dr. Moſely rejects it upon grounds that are very far from being indiſputable. " The French writ- " ers (ſays he) have not been at the trouble to conſider " that a diſeaſe brought from Siam in the Eaſt Indies, in " a ſimilar latitude to the Weſt India iſlands, would be " moſt likely to affect the natives, living in a climate " ſimilar to that in which the diſeaſe originated, rather " than the Europeans of ſo different a temperament of " body." But this argument would prove too much; for if the diſeaſe would be moſt likely to affect the natives in a climate *ſimilar* to that in which the diſeaſe originated, ſurely it would be ſtill more likely to attack the natives in *that very climate* in which the diſeaſe did originate, and that Europeans would be free. But the very reverſe is the caſe. The diſeaſe, according to Dr. Moſeley himſelf, originates in the Weſt Indies; and yet Europeans, eſpecially thoſe newly arrived, are particularly objects of its vengeance.

" But (adds our author) the fact is, that this diſ- " eaſe never attacks either white or black natives of hot " climates; neither was it brought from Siam; and " though it is poſſible, from the heat of the climate, that " it may frequently appear there, or in any other tro- " pical country (though BARRERE ſays it is unknown " at *Cayenne*) no hiſtory of that country that I have yet " met with mentions ſuch a diſeaſe; notwithſtanding " what many writers have boldly advanced to the con- " trary."

Here it is evident we have no argument, but a parcel of aſſertions, the firſt of which contradicts what he had juſt before quoted from Mr. Hughes. For the latter informs us that in 1696 a great many of the *inhabitants* died of it as well as ſtrangers. His not meeting

meeting with it in any hiſtory of Siam is not a proof of its non-exiſtence in the country, neither indeed does he himſelf think that it is ſo, as he tells us that it may poſſibly appear there, or in any other tropical country.

In Sauvages's Noſology we find the plague diſtinguiſhed into a number of different ſpecies, among which there is one called the *plague of Siam*. This, he ſays, was in the year 1685 brought from Siam to Martinico, in the ſhip called the *Oriflame*. This ſeems to have been the *yellow fever*, and the ſymptoms are conſidered in the following ſection. This date agrees exactly with what Mr. Hughes ſays in the place above quoted, that it was violent in Barbadoes in the year 1691, when it went by the names of the *new fever*, and *Kendal's fever*. Both theſe names imply that the diſeaſe had been but lately known, and that it was by no means a native of the climate. It muſt either have been *imported* therefore from ſome other country, or it muſt have *originated* in conſequence of the ſettlement of ſome Europeans in a climate ſo diſſimilar to their own, while ſome of them ſtill continued to ramble from one country to another, occaſionally viſiting all, without taking up their reſidence in any.

Martinique ſeems to have been the firſt place where this diſtemper made its appearance; and from thence it ſeems quickly to have extended itſelf to St. Domingo and Barbadoes. Its farther progreſs, however, cannot be traced, nor can we tell exactly what time it firſt entered the continent. Whether the true plague was ever imported into the Weſtern Continent cannot at preſent be aſcertained, neither can we tell what diſeaſes the Indians were ſubject to before the arrival of the Europeans. The Spaniards, who firſt arrived, are allowed to have been leſs ſubject to the plague than other nations,* but they were quickly followed by thoſe who had no ſuch exemption. Sebaſtian Cabot diſcovered the North American Continent for Henry VII of England, very ſoon after, if not before Columbus diſcovered the Southern Continent for the king of Spain. This was a very ſuſpicious time; for Henry VII himſelf had introduced

* See p. 319.

troduced the ſweating ſickneſs into England only thirteen years before ;* and in thoſe days the plague ſeems never to have been eradicated ; ſo that it is by no means impoſſible that theſe firſt adventurers might have communicated to the Indians with whom they had any communication, the ſeeds of diſeaſes totally unknown to them before. Certain it is, that the North American Indians were ſubject to epidemics before the ſettlement of any Engliſh colonies among them. Hutchinſon in his Hiſtory of Maſſachuſetts takes notice of the Indians having been greatly weakened by an epidemic, which was attributed to an unfavourable ſeaſon, in conſequence of which they were obliged to feed upon unripe ſquaſhes, fruits, &c. We know not the nature of the diſtemper, though, from the circumſtance juſt mentioned, we may not unreaſonably conjecture it to have been of the peſtilential kind. That epidemics ſtill continue among theſe people we alſo know from the teſtimony of Capt. Carver, who found one of their towns deſerted, and the inhabitants fled into the woods, on account of an epidemic diſorder; but what the nature of it was he does not inform us.† Mr.

* See p. 17.

† In Belknap's Biography we have a more particular account of this *peſtilence*, as it is called, and which, if the relations there given are to be credited, certainly determines the diſeaſe in queſtion to have been the yellow fever. The account is to the following purpoſe : Lord Arundel, of Wardour, had employed a captain Weymouth to ſearch for a N. W. paſſage to India. In this he failed, but falling in with a river, ſuppoſed to be either the Kennebeck or Penobſcot, he brought from thence five of the natives, with whom he landed at Plymouth in July 1605. Three of the Indians were taken into the family of Sir Ferdinando Gorges ; and from theſe many particulars were obtained reſpecting their country, which being eagerly attended to by Gorges, he formed a plan of advancing his fortune by a thorough diſcovery of the country. Two veſſels were accordingly fitted out ; one of which failed, but the other brought ſuch information as gave encouragement to attempt the founding of a colony. Two of the natives who had been brought to England were ſent back, and 45 perſons were left on the continent to begin the ſettlement; but theſe, having undergone great hardſhips, quitted the place in 1608. Gorges, however was not diſcouraged. He ſent out one of his ſervants, by name *Richard Vines*, and ſome others, whom he hired to ſtay in the country all winter.

" Mr. Vines and his companions were received by the Indians with great " hoſpitality, though their reſidence among them was rendered hazardous ; " both by a war which raged among them, and by a peſtilence which accom- " panied or ſucceeded it.

" This war and peſtilence are frequently ſpoken of by the hiſtorians of " New England, as remarkable events, in the courſe of Providence, which " prepared

Mr. Webſter, in his eighth letter to Dr. Currie on the ſubject of peſtilential diſeaſes, quotes from the Doctor's letter to Mr. Wynkoop, of October 5th, 1797, the following paſſages: "Thomas Story and Joſeph "Gough relate, that a malignant fever prevailed in "Philadelphia in 1699, introduced from the Weſt "India iſlands. . . . Dr. Mitchill aſcribes the yellow "fever as it appeared in Virginia in 1741 and 47 to "ſpecific contagion, and mentions that it had been "twice imported into Virginia by his Majeſty's ſhips of "war. Dr. *Leamy (Lining)* in the Phyſical Eſſays in "Edinburgh, informs us, that the yellow fever which "has prevailed at different periods at Charleſton, South "Carolina, was always traced to ſome infected perſon "recently from the Weſt Indies. In 1741 it was in-"troduced by a cheſt of wearing apparel which had be-"longed

"prepared the way for the eſtabliſhment of an European colony. Concerning "the war, we know nothing more than this, that it was begun by the Tar-"ratenes, a nation who reſided eaſtward of Penobſcot. Theſe formidable "people ſurpriſed the baſhaba, or chief ſachem, at his head quarters, and de-"ſtroyed him with all his family; upon which all the other ſachems who "were ſubordinate to him quarrelled among themſelves for the ſovereignty; "and in theſe diſſenſions many of them as well as of their unhappy people "periſhed. Of what particular kind the peſtilence was, we have no certain* "information; but it ſeems to have been a diſorder peculiar to the Indians, "for Mr. Vines and his companions, who were intimately converſant with "them, and frequently lodged in their wigwams, were not in the leaſt de-"gree affected by it, though it ſwept off the Indians at ſuch a prodigious rate "that the living were not able to bury the dead, and their bones were found "ſeveral years after, lying about the villages where they had reſided. The "extent of this peſtilence was between Penobſcot in the eaſt, and Narraganſet "in the weſt. Theſe two tribes eſcaped, whilſt the intermediate people were "waſted and deſtroyed."

This diſtemper appears to have raged among the Indians in the year 1616. The following particulars are further given in Belknap's Biography, vol. ii, p. 208: "Hitherto they (the Engliſh coloniſts) had not ſeen any of the na-"tives at this place. The mortal peſtilence which raged through the country, "four years before, had almoſt depopulated it. One remarkable circumſtance "attending this peſtilence was not known till after this ſettlement was made. "A French ſhip had been wrecked on Cape Cod. The men were ſaved, with "their proviſions and goods. The natives kept their eye on them, till they "found an opportunity to kill all but three or four, and divide their goods. "The captives were ſent from one tribe to another, as ſlaves. One of them "learned ſo much of their language, as to tell them that God was angry with "them for their cruelty, and would deſtroy them, and give their country to "another people. They anſwered that they were too many for God to kill. "He replied, that if they were ever ſo many, God had many ways to kill "them,

* "The Pawkunnawkutts were a great people heretofore. They lived to "the eaſt and northeaſt of the Narraganſitts, and their chief ſachem held do-"minion

"longed to a perſon who died of it from Barbadoes." Theſe quotations are made by Mr. Webſter with a view to diſpute the contagious nature of the diſeaſe. Here they are introduced only to ſhow if poſſible the time that the diſeaſe firſt entered the United States; and the introduction of it into Philadelphia in 1699 (though we are not ſure if even this was its firſt appearance, ſtill correſponds extremely well with the date of its introduction into Martinique mentioned by Sauvages. Dr. Lining ſays it had been four times epidemic in Charleſton before the time that he wrote; viz. in 1732, 1739, 1745, and 1748. Hence we may conclude, that this fever, on the northern part of the continent of America, has been nearly coeval with the ſettlement of the Britiſh colonies there; for we cannot ſuppoſe that we have accounts of the very firſt time that it made its appearance

"them, of which they were then ignorant. When the peſtilence came among "them (a *new diſeaſe*, probably the *yellow fever*) they remembered the "Frenchman's words; and when the Plymouth ſettlers arrived at Cape Cod, "the few ſurvivors imagined that the other part of his prediction would ſoon "be accompliſhed. Soon after their arrival, the Indian prieſts or powows "convened, and performed their incantations in a dark ſwamp three days "ſucceſſively, with a view to curſe and deſtroy the new comers. Had they "known the mortality which raged among them, they would doubtleſs have "rejoiced in the ſucceſs of their endeavours, and might very eaſily have taken "advantage of their weakneſs to exterminate them. But none of them were "ſeen till after the ſickneſs had abated; though ſome tools, which had been "left in the woods, were miſſing, which they had ſtolen in the night."

"minion over divers other petty ſagamores; as the ſagamores upon the iſland "of Nantuckett, and Nope, or Martha's Vineyard, of Nawſett, of Manna-"moyk, of Sawkattukett, Nobſquaſitt, Matakees, and ſeveral others, and "ſome of the Nipmucks. Their country, for the moſt part, falls within "the juriſdiction of New Plymouth colony. This people were a potent na-"tion in former times, and could raiſe, as the moſt credible and ancient In-"dians affirm, about three thouſand men. They held war with the Narra-"ganſitts, and often joined the Maſſachuſetts as friends and confederates "againſt the Narraganſitts. This nation, a very great number of them, were "ſwept away by an epidemical and unwonted ſickneſs, an. 1612 and 1613, "about ſeven or eight years before the Engliſh firſt arrived in thoſe parts to "ſettle the colony of New Plymouth. Thereby Divine Providence made way "for the quiet and peaceable ſettlement of the Engliſh in thoſe nations. "What this diſeaſe was, that ſo generally and mortally ſwept away, not only "theſe but other Indians, their neighbours, I cannot well learn. Doubtleſs "it was ſome peſtilential diſeaſe. I have diſcourſed with ſome old Indians, "that were then youths, who ſay, that the bodies all over were exceeding *yel-"low* (deſcribing it by a yellow garment they ſhowed me) both before they "died, and afterward.

"The Maſſachuſetts, being the next great people northward, inhabited "principally about that place in Maſſachuſetts bay, where the body of the "Engliſh now dwell. Theſe were a numerous and great people. Their chief "ſachem

appearance any where. Numbers of individuals would probably be affected with it, and their cases pass unnoticed, till the general malady attracted the public attention.

In the Spanish dominions it seems to have been otherwise. Dr. Moseley quotes Don Ulloa saying that "the "*vomito prieto*, or black vomit, was unknown at Cartha-"gena, and all along the coast, till the years 1729 and "1730. In 1729 Don Domingo Justiniani, commodore "of the guarda costas, lost so considerable a part of his "ships' companies at *Santa Martha*, that the survivors "were struck with astonishment and horror at the "havock made among their comrades. In 1730, when "the galleons under Don Manuel Lopez Pintado came "to Carthagena, the seamen were seized with the same "dreadful mortality, and so sudden were the attacks of "the

"sachem held dominion over many other petty governors; as those of Wee-"chagasskas, Neponsitt, Punkapaog, Nonantum, Nashaway, some of the "Nipmuck people, as far as Pocomtacuke, as the old men of Massachusetts "affirmed. This people could, in former times, arm for war about three "thousand men, as the old Indians declare. They were in hostility very of-"ten with the Narraganssitts, but held amity for the most part with the Paw-"kunnawcutts, who lived on the south border, and with the Pawtucketts, who "inhabited on their north and northeast limits. In an. 1612 and 1613 these "people were also sorely smitten by the hand of God with the same disease "before mentioned; which destroyed the most of them, and made room for "the English people of Massachusetts colony, which people this country, and "the next called Pawtuckett. There are not of this people left at this day "above three hundred men, besides women and children.

"Pawtuckett is the fifth and last great sachemship of Indians. Their coun-"try lieth north and northeast from the Massachusetts, whose dominion reach-"eth so far as the English jurisdiction, or colony of the Massachusetts, doth "now extend, and had under them several other smaller sagamores; as the "Pennakooks, Agawomes, Naamkeeks, Pascataways, Accomintas, and others. "They were also a considerable people heretofore, about three thousand men, "and held amity with the people of Massachusetts. But these also were al-"most totally destroyed by the great sickness before mentioned; so that at "this day they are not above two hundred and fifty men, besides women and "children. This country is now inhabited by the English under the govern-"ment of Massachusetts." (Gookin's Historical Collections of the Indians in New England.)

The following was communicated to Benjamin Basset, esq. of Chilmark, by Thomas Cooper, a half blooded Indian, of Gay Head, aged about sixty years; and which, he says, he obtained of his grandmother, who, to use his own expression, was a stout girl when the English came to the island: "Before "the English came among the Indians, there were two disorders of which "they generally died, viz. the consumption and the yellow fever. The latter "they could always *lay* in the following manner: After it had raged and swept "off a number, those who were well, met to lay it. The rich, that is, such "as had a canoe, skins, axes, &c. brought them; They took their seat in a "circle, and all the poor sat around without. The richest then proposed to "begin

" the diſeaſe, that perſons, walking about one day, were " the next carried to their graves. Unhappily, after all " the experiments of the ſurgeons of the galleons, and " phyſicians of the country, no good method of treat- " ing the diſeaſe has been diſcovered; no ſpecific for " curing it."

This fatal diſeaſe, however common in the ſouthern and warm part of the continent of America, ſeems not to have exerted its power in the more northern and temperate climates till the year 1793. Since that time its ravages have been too well known to require an enumeration here. To deſcribe the ſymptoms, inquire into the cauſes, and the means of prevention and cure, is a work of more importance, and to this we muſt now proceed.

" begin to lay the ſickneſs; and, having in his hand ſomething in ſhape reſem- " bling his canoe, ſkin, or whatever his riches were, he threw it up in the air; " and whoever of the poor without could take it, the property it was intended " to reſemble became for ever transferred to him or her. After the rich had " thus given away all their moveable property to the poor, they looked out the " handſomeſt and moſt ſprightly young man in the aſſembly, and put him " into an entire new wigwam, built of every thing new for that purpoſe. " They then formed into two files at a ſmall diſtance from each other; one " ſtanding in the ſpace at each end put fire to the bottom of the wigwam on " all parts, and fell to ſinging and dancing Preſently the youth would leap " out of the flames, and fall down to appearance dead. Him they committed " to the care of five virgins, prepared for that purpoſe, to reſtore to life again. " The term required for this would be uncertain, from ſix to forty-eight hours, " during which time the dance muſt be kept up. When he was reſtored he " would tell, that he had been carried in a large thing high up in the air, where " he came to a great company of white people, with whom he had interceded " hard to have the diſtemper laid, and generally, after much perſuaſion, would " obtain a promiſe, or anſwer of peace, which never failed of laying the " diſtemper."

The following is extracted from Prince's Chronological Hiſtory of New England, p. 46: " This winter (1617) and the ſpring enſuing, a great plague " befals the natives in New England, which waſteth them exceedingly; and " ſo many thouſands of them die, that the living are not able to bury them, " and their ſkulls and bones remain above ground at the places of their habi- " tations for ſeveral years after.

" By Capt. Dermer's letter of Dec. 27, 1619, in Purchas, and of June 30, " 1620, in Gov. Bradford, compared with Gov. Bradford's own account, it " ſeems that the Narraganſitts in the weſt, and Penobſcots in the eaſt, eſcaped " this plague, or that it raged only in the countries lying between them, and " prepared the way for another people."

SECTION

SECTION. II.

Symptoms of the Yellow Fever, as deſcribed by various authors.—Compariſon between them and thoſe of the Plague, with an inquiry into the Cauſes.—Hiſtory of the Diſtemper as it has appeared in various parts of the United States ſince the year 1793.—*A diſcuſſion of the queſtion Whether the Yellow Fever is Contagious or not.*

OF all thoſe who have attempted to give an account of this fatal diſeaſe, none appear to have exceeded Dr. Moſeley, either in his accuracy in enumeration, or perſpicuity in deſcription, of the ſymptoms. According to him the yellow fever is a ſpecies of the *kauſos* of Hippocrates, Aretœus and Galen; that is, the *febris ardens* or *cauſus*, aggravated by climate, incidental only to the groſs, inflammatory and plethoric at any ſeaſon of the year, totally different from the remitting bilious fever to which all habits of body are ſubject in hot climates, particularly after rains, and in the fall of the year. The cauſus, ſeldom ſeen in the temperate climates of Europe, never appears there with the violent ſymptoms which attend it in hot climates. "Whether in the latitudes (ſays he) ſo "mild as thoſe of Spain, Greece, Italy and the Archi- "pelagan iſlands, the cauſus has ever been attended with "black vomiting, as in the Weſt-Indies, I cannot tell. "Lommius mentions the vomiting of blood, and void- "ing black liquid ſtools and black urine. Critical and "ſymptomatical yellowneſs of the ſkin in the cauſus are "enumerated by Hippocrates among its ſymptoms, and "Lommius mentions the danger of that appearance be- "fore the ſeventh day. The affinity of the ſymptoms, "progreſs and termination of a cauſus in Europe to "thoſe of the yellow fever in the Weſt-Indies, excepting "the black vomiting, leaves no room to doubt that the "difference of climate conſtitutes all the difference that "is found between them."

For theſe reaſons Dr. Moſeley adopts the name of *endemial cauſus*; and he takes notice that many difficulties

ties have ariſen to young practitioners, and to ſtrangers in the Weſt-Indies, from the various names improperly given to it from its ultimate and not from its primary ſymptoms. Some calls it a *burning* bilious fever; Warren, a *putrid* bilious fever; but, though they have diſputed about their terms, Dr. Moſeley thinks that neither of them have proved whether bile be the cauſe or the effect of the diſeaſe. To call it the black vomit or the yellow fever, he thinks alſo improper, as a ſtranger would not know the diſeaſe until ſome of theſe ſymptoms appear; both of which are generally fatal, and neither of them conſtant.

The Weſt-India cauſus he ſays is no more putrid than the ſmall-pox, or any other acute diſeaſe; which may, after it has paſſed its inflammatory ſtate, change to putrefaction, and end in death with an extraordinary diſſolution of the fluids. The diſeaſe is in truth an inflammatory one in the higheſt degree poſſible; accompanied with ſuch ſymptoms in a greater extent as attend all inflammatory fevers, and moſt ſtrikingly the reverſe of any diſeaſe that is putrid, or of one exacerbation. It obeys no ſeaſon of the year, and attacks ſuch people, and under ſuch circumſtances, as are ſeldom the objects of putrid diſeaſes, viz. all who are of an inflammatory diatheſis, and do not perſpire freely.

This diſtemper attacks ſailors in the Weſt-Indies more than any other ſet of men, even of new comers. For this the Dr. aſſigns as a reaſon, that they eat, drink, and ſleep, ſo much at ſea, uſe no exerciſe, and are always of groſs habit of body. To this he adds the heat and dampneſs of harbours, generally in the neighbourhood of marſhes, and their expoſure to land winds at night; the labour they endure on board veſſels in port, and the careleſſneſs and exceſſes frequently committed by theſe people after long voyages.

When a ſtranger newly arrived feels a ſudden loſs of ſtrength, with a continual deſire of changing his poſition without finding reſt in any, we may expect a cauſus. If he has expoſed himſelf to any of the cauſes juſt mentioned, the probable conſequences would be, that on the morrow

morrow he would feel an heavineſs, laſſitude, oppreſſion and loſs of appetite.* Next day, or perhaps within twelve hours from the firſt indiſpoſition, the violence of the diſeaſe commences with faintneſs, generally giddineſs of the head, with a ſmall degree of chillneſs and horror, but never any rigor. Theſe ſymptoms are ſucceeded by a high fever, great heat, and ſtrong beatings of the arteries, particularly thoſe of the temples and carotids; fluſhings of the face, gaſping for cool air; tongue white tinged with yellow, after the retchings have commenced; exceſſive thirſt; redneſs, heavineſs, and ſenſations of burning in the eyes; heavineſs and darting pains in the head, ſmall of the back, and often down the thighs; the pulſe generally full and ſtrong, but ſometimes quick, low, and vaccillating; the ſkin hot and dry, though ſometimes it has a partial and momentary moiſture. There is a ſickneſs of ſtomach from the beginning; retchings ſucceed immediately after any liquid is ſwallowed, which bring up bilious matter. There is an anxiety with ſtricture, ſoreneſs, and intenſe heat about the præcordia; great reſtleſſneſs, heavy reſpiration, ſighing, urine deep coloured and in ſmall quantity.

Thus the fever goes on during its firſt ſtage, which conſtitutes the inflammatory period, and continues from twenty-four to ſixty hours. The ſecond, which our author calls the *metaptoſis*, is comparatively mild, and is an intermediate ſtate between the inflammatory and gangrenous ſtages. In this there is an abatement of many of the former ſymptoms, and a kind of deceitful tranquillity, accompanied, however, with a perturbation, if the patient ſhould happen to ſleep. There now appears a yellow tinge in the eyes, neck and breaſt; the heat ſubſides, ſometimes accompanied with chillneſs, but never with that kind of rigor, which, when it happens, terminates the diſeaſe by ſweat, or by copious bilious evacuations, upwards or downwards. The retchings increaſe and become porraceous: the pulſe flags, but is ſometimes high, and

* "This (ſays the Doctor) is the time to extinguiſh the diſeaſe; but Europeans and North Americans generally neglect it, as they are not accuſtomed at home to have recourſe to medicine on the firſt moment of indiſpoſition."

and ſometimes ſoft; the ſkin moiſt and clammy; urine of a dark ſaffron colour, and in ſmall quantity; the tongue in ſome caſes is dry, hard, and diſcoloured, in others furred and moiſt; the head is confuſed, ſometimes with delirium, with a gloſſineſs of the eyes. This ſtage of the diſeaſe continues ſometimes only for a few hours, at others from twelve to forty-eight, ſeldom longer, and too frequently the diſeaſe hurries on rapidly from the firſt to the third ſtage, which is the gangrenous or fatal ſtate. Now the pulſe ſinks, intermits, and becomes unequal, ſometimes very quick; the vomiting becomes frequent with great ſtraining and noiſe. The matter diſcharged is now in greater quantity, appearing like the grounds of coffee, or of a ſlate colour, and the ſtomach can retain nothing: the breathing is difficult, the tongue black, the ſweats cold and clammy, the eyes yellow and ſunk; there is a yellowneſs round the mouth and temples, and ſoon after over the whole body. The deepening of the yellow colour, with an aggravation of the other ſymptoms, is a forerunner of death. There is a deep reſpiration, ſubſultus tendinum, a convulſive kind of ſighing; the urine is quite black, and ſometimes totally ſuppreſſed. There is a death-like coldneſs of the hands, feet and legs, while the heat ſtill remains about the ſtomach; the patient is delirious, and ſtruggles to get up in bed; he trembles, his ſpeech falters; blood oozes from the mouth and noſtrils, ſometimes from the corners of the eyes and ears; a black bloody cruor is diſcharged both by vomit and ſtool: livid ſpots appear on different parts of the body, particularly the præcordia; hiccup, muttering, coma, and death, follow in quick ſucceſſion.

The affecting caſe of capt. Mawhood, who died on the fourth day of the diſeaſe, at Port-Royal in Jamaica, in the year 1780, exhibits a dreadful picture of this diſeaſe in its laſt ſtage. "When I entered the room, (ſays Dr. "Moſeley) he was vomiting a black, bloody cruor, and "he was bleeding at the noſe. A bloody ichor was "oozing from the corners of his eyes, and from his mouth "and gums. His face was beſmeared with blood, and

" with the dullneſs of his eyes it preſented a moſt diſtreſ-
" ſing contraſt to his natural viſage. His abdomen was
" ſwelled and inflated moſt prodigiouſly. His body was
" all over of a deep yellow, interſperſed with livid ſpots.
" His hands and feet were of a livid hue. Every part of
" him was cold, excepting about his heart. He had a
" deep, ſtrong, hiccup, but neither delirium nor coma;
" and was, at my firſt ſeeing him, as I thought, in his
" perfect ſenſes. He looked at the changed appearance
" of his ſkin, and expreſſed, though he could not ſpeak,
" by his ſad countenance, that he knew life was ſoon to
" yield up her citadel, now abandoning the reſt of his
" body. Exhauſted with vomiting, he was at laſt ſuf-
" focated with the blood he was endeavouring to bring
" up, and expired."

The ſymptoms juſt now enumerated generally take place in thoſe who die from the third to the ſeventh day of the diſeaſe. But in this, as in other fevers, the ſymptoms vary conſiderably according to the conſtitution of the patient, and habit of the body. In ſome it begins neither with chillneſs, faintneſs, nor fluſhings of the face. Sometimes the pulſe is much depreſſed and not quick; and in ſultry weather, and damp ſituations, where the inflammatory ſtate has been only of a few hours duration, the *metaptoſis* has been ſo rapid, that the black vomiting and the mortified ſtate have unexpectedly appeared, and have ended the patient in 24, 36 or 48 hours. But our author ſays that he never ſaw or heard of an inſtance of what Lind ſays, that the black vomit may attack a man when newly arrived, without any previous complaint; or of that mentioned by the ſame author, viz. " an uneaſy itching ſenſation, commonly in the legs; and upon pulling down the ſtockings, ſtreams of thin-diſſolved blood followed, and a ghaſtly yellow colour quickly diffuſed itſelf all over the body."

In ſome caſes the diſeaſe is much more mild. There are inſtances where it has been protracted to the eighth, ninth or tenth day; and others where it has never paſſed from the inflammatory ſtage; but being checked, though not extinguiſhed, it has been lengthened out, and

at

at laſt converted into a remittent of great duration, moſt difficult of cure, and tedious of recovery.

According to our author, the ſtomach ſeems to bear the principal burden of the diſeaſe, and accordingly, after death, appears to have been principally affected. Great heat is perceived near the præcordia during all the ſtages of the diſeaſe, and pain and uneaſineſs are complained of when thoſe parts are preſſed with the hand. After death, livid ſpots appear over the whole body, particularly about the præcordia. On diſſection, the ſtomach, in ſome part or other, is generally found mortified, eſpecially if the black vomiting has continued long, and the livid ſpots have appeared before death. Frequently the upper part of the duodenum is in a gangrenous ſtate, and always bears the marks of inflammation, let the diſeaſe have been of ever ſo ſhort a duration.

Though both liver and gall-bladder muſt be very much affected in this diſeaſe, yet Dr. Moſeley is of opinion that nothing can be depended upon from an inſpection of them after death. Some ſymptoms there are in common with inflammations of the liver, but none of thoſe which diſtinguiſh it from other diſeaſes. It never terminates in ſuppuration of the liver as the hepatitis ſometimes does, though it is frequently carried off by an enormous ſecretion of bile. "Diſſections "(ſays the Doctor) have never diſcovered any certain "and uniform appearance in the liver of thoſe who have "died of this diſeaſe. In hot climates a ſound ſtate of the "liver is never to be expected after death, whether the "diſeaſe has been acute or chronical. Of the latter claſs "of diſeaſes it is almoſt always either the ſeat, or the "origin."

Dr. Lining, in a letter to Dr. Whytt at Edinburgh, publiſhed in the Phyſical and Literary Eſſays, defines the diſeaſe, to be "that fever, which continues two or "three days, and terminates without any critical diſ-"charge by ſweat, urine, ſtool, &c. leaving the patient "exceſſively weak, with a ſmall pulſe, eaſily depreſſible "by very little motion, or by an erect poſture; and "*which* is ſoon ſucceeded by an icteritious (jaundice) "colour

" colour in the white of the eyes and the ſkin; vomiting, " hæmorrhages, &c. and thoſe without being accom- " panied with any degree of a febrile pulſe and heat."

In the four times in which he mentions it to have been epidemic at Charleſton, our author ſays, that none of the years (excepting 1739, the ſummer and autumn of which had been remarkably rainy) were either warmer or more rainy (and ſome of them leſs ſo) than the ſummers and autumns were in ſeveral other years in which there was not one inſtance of any one being ſeized with it. The ſubjects were whites of both ſexes, eſpecially ſtrangers lately arrived from cold climates, Indians, Miſtees, Mulattoes of all ages, excepting young children, and of thoſe only ſuch as had formerly eſcaped the infection. Negroes were not liable to it.

Thoſe affected with the fever, for a day or two previous to the attack generally complained of head-ach, pain in the loins and extremities, but principally in the knees and legs, debility and laſſitude; but ſome were taken ill ſuddenly without any warning. The ſymptoms were, ſhivering; frequent, full, hard and ſtrong pulſe; though ſometimes ſmall and hard, and in others ſoft and ſmall; but towards the end of the fever it became ſmaller, harder, and leſs frequent. Sometimes there was a remarkable throbbing in the hypochondria and carotids, the former cauſing in ſome a tremulous motion of the whole abdomen. The heat was about 102 of Fahrenheit, and nearly equal over the whole body; ſome had frequent returns of chilline's without any diminution of temperature of the body. " In a few there happened ſo " great a remiſſion of the heat for ſome hours, when at the " ſame time the pulſe was ſoft and leſs frequent, and the " ſkin moiſt, that one from theſe circumſtances might " reaſonably have hoped that the fever would only " prove a remittent or intermittent. About the end of " the ſecond day the heat began to abate." Here Dr. Moſeley takes notice that when the fever abates, ſome, who have miſtaken the *bilious remittent* for the *cauſus*, ſpeak of remiſſions which do not happen in this fever. " This circumſtance of the endemial cauſus (ſays he) I believe, has never been mentioned before." Dr.

Dr. Lining goes on to inform us, that the ſkin was rarely dry in this diſeaſe, there being generally a propenſity to ſweat. "On the firſt day the ſweating was commonly profuſe and general, on the ſecond it was more moderate; but on both thoſe, there happened frequent and ſhort remiſſions of the ſweatings, at which times the febrile heat increaſed, and the patient became more uneaſy. On the third day the diſpoſition to ſweat was ſo much abated that the ſkin was generally dry; only the forehead and backs of the hands continued moiſt." A great deſpondency and proſtration of ſtrength took place from the firſt attack. On the firſt day they generally dozed much, but were afterwards very watchful. On the ſecond day the pains in the head, loins, &c. of which they had complained before the attack, and which were ſometimes very acute in the forehead, generally went off. Many on the firſt day were a little delirious, but afterwards not until the receſs of the fever.

The blood had no inflammatory cruſt; in warm weather it was florid like arterial blood, and continued in one ſoft homogeneous like maſs, without any ſeparation of the ſerum after it was cold. When there was any ſeparation, the craſſamentum was of too looſe a texture.

This diſeaſe was not attended with any remarkable thirſt; but, on the third day, as the fever began to leſſen, or rather, ſays the Doctor, as the fulneſs of the pulſe, heat and diſpoſition to ſweat, began to abate, a nauſea, vomiting, or frequent reachings to vomit, came on eſpecially after the exhibition of either medicines or food. A very few had a vomiting, either bilious or phlegmatic, on the firſt day. The whole febrile ſtate was attended with an obſtinate coſtiveneſs.

Theſe were the principal ſymptoms with which the febrile ſtate was attended, and which generally went off on the third day, or in ſeventy-two hours from the firſt attack, without any ſalutary criſis, and was ſoon ſucceeded by the ſecond *ſtadium*, as our author calls it; a ſtate, though without a fever, much more terrible than the former. The ſymptoms now were,

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1. The pulſe, though hard and ſmall, became leſs frequent; very little more ſo than in health. Soon after it became much ſlower, and very ſoft; this ſoftneſs remaining while any pulſe could be felt. In many it gradually ſubſided, till it became ſcarce perceptible; neither could it be ſupported by any of the ordinary means uſed for that purpoſe. After this the yellow ſuffuſion, the vomiting, delirium, reſtleſsneſs, &c. increaſed to a great degree. Sometimes the pulſe would recover its ſtrength, but only for a ſhort time.

2. The heat did not exceed the natural, and was ſtill farther diminiſhed as the pulſe ſunk; the ſkin became cold, and the face, breaſt and extremities acquired ſomething of a livid colour. There was no great thirſt, though the ſick had a great inclination for ſtrong liquors.

3. The vomiting or reaching to vomit increaſed, and in ſome were ſo conſtant, that neither medicines nor aliment of any kind could be retained. Some vomited blood, others only what was laſt exhibited, mixed with phlegm, while others had what is called the *black vomit*. But this, though its general appearance is black, appears not to be entirely ſo, but owes its colour to a great number of black ſlakey ſubſtances. Theſe are by our author ſuppoſed to be the bile mixed with the mucus of the ſtomach, or adhering to it. He founds his opinion upon obſervations from diſſection, where the mucus of the ſtomach was always found abraded, and the bile in its cyſtis black, and ſometimes very viſcid. This change in the ſtate of the bile he has always obſerved in ſuch as died of this diſeaſe, and likewiſe that the blood was very fluid, and the veſſels of the viſcera much diſtended. In one caſe he found the bile of the conſiſtence of turpentine, and carbuncles or gangrenous ſpecks on the ſtomach.

The reaching to vomit continued a longer or ſhorter time, according to the ſtate of the pulſe; an increaſe of fulneſs of the pulſe being attended with an abatement of the reaching, and the contrary.

In this ſtate the patients were extremely unquiet, even their ſleep being frequently attended with dejection of ſpirits and debility. This laſt ſymptom was ſo exceſ-

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ſive that if the patient was only raiſed up in bed, or ſometimes if the head was only raiſed from the pillow, while a little drink was given, the pulſe ſunk immediately, and became ſometimes ſo ſmall, that it could ſcarce be felt: they became cold, the ſkin became clammy, the delirium increaſed, their lips and ſkin, eſpecially about the neck, face and extremities, as well as the nails, acquired a livid colour. The reſtleſſneſs and toſſing were ſo great, that it was ſometimes ſcarce poſſible to keep the ſick in bed, though, even in this ſtate, they made no particular complaint, and if aſked how they did, the reply was, *Very well.*

A yellowneſs in the eyes became now very obſervable, and this was ſoon diffuſed all over the body; but in ſome, this colour did not appear until a little before death, when it ſpread ſurpriſingly quick, eſpecially about the breaſt and neck. Along with this were a number of ſmall ſpots of a ſcarlet, purple or livid colour. Theſe appeared principally about the neck and breaſt.

Some were obſtinately coſtive, others the contrary, with large, liquid and black ſtools, but others were relieved by moderate ſtools, even though black. In ſome they reſembled tar, in ſmoothneſs, tenacity, colour and conſiſtence.

In this diſeaſe there was ſuch a putrid diſſolution of the blood that hæmorrhages took place from almoſt all parts of the body. In women the menſtrua flowed, ſometimes in great quantity, even at irregular periods. Blood flowed alſo from the eyes, noſe, mouth and ears, and from thoſe parts where bliſters had been laid on. "Nay, (ſays our author) in the year 1739 or 1745, there "were one or two inſtances of an hæmorrhage from the "ſkin, without any apparent puncture, or any loſs of the "ſcarf-ſkin." The urine was pale while the patient was not yellow, but a deep ſaffron colour when the yellowneſs had come on. Sometimes it was turbid, at others bloody, and the quantity of blood was always in proportion to the ſtate of the pulſe; diminiſhing as the pulſe became more full, and increaſing as it became weaker.

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In the third ſtage, which always terminated in death, the pulſe was exceedingly ſmall and unequal, though ſoft; the extremities were cold, clammy and livid; the face and lips in ſome fluſhed, in others they were of a livid colour; the livid ſpecks increaſed ſo faſt, that in ſome the whole breaſt and neck appeared livid; the heart palpitated ſtrongly; the heat about the præcordia was greatly increaſed, reſpiration became difficult, with frequent ſighing; the patient became anxious and extremely reſtleſs, the ſweat flowed from the face, neck and breaſt, blood from the mouth or noſe or ears, and in ſome from all together; the deglutition became difficult, hiccup and ſubſultus tendinum came on, the patient picked the bedclothes, was comatous or conſtantly delirious. In this terrible ſtate ſome continued eight, ten or twelve hours before they died, even after they had been ſo long ſpeechleſs, and without any perceptible pulſation of the arteries and wriſts; whereas in all other acute diſeaſes, death follows immediately after the pulſe in the wriſts ceaſes. When the diſeaſe was very acute, violent convulſions ſeized the unhappy patient, and quickly brought this ſtadium to its fatal end. After death the livid blotches increaſed faſt, eſpecially about the face, neck and breaſt, and the putrefaction began very early, or rather increaſed very quickly. In hot weather, and when the ſymptoms at firſt were very violent, there was little difference to be obſerved between the ſtadia, the whole tragedy being completed in leſs than forty-eight hours.

On this diſeaſe in general Dr. Lining remarks, that the infection was increaſed by warm, and leſſened by cold, weather. In hot days the violence of the ſymptoms were augmented to ſuch a degree as ſometimes to become fatal to thoſe who, in moderate weather, ſeemed to be in no danger; while, on the other hand, in cold days, ſome who had been in great danger were apparently ſaved from the jaws of death. The diſeaſe was alſo more fatal to thoſe who lay in ſmall chambers without a proper ventilation, to ſuch as were of an an athletic and full habit, to ſtrangers, natives of a cold climate, and to ſuch as were moſt afraid of it, as well as to thoſe who

who had previouſly overheated themſelves by exerciſe in the ſun, or by exceſſive drinking of ſtrong liquors. It proved alſo moſt certainly fatal to valetudinarians, or to ſuch as had been previouſly weakened by any diſeaſe.

Dr. Lind obſerves that "a yellow colour of the ſkin "is obſerved not only in common agues, but likewiſe "in other fevers; ſometimes denoting, as in contagious "fevers, their malignant nature, at other times, as in "ſome Weſt Indian fevers, an univerſal diſſolution of "the blood and humours; and frequently this ſymptom "accompanies gentle diſcharges of the bile, and a diſ-"eaſed liver." In ſpeaking of the diſeaſes in the Weſt Indies, he mentions ſome fevers, which he derives from ſtagnated air, "of ſuch a malignant nature, that the "people after being there a few days are ſuddenly ſeized "with violent vomitings, head-achs, deliriums, &c. and "in two or three days more the whole body putrefies, "and the diſſolved maſs of blood iſſues from every "pore. . . . On conſidering the yellow fever particu-"larly he is of opinion that the remarkable diſſolution "of the blood, together with the tendency to putrefac-"tion in the whole body, the black vomit, and other "characteriſtic ſymptoms, are often accidental though "fatal appearances in fevers of the Weſt Indies. They "proceed, according to him, in ſuch as are newly arrived, "ſometimes from a groſs habit of body, exceſſive drink-"ing of ſpiritous liquors, and from being afterwards "overheated in the ſun; but the intenſe heat and un-"healthfulneſs of the air does much more frequently "produce all thoſe ſymptoms. This fever was once "ſuppoſed to have been firſt carried into the Weſt In-"dies by a ſhip from Siam: *an opinion truly chimerical*; "as ſimilar diſeaſes have made their appearance, not only "in the Eaſt Indies, but in ſome of the ſouthern parts of "Europe, during a ſeaſon when the air was intenſely "hot and unwholeſome. This happened in the months "of September and October 1764, when exceſſive heat "and want of rain for ſome months gave riſe to violent "epidemic bilious diſeaſes, reſembling thoſe of the Weſt "Indies, in the city of Cadiz in Spain, of which an

" hundred perſons often died in a day. At this time " the winds blew moſtly from the ſouth, and after ſun- " ſet there fell an unuſual and very heavy dew. The " diſeaſe began with alternate heats and chills, nauſea, " pains of the head, back and loins, and at the pit of the " ſtomach. Theſe ſymptoms were often followed, in " leſs than 24 hours, with violent reachings, and a " vomiting of green and yellow bile, the ſmell of which " was very offenſive. Some threw up an humour as " black as ink, and died ſoon after, in violent convul- " ſions and in a cold ſweat. The pulſe was ſometimes " ſunk, ſometimes quick, but often varying. After the " firſt day, the ſurface of the body was generally either " cold, or dry and parched. The head-ach and ſtupor " often ended in a furious delirium, which quickly " proved fatal. The dead bodies having been examined " by order of the court of Madrid, the ſtomach, meſen- " tery and inteſtines were found covered with gangre- " nous ſpots. The orifice of the ſtomach appeared to " have been greatly affected, the ſpots upon it being " ulcerated. The liver and lungs were both of a putrid " colour and texture.

" The ſtomach contained a quantity of an atrabilious " liquor, which, when poured on the ground, produced " a ſenſible efferveſcence; but, when mixed with ſpirit of " vitriol, a violent ebullition enſued. The dead bodies " turned ſo quickly putrid, that at the end of ſix hours their " ſtench was intolerable, and in ſome of them worms " were already found lodged in the ſtomach. His Ma- " jeſty's ſhip the Tweed being at that time in Cadiz bay, " ſeveral of her men were taken ill when on ſhore, but, " by being carried on board, all of them recovered. " Neither did the black vomit or any other deadly " ſymptom of that fever make its appearance in any of " the ſhips. The dread of this diſtemper forced many " people of faſhion to retire into the country, where they " remained in perfect ſafety."

Dr. Lind further remarks, that in the yellow fever it is a bad ſign if the ſkin is very dry and rough; " and the " longer it continues in this ſtate, the greater is the dan- " ger,

" ger, as ſuch patients ſeldom recover, though the pulſe " may give hopes, and the other ſymptoms alſo be flat- " tering; for many have a good pulſe in this fever a little " before death." He alſo quotes Dr. Bruce, an eminent phyſician of Barbadoes, whoſe account of the diſeaſe is to the ſame purpoſe. He ſays it may come on at any ſeaſon of the year, but that the ſymptoms are moſt ſevere when there is great heat joined with moiſture. The blood, even in the beginning of the diſeaſe, is of a florid red colour, and as it were rarefied; the craſſamentum ſcarcely cohering; the ſerum of a clay-coloured yellow. It ſometimes finiſhes its courſe in 24 hours.

The account given by Dr. Hillary correſponds alſo very much with that already given. the ſubjects of the diſeaſe are the ſame with thoſe already mentioned. He has ſeen it at all ſeaſons of the year, but it is worſt in a hot ſeaſon, eſpecially if it was preceded by moiſt and warm weather. " Blood, taken even at the beginning " of the diſeaſe, is often of an exceeding florid red colour, " much rarefied and thin, and without the leaſt appear- " ance of ſizineſs; and the craſſamentum, when it has " ſtood till it is cold, will ſcarce cohere, but fluctuates; " the ſerum is very yellow. . . . On the ſecond or third " day the blood is much more diſſolved, the ſerum " more yellow, and the craſſamentum looſe, ſcarcely " cohering, but undulates like ſizy water when ſhaken, " and ſometimes has dark, blackiſh ſpots on its ſurface, " ſhowing a ſtrong gangreneſcent diatheſis. . . . In the " latter ſtage of this fever the blood is ſo attenuated " and diſſolved, that we frequently ſee it flowing not " only out of the noſe and mouth, but from the eyes, " and even through the very pores of the ſkin; alſo " great quantities of black, half-baked, half-mortified " blood is frequently voided, both by vomiting and " ſtool, with great quantities of yellow and blackiſh pu- " trid bile, by the ſame ways; and the urine, which " was before of a high icteritious colour, is now almoſt " black, and is frequently mixed with a quantity of half- " diſſolved blood. . . . Soon after death the body ap-

" pears

" pears much fuller of livid, large, blackiſh, mortified " ſpots, particularly about the præcordia and hypocon- " dres, eſpecially the right; which parts ſeem to be, " even from the firſt ſeizure, the principal ſeat of this " terrible diſeaſe. And upon opening the bodies of " thoſe who die of it, we generally find the gall-bladder " and biliary ducts filled with a putrid blackiſh bile, " and the liver and ſtomach, and adjoining parts, full of " blackiſh and mortified ſpots, and ſometimes gan- " grenes, in thoſe, as alſo in ſeveral other parts of the " body. And the whole corpſe ſoon putrefies after " death, and can be kept but a few hours above " ground."

Dr. Jackſon, in deſcribing the yellow fever of Jamaica, acknowledges the difficulty of characteriſing the diſeaſe, even though he is of opinion that it " poſſeſſes ſome " characteriſtics of its own, different from thoſe of any " other." In a note at the end of his work, he obſerves the impropriety of calling it the *yellow* fever; becauſe that yellowneſs ſometimes does not appear at all; and in no one caſe does it ordinarily ſhow itſelf till the latter ſtages. " I know alſo (ſays he) that moſt of the " practitioners of Jamaica conſider it only as an aggra- " vated ſpecies of the remittent, the common endemic " of hot climates. It appeared to me, I muſt confeſs, in " a different light. . . . It may not, however, be im- " proper here to take notice of the opinion of Dr. Moſe- " ley, who has endeavoured to perſuade us that it is no " other than the *kauſos*, or ardent fever, of the ancients. " But the yellow fever of the Weſt Indies is, by Dr. " Moſeley's own confeſſion, in ſome meaſure peculiar " to ſtrangers newly arrived in tropical climates. The " *kauſos*, we are informed, made its appearance in the " iſlands of the Archipelago, and on the coaſts of the " contiguous continents, indiſcriminately among men " and women, natives and foreigners: in fact it has not, " as far as I can perceive, any claim to be conſidered as a " diſtinct diſeaſe. If I rightly underſtand Hippocrates, " or the deſcription of the ſtill more accurate Aretæus, " *kauſos* in reality is only an accidental condition of the " common

" common endemic of the country, where the force of " the fever is chiefly exerted upon the ſtomach and ali- " mentary canal. In this manner it appears frequently " in Jamaica, and in the ſouthern provinces of America. " In the hot months of ſummer, it appears occaſionally " in every climate; and is not neceſſarily accompanied " with, nor does it depend upon, a general inflammatory " diatheſis of the ſyſtem for its exiſtence."

The Doctor divides this diſeaſe into three ſpecies: 1. Where " ſigns of putrefaction are evident at a very " early ſtage, which is generally rapid in its courſe, and " which caſually terminates in black vomiting. Yel- " lowneſs ſeldom or never fails to make its appearance in " the preſent inſtance; and perhaps it is the only one " which, ſtrictly ſpeaking, can be called the yellow fever. " 2. A form of fever which has either no remiſſions, or " remiſſions which are ſcarcely perceptible; in which " ſigns of nervous affection are more obvious than ſymp- " toms of putreſcency; and in which yellowneſs and black " vomiting are rare occurrences. 3. Another form, in " which regular paroxyſms and remiſſions cannot be tra- " ced; but in which there are marks of violent irritation, " and appearances of inflammatory diatheſis in the ear- " lier ſtage, which give way, after a ſhort continuance, " to ſigns of debility and putreſcency, to which yellow- " neſs frequently ſucceeds, or even ſometimes the ſo " much dreaded vomiting of matter of a dark colour. " The diſeaſe in theſe three forms appears to be in reality " one and the ſame. The difference of the ſymptoms " probably ariſes from very trivial or very accidental " cauſes. It is in ſome meaſure peculiar to ſtrangers " from colder regions ſoon after their arrival in the Weſt " Indies, and may generally be diſtinguiſhed from the com- " mon endemic of the country, not only by a total want of " paroxyſms and remiſſions, but likewiſe by a certain ex- " preſſion of the eye and countenance, with ſomething un- " uſually diſagreeable in the feelings, of which words " convey only an imperfect idea."

The ſymptoms enumerated by Dr. Jackſon are in general the ſame with thoſe already taken notice of.

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He mentions likewiſe a degree of confuſion frequently joined with *grimneſs*, difficult to be deſcribed in words, but which a perſon acquainted with the appearances of the diſeaſe immediately recogniſes as one of its diſtinguiſhing marks. In the ſecond ſtage he ſays, that no ſweat or moiſture was now obſervable on any part of the body: the ſtate of the ſkin impreſſed the idea as if it were not pervious to any degree of perſpiration, and heat gradually forſook the ſurface and extremities: the tongue became moiſt, and at the ſame time frequently clean about the edges: the gums became redder, more ſpongy, and ſhowed a greater diſpoſition to bleed: vomiting was troubleſome: the matter thrown up was ropy, in large quantity, and abounding with villous or mucous flakes of a darker colour. The circulation in the extreme veſſels became gradually more languid; the natural heat retired from the ſurface of the body, which was now dry and impervious; the pulſe returned nearly to its ordinary ſtate, or became ſlow, full and regular; the yellowneſs increaſed faſt, ſo that the whole body was frequently yellow as an orange, or of as deep a colour as the ſkin of an American ſavage: anxiety was inexpreſſible; vomiting was irreſtrainable, and the vomiting of a matter like the grounds of coffee at laſt made its appearance. This matter was often as black as ſoot, where the progreſs of the diſeaſe had been rapid; while it was not only leſs intenſely black, but often tinged with green, where the diſeaſe had been more ſlow and gradual. The number of villous or mucous flakes, in the matter diſcharged by vomit, increaſed as the diſeaſe advanced, and with them were joined ſtreaks of blood, which ſeemed principally to come from the throat and gums. As the diſeaſe advanced, the vomiting became more frequent, but was ſeldom accompanied with any violent retching. Quantities of liquor were diſcharged, ſo enormous that it was often difficult to imagine whence they came; after which the patient enjoyed ſome reſpite, till a ſimilar collection was made. As ſoon as the matter diſcharged by vomit acquired this dark and ſooty colour, the belly generally became looſe, the ſtools being black, ſmooth, and not unlike

unlike tar or molaſſes; the tongue became clean, the gums putrid; hæmorrhages, or rather *oozings of blood*, were ſometimes obſerved in different parts of the body, while livid blotches made their appearance on the belly and inſides of the thighs. The pulſe, which during the latter ſtages of the diſtemper could ſcarcely be diſtinguiſhed from that of a perſon in health, became at laſt irregular, quick, or intermitting; ſoon after which coma or convulſions cloſed the ſcene. Sometimes the yellowneſs ſucceeded the black vomiting. In theſe the vomiting began unexpectedly, or without much previous affection of the ſtomach: the colour was commonly intenſely black; the patient turned yellow almoſt in an inſtant, and died in a very ſhort time. When any one recovered from this deplorable ſituation, of which there were ſome few inſtances, the termination was not by any regular criſis. The black vomiting ceaſed, ſometimes apparently in conſequence of treatment, ſometimes evidently of its own accord: but a vomiting of a ropy, glutinous matter continued for a great length of time, together with an extreme irritability of the ſtomach, and a very peculiar ſtate of the ſkin; which ſometimes did not recover its natural ſmoothneſs and unctuoſity for ſeveral weeks.

The diſpoſition to faint, ſo common in the yellow fever, is ſuppoſed by Dr. Jackſon to ariſe from a kind of torpor in the nervous ſyſtem, rather than the uſual cauſes of fainting. For this opinion he aſſigns as a reaſon, that "the patient was often able to ſtand upright for ſome "time, and even to walk to a conſiderable diſtance; "and, when at laſt overcome, was obſerved to fall down "in a torpid, rather than a fainting, ſtate."

In diſſections our author obſerved that the omentum and all its appendages were in a dry and parched ſtate, and of an uncommon dark grey colour. But, along with this dark grey colour, and want of unctuoſity and moiſture, uſually met with in the abdomen, the ſtomach and inteſtines had a dirty yellow appearance, were highly putrefied, and much diſtended with wind. The liver and ſpleen were generally enlarged in ſize; the former

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of a deeper yellow than any of the other abdominal viſcera; while the texture of the ſpleen was often leſs firm than natural. The bile was uſually black and thick, like tar or molaſſes; the blood-veſſels of the liver bearing marks of uncommon diſtenſion. A quantity of black fluid, ſimilar to that ejected by vomit, was found in the ſtomach, which fluid our author ſays poſitively derived its blackneſs from the bile, the flakes obſerved to float in in being parts of the villous coat of the ſtomach abraded. He denies that the black colour of the matter vomited is owing to blood, as many authors have ſuppoſed. He ſays that the paſſage of the bile might be eaſily traced from the gall-duct into the pylorus.

This being in the Doctor's opinion the only true kind of yellow fever, we ſhall not follow him through the deſcription of the other two ſpecies, but proceed to conſider that remarkable and exceſſively fatal diſtemper which appeared in the year 1793, firſt in the Weſt India iſlands, and then on the American continent. Dr. Chiſholm, who has deſcribed the diſtemper very particularly, derives it from the coaſt of Africa, and gives the following account of its origin on the authority of a Mr. J. Paiba, "one of the adventurers in the Boullam "ſcheme; and who, deſpairing of ſucceſs, left the coaſt "of Africa in a veſſel called the *Hankey*. This veſſel "ſailed from England in April 1792 with ſtores and "adventurers for the intended colony at Boullam. The "people were all in good health: that part of the coaſt "of Africa on which they touched is remarkable for its "healthineſs; only it is deſtitute of water except what "can be procured by digging temporary wells on the "beach, and which is brackiſh, and conſequently un-"wholeſome. The ferocity of the negroes who inhabit "that part of the continent prevented them from being "accommodated on ſhore, ſo that they found themſelves "obliged to remain on board the Hankey for nine "months. As the rainy ſeaſon came on almoſt imme-"diately after their arrival on the African coaſt, they "attempted to ſhelter themſelves by raiſing the ſides of "the veſſel ſeveral feet, and covering it with a wooden

"roof.

"roof." Thus were upwards of two hundred perſons, among whom were many women and children, confined in ſuch a manner as muſt be ſuppoſed capable of producing fevers of a bad kind, if they could be produced by ſuch cauſes. Accordingly a malignant fever did break out; the veſſel was not ventilated, nor were the bed-clothes, &c. of the ſick deſtroyed; from whence Dr. Chiſholm concludes that the infection remained on board the veſſel. The Doctor then proceeds to give the following account of the veſſel after her departure from Boullam:* "Capt. Coxe, finding the water at "Boullam unwholeſome, proceeded with his ſhip to "Biſſao, where there is a Portugueſe ſettlement, for a "ſupply. The ſhip was navigated by about twelve ſea-"men, moſt of whom had not experienced ſickneſs, and "had probably been procured from Sierra Leone: at "any rate they were then taken on board for the firſt "time. Of theſe, before the return of the Hankey to "Boullam, nine died; and the remainder, with the "captain, were reduced to a deplorable ſtate. The "time for which the Hankey was chartered being ex-"pired, Mr. Paiba, with his family, intended to return "to England in her; but as no ſeamen could be pro-"cured they put to ſea, having on board the captain, ſick, "and only the mate, Mr. Paiba and two ſeamen to navi-"gate the ſhip. With much difficulty they arrived at "St. Jago, where they fortunately found the Charon "and Scorpion ſhips of war. Capt. Dodd of the for-"mer, humanely rendered them every ſervice in his "power, and on leaving them put two men of each ſhip "on board the Hankey. With this aid they proceed-"ed to the Weſt Indies; a voyage to England being "impracticable in their wretched ſtate. On the third "day after leaving St. Jago, the men they procured "from the ſhips of war were ſeized with the fever, which "had carried off three fourths of thoſe on board the "Hankey at Boullam; and, having no aſſiſtance, two "of the four died: the remaining two were put on "board

* Chiſholm's Eſſay on the Malignant Peſtilential Fever, p. 86.

" board here in the moſt wretched ſtate poſſible. Capt. " Dodd, on his arrival at Barbadoes from the coaſt of Afri- " ca, was ordered to convoy the homeward-bound fleet of " merchantmen. In the execution of his orders he came to " Grenada on the 27th of May, and, hearing of the " miſchief which the Hankey had been the cauſe of, " mentioned that ſeveral of the Charon's and Scorpion's " people were ſent on board the Hankey at St. Jago, to " repair her rigging, &c. that from this circumſtance, " and the communication which his barge's crew had " with that ſhip, the peſtilence was brought on board " both ſhips; and that of the Charon's crew thirty " died, and of the Scorpion's, about fifteen. The Han- " key arrived at the port of St. George's (in Grenada) on " the 19th of February, in the moſt diſtreſſed ſituation, " and for a few days lay in the bay, but was afterwards " brought into the careenage. From this period are we " to date the commencement of a diſeaſe before, I be- " lieve, unknown in this country, and certainly un- " equalled in its deſtructive nature."

This account of the introduction of the fever (which however is by Dr. Chiſholm accounted very different from the yellow fever above deſcribed) is ſo clear and diſtinct, that, at firſt reading, it commands our belief. It hath not, however, met with univerſal approbation; and even the *facts*, for which both parties appeal to Mr. Paiba and capt. Dodd, vary from one another in a ſurpriſing manner. Dr. Trotter, in his Medicina Nautica, p. 328, gives the following account: " Dr. Chiſholm " tells us, that the ſhips of war on the African ſtation, " having ſent men to aſſiſt the Hankey, after numbers " had periſhed from the fever, received the infection by " means of this communication, and that in the Charon " thirty died, and fifteen in the Scorpion. Capt. Dodd, " who at that time had his broad pendant in the Cha- " ron, now commands the Atlas of 98 guns in the fleet; " Mr. Smithers, the ſurgeon, is at preſent in the For- " midable, a ſecond rate, alſo in the fleet; *from them* I " have copied the following narrative of their tranſac- " tions with the Hankey:

" When

"When the ſquadron under commodore Dodd "came to St. Jago in 1793, the Hankey lay there in "great diſtreſs for want of hands; having buried above "one hundred perſons, men, women and children, from "the time ſhe had been at Bulam. *The fever was now* "*overcome*: Mr. Smithers ſaw two men that had lately "recovered. He left a quantity of bark. The Charon "and Scorpion ſent two men each to aſſiſt in navigating "her to the Weſt Indies. The Hankey at this port "was cleaned, waſhed with vinegar, and fumigated. *No* "*fever appeared in either of the men of war*, in conſe- "quence of this communication; they arrived at Gre- "nada in perfect health, but did not go into the ſame "part of the iſland to which the Hankey went. The "Charon, at this harbour received ſome ſeamen from "the merchant ſhips then taking in cargoes for England; "ſhe had afterwards *fourteen* caſes of yellow fever, of "which one died: but it is remarkable that the Scor- "pion did not bury a ſingle man during the whole voy- "age.* It is probable from theſe facts, that the Han- "key *did not* import the infection that produced the "Grenada fever; for, *after the diſeaſe was worn out*, ſhe "had a paſſage to make to the Weſt Indies of many "hundred leagues. It is alſo doubtful how the effects "left in the Hankey could produce the fever, for *the* "*bedding was thrown away*, and what clothing remained "had been aired, and probably had ſcarcely been in "contact with the body after being ſick."

The diſcordance between this and the foregoing account is abundantly evident. Dr. Chiſholm's account of the bedding, &c. is alſo very different. "Our lieu- "tenant governor, Ninian Home, eſq. ſome time after "the diſeaſe became epidemic, informed me, that, in "conſequence of the information he had received of "the clothes, &c. of the victims of the fever at Boul- "lam being ſtill on board the Hankey, he ordered Capt. "Coxe to be brought before him and ſome gentlemen "of the council. He then acknowledged, that *all the* "*effects* of thoſe who had died were then on board his "ſhip,

* To this is ſubjoined the atteſtation of Mr. Smithers with reſpect to the Charon.

" ſhip, and ſaid that he *would not* deſtroy them, unleſs " he was indemnified for the loſs he might ſuſtain, " ſhould the heirs of the deceaſed call on him for thoſe " effects. Every argument was uſed to induce him to " deſtroy the articles, but the only one which influences " a man of this deſcription, *indemnification*; and he of " courſe carried the ſeminium of the diſeaſe to England." It was this conſideration which induced the governor to write to the ſecretary of ſtate, and in conſequence of his repreſentation the veſſel was obliged to perform quarantine in England, a circumſtance which Dr. Trotter mentions without approbation.

Thus far the matter of *fact* ſeems to be very much obſcured; and the more we inveſtigate, the more we are involved in darkneſs. In the Medical Repoſitory, vol. i, p. 484, we find the following ſevere cenſure paſſed upon Dr. Chiſholm by the late Dr. Smith of New York: " It belongs to another part of this paper to aſſign the " probable motives of Dr. Chiſholm for maintaining " that the fever was imported into Grenada: certain it " is that he avowed a different opinion to Mr. Paiba, to " whom he freely declared, that he could by no means " trace the diſeaſe to the *Hankey*; and that he believed " it to be of local origin, owing to the unhealthy condi- " tion of the careenage, and the particular prevailing " winds: and, to confirm this notion, he informed " Mr. Paiba that a ſimilar diſeaſe, from the ſame cauſe, " though in a leſs degree, had exiſted in St. George's " ſome years before."

This was plainly giving Dr. Chiſholm *the lie*; which, whatever might have been the conſequence between the two parties, abſolutely ſuperſedes, to any impartial and unconcerned perſon, the evidence of *both*, at leaſt as far as regards the origin of this diſeaſe. It is not, however, to be ſuppoſed that Dr. Chiſholm would paſs ſuch a cenſure unnoticed. He did accordingly reply in a letter to Dr. Smith, who had ſent him a copy of the Repoſitory, with a letter inviting him to defend what he had ſaid. Dr. Smith died before this letter reached him, but the principal part has appeared in the Medical Repoſitory,

vol.

vol. ii, p. 285. In this Dr. Chiſholm retracts what he had ſaid concerning the mortality on board the Charon and Scorpion ſhips of war. "I have lately received "(ſays he) from a gentleman of the navy here, a log-"book of the Charon, kept by one of her officers during "the voyage in queſtion. In this I find, that no ſick-"neſs took place in either of theſe ſhips in conſequence "of this interview. A log-book is unqueſtionable "evidence, and I therefore admit it." As to the more ſerious part of the charge, viz. that Dr. Chiſholm had wilfully miſrepreſented matters, the Doctor replies, that the narrative publiſhed by him was in general ſuch as he had from Mr. Paiba; not indeed in manuſcript, as Dr. Smith ſtated his to have been, but in converſation; and that this converſation took place expreſſly with a view to elucidate the cauſe of the fever, which he (Dr Chiſholm) could not account for by any reaſoning from local cauſes, but heard it very generally aſcribed to infection from the Hankey. Mr. Paiba was introduced to Dr Chiſholm at the requeſt of the latter by the Hon. Samuel Mitchill *now* (the letter is dated Sept. 6th 1768 probably 1798) the ſenior member of the council of Grenada. "Mr. Mitchill (ſays the Doctor) brought "Mr. Paiba to my houſe, and was preſent during the "greateſt part of the time the converſation continued. "I found Mr. Paiba very willing to give me every infor-"mation in his power relative to the ſtate of the Bu-"lama or Boulam colony, and of the ſhip Hankey; "but I found him ſtrongly diſinclined to fall in with the "univerſally received opinion, that that ſhip introduced "the diſeaſe. The particulars I have given, are thoſe "Mr. Paiba related to me in this converſation; and, in "order to be correct, I immediately, after Mr. Paiba "left me, committed them to paper. Mr. Paiba pro-"miſed to favour me with a written account; and in "order to direct that gentleman's attention to the points "I conſidered as of moſt importance, I drew up a ſet of "queries, and Mr. Mitchill charged himſelf with the "delivery of it. A copy of theſe I have now in my "poſſeſſion, and a ſlight attention will exhibit my view

"in

" in framing them, and ſhow the doubts reſpecting the " nature of the epidemic which ſuggeſted them. Al- " though I repeatedly, through Mr. Mitchill and Mr. " Palmer, the gentlemen with whom Mr. Paiba reſided " in the country, renewed my requeſt to have this pro- " miſe fulfilled, Mr. Paiba left the Iſland without gra- " tifying it. If no other ſtrong proof exiſted of ſome- " thing peculiar in the fever which at that time prevail- " ed, the circumſtance of my formally applying to Mr. " Paiba for information relative to the ſtate of the " Hankey, and of taking the trouble to obtain an inter- " view with him, preſents an evidence as concluſive as " can well be required by reaſonable men. But the be- " lief of the infection of the Hankey was *univerſal*, nor " was it by any means confined to thoſe whoſe intereſt " might have been affected by the proſperity of an in- " fant colony on the coaſt of Africa."

Another charge againſt Dr. Chiſholm is, that he falſifies the date of the Hankey's arrival at Grenada; and which in Dr Smith's paper is brought forward in the following words: " In p. 91 the Doctor remarks, that, 'in " the ſhort ſpace of time from the beginning of March " to the end of May, 200 of about 500 ſailors, who " manned the ſhips in the regular trade, died of this " fever.' By this it appears that the fever in queſtion " broke out as early as the beginning of March. The " diſingenuouſneſs of this author is particularly evident " from this quotation, if the period of the commence- " ment of the diſeaſe be correctly aſſigned: and that it " is ſo is probable from the difficulty of concealing the " fact; as there muſt have been thouſands of witneſſes " to the progreſs of the fever. When therefore it was " thought proper to fix the odium of introducing the " diſeaſe upon the Hankey (a project of which Dr. " Chiſholm ſeems originally to have had no idea) it be- " came neceſſary for him to fix an earlier date to her " arrival. Now, that the Hankey did not arrive till " towards the latter end of March, is verified by the " concurring teſtimony of Mr. and Mrs. Paiba, and of " Mr. Bell, of this city (New York) who happened to

" be

"be in Grenada about that time, and was perſonal-
"ly acquainted with Mr. and Mrs. Paiba in that
"iſland."

In anſwer to this Dr. Chiſholm repeats his declaration that the Hankey arrived at Grenada on the 18th of *February*, and not on the 19th of March, as Dr. Smith (ſuppoſed on the authority of Mr. Paiba) had ſtated. In proof of this he produces an inconteſtible evidence, viz. an extract from the St. George's Gazette in Grenada, of date 19th of February, which begins thus: "By the ſhip Hankey of London, arrived here *yeſterday* from the iſland of Boulam on the coaſt of Africa, we are informed," &c. The remainder of the extract contains an account of the exceſſive mortality on board the ſhips; which, as it may perhaps be exaggerated, it is needleſs to tranſcribe.

The next thing of conſequence is the deſtruction of the bed-clothes and effects of the deceaſed; of which Dr. Smith ſays, "Before the Hankey put to ſea, all
"the bedding of the ſick was thrown overboard or de-
"ſtroyed; the ſhip was waſhed from ſtem to ſtern, both
"above and below, with ſalt water; and the purifica-
"tion was completed by fumigating her with tar, pitch
"and gun-powder. In this clean condition they bade
"farewel to Bulama on the 22d of November, 1792;
"but, in attempting to paſs through the channel near
"to the entrance into the open ſea, in a dark and foggy
"night, they got aground on a ſand-bank, upon the
"north ſide of the iſland of Formoſa or Warang, be-
"longing to the Bijugas, who are repreſented as canni-
"bals. The extreme terror excited by this accident
"was not calculated to improve the health of the peo-
"ple on board the Hankey; ſo that, when it became
"neceſſary to take meaſures for their ſecurity and de-
"liverance, only four men were found in a condition to
"do duty, and all of theſe had intermittents. With
"them, however, and his lady, Mr. Paiba ſet off, in an
"open boat, for Biſſao, to obtain aſſiſtance from the
"Portugueſe ſettlement. Thither he arrived, rowing
"though rains and fogs, in a leaky boat, after being out

"two

" two nights and a day; and having obtained such help " as he could, returned to the Hankey, got her off, and " carried her to Biſſao. On the paſſage there *eight* per- " ſons died who belonged to this ſhip. At Biſſao they " refitted, and the Hankey *was a ſecond time purified as* " *completely as ſhe had been before leaving Bulama.*"

In anſwer to all this Dr. Chiſholm *again declares*, " that " the bedding and effects of the deceaſed *were preſerved* " on board the Hankey, and conſtituted the ſeminium " of the infection. Capt. William Liddle, of the ſhip " General Mathew, ſaw them on board; and it was in " conſequence of that gentleman's repreſentation that " the lieutenant governor, Mr. Home, entered into a " ſtrict inveſtigation of the matter; the general reſult of " which I have given; and the authenticity of it may be " depended on. Capt. Liddle is now reſident in Lon- " don, and Mr. Byles, the governor's ſecretary, is now " reſident commiſſary at Grenada; and theſe gentlemen " will readily teſtify to the truth of my ſtatement. The " deſtructive articles I have mentioned *were not thrown* " *overboard* till the Hankey arrived in Grenville Bay, " when they were deſtroyed at the requeſt of Mr. Prend- " foot, the gentleman who chartered the ſhip for Eng- " land.

Dr. Chiſholm is likewiſe charged with having miſ-ſtated the caſe of a Capt. Remington, ſaid to be the firſt who ſuffered by the fever in Grenada. The words in Dr. Chiſholm's Eſſay are, " A Capt. Remington, an in- " timate acquaintance of Capt. Coxe's, was the firſt per- " ſon who viſited the Hankey after her arrival in St. " George's bay. This perſon went on board of her in the " evening after ſhe anchored, and remained three days; " at the end of which time he left St. George's, and pro- " ceeded in a drogher (a coaſting veſſel) to Grenville " bay, where his ſhip, the Adventure lay. He was ſeiz- " ed with the malignant peſtilential fever on the paſſage; " and the violence of the ſymptoms increaſed ſo rapidly, " as, on the third day, to put an end to his exiſtence." In oppoſition to this Dr. Smith gives the follwing ſtate-ment from Mr. Paiba: " He (Capt. Remington) had " been

" been all day and all night coming from Grenville bay, " and had been wet through. He ſlept on board in his " clothes; and went in an open boat *the next day* back " to his ſhip: enough to kill any one in that climate." Dr. Chiſholm replies " that the above ſtatement is not " correct, nor founded on fact; Dr. Chiſholm's evidence " for what he ſaid was founded on the information of " captains of veſſels, who knew all the circumſtances of " his viſit to the Hankey; and of Dr. Stewart, an emi- " nent practitioner, who attended him at Grenville bay, " when he landed there. Laſtly, that the idea of his " having returned to Grenville bay in an open boat, is " abſurd; nothing of the kind having been ever at- " tempted."

From this tedious account it is plain that the evidence relative to the importation of the fever into Grenada by the Hankey is quite contradictory, and ſubverſive of itſelf, becauſe we are unable to judge between the two diſputants. A further conſideration of it would lead us entirely from the ſubject of this treatiſe, into an endleſs diſpute about which of the two parties had ſpoken the truth. Setting aſide therefore *the whole* of the evidence on both ſides as inſufficient, we ſhall now proceed to give an account of the ſymptoms of the diſtemper as deſcribed by Dr. Chiſholm, and to which deſcription there has never been any objection made.

In the moſt violent kind of this fever, according to our author, " the patient, without any previous com- " plaint, ſuddenly becomes giddy; he loſes his eye-ſight; " every thing ſeems to move round him with inconceiva- " ble velocity; he falls down almoſt inſenſible, and in " that ſtate remains near half an hour, or upwards. " During this paroxyſm the body feels cold, and is over- " ſpread with cold ſweat, which iſſues from every pore " in aſtoniſhing abundance. On his recovery the cold " goes off, and is inſtantly ſucceeded by intenſe heat, and " quick, ſmall, hard pulſe; the head achs dreadfully, " particularly the fore part; generally accompanied with " pain in the right ſide and at the præcordia. The laſt, " however, has never been acute, and may rather be cal-

" led oppreſſion than pain. The eyes are much inflamed, " watery, protruded, and wildly rolling ; the face much " fluſhed ; much heat is felt at the pit of the ſtomach, " and that organ ſeems to be conſiderably affected by " the frequent retching and vomiting which then come " on. The patient ſoon after complains of intolerable " pains in the ſmall of his back and in the calves of his " legs ; but the latter appears to be moſt violent. Dur- " ing twelve, eighteen, twenty-four or thirty-ſix hours, " theſe ſymptoms continue increaſing, except the quick- " neſs and hardneſs of the pulſe, which does not change " materially during that time ; and are then ſucceeded " by general coldneſs, cold ſweat, a greater or leſs degree " of coma and delirium, or a ſtate very much reſembling " intoxication. Life in this ſtate is lengthened out to " ſixty or ninety hours from the firſt attack. A ſhort in- " terval of reaſon then takes place ; the patient conſiders " himſelf better, and is, for a moment, flattered with the " proſpect of recovery : but a fit as ſudden and unex- " pected as the firſt comes on, during which he foams " at the mouth, rolls his eyes dreadfully, and throws " out and pulls back his extremities in quick ſucceſſion. " In general the patient expires in this fit ; but ſome " have recovered from it, and continued rational for a " few hours longer, when a ſecond fit has carried them " off."

This, without much deviation, was the general pro- greſs of the worſt kind of the fever. In ſome, however, a comatoſe diſpoſition ſhowed itſelf from the very firſt ; in others the diſeaſe began with ſhort convulſive fits in frequent ſucceſſion, followed by conſtant delirium and cold clammy ſweat, without any intervening heat. In a few caſes the firſt ſymptoms were coldneſs and ſhiver- ing, as in other fevers.

The diſtinguiſhing ſymptoms were the uncommonly ſudden attack, the remarkably acute pain in the loins and calves of the legs, the watery, inflamed and rolling eye, fluſhing of the face, tendency to coma, the pain general- ly confined to the forehead, and the peculiar caſt of the delirium, during which the looks and actions of the pa- tient

tient very much reſembled thoſe of a perſon intoxicated. It was never furious in any other way than by making efforts to get out of bed; and theſe in a few inſtances roſe ſo high that the patients got up, dreſſed themſelves, and walked out a conſiderable way before they could be overpowered. "The ſtrength during the delirium is "to appearance ſurpriſingly great, for it is frequently "neceſſary to uſe the united efforts of two or three men "to keep the patient in bed. This is, however, no more "than a ſpaſmodic affection of the muſcles; for in re- "ality the powers of the ſick in this diſeaſe are reduced "to the extreme of debility, as is ſeen in the convaleſ- "cent ſtate."

The moſt unequivocal characteriſtic of this diſeaſe, however, according to our author, is the appearance of a kind of petechiæ, but which look rather like red or livid patches than what is commonly underſtood by that word. They were *always* the forerunners of death. In a few very violent caſes the body was almoſt of a livid or black colour, but they were generally ſeated on the neck, ſhoulders and breaſt. *Vibices* alſo, like thoſe in the plague, deſcribed p. 258, ſometimes made their appearance, and were alſo a fatal preſage.

Hæmorrhage occurred much more frequent and profuſe in this than in any other acute diſtemper our author had met with. "In ſeveral inſtances, the immenſity of "blood diſcharged has evidently been the more imme- "diate cauſe of death. The robuſt, plethoric and groſs "habits have been the moſt ſubject to it. It has taken "place from the noſtrils, mouth, anus, and urethra; "ſometimes from the canthi (corners) of the eyes; but "never, I believe, from the ears or pores of the ſkin. "The moſt profuſe diſcharge has been from the noſtrils "and anus, and has frequently, amounted to three or "four pounds at a time; the ſtools having been on thoſe "occaſions entirely compoſed of pure blood. Towards "the cloſe of life, the blood thus diſcharged has appeared "granulous, or like ichor, with a ſediment of a black "gritty ſubſtance, and has been ſo extremely offenſive "as to oblige all the attendants to keep at a conſiderable

"diſtance

" diſtance till the hæmorrhage ceaſed. Hæmorrhage, " however, has never been critical, nor has it in any " inſtance permanently relieved the head-ach or pain in " the breaſt or ſide. . . . Nearly about the period that " theſe profuſe diſcharges came on, a rawneſs was felt on " the whole of the interior ſurface of the noſe, and on " ſeveral parts of it little ulcers formed; on others, " ſmall eſchars, which were remarkably itchy, but on " being touched, or an attempt made to detach them " from the membrane of the noſe, were very painful, and " bled. Theſe diſappeared in proportion to the patient's " recovery; and I have reaſon to ſuſpect, that, when " the iſſue of the diſeaſe was fatal, theſe little eſchars " became gangrenous."

In this diſtemper there was always a tendency to coma after the firſt two days; and after the third, it certainly came on. On examining the heads of two who died convulſed after having been comatoſe for ſome time, a great quantity of ſerum was found in the brain; and, on narrowly inſpecting the eyes of thoſe who were afterwards ſeized with coma, the pupil was found manifeſtly dilated.

A remarkable ſymptom unnoticed in any other fever is taken notice of by our author; viz. an affection of the teſticles. " About the end of the ſecond day the pa- " tient began to complain of a violent pain in theſe parts, " accompanied with a contraction of the ſpermatic cord, " and a drawing up of the teſticles towards the abdo- " minal ring. On examination they appear very much " leſſened in ſize, are drawn up conſiderably towards the " abdomen, and the ſcrotum appears at the ſame time " remarkably flaccid and empty. The ſurface of the " ſcrotum becomes ſoon after very painful, and an exco- " riation takes place, chiefly at the moſt deſcending " part, from which a conſiderable quantity of very offen- " ſive purulent matter iſſues: at the ſame time a ſimilar " diſcharge from the urethra takes place, which ceaſes " with the diſeaſe when the event is favourable, or be- " comes ichorous and bloody, and inſufferably fœtid " when death is the conſequence. In caſes which ter-

" minate

" minate favourably, the whole of the ſcrotum, in a few " days, is covered with a cruſt of hardened pus, which, " in the convaleſcent ſtate, comes away very eaſily by " means of a warm bath. The thickneſs of this coat " may be about the fourth of a line; and, when ſepara- " ted, it much reſembles moiſtened parchment. In " fatal caſes, this affection of the ſcrotum always termi- " nates in gangrene a few hours before death."

Another remarkable ſymptom is the change of voice to a ſhrill, ſoft and low ſound when compared with the natural tone, at the ſame time that the ſyllables are more diſtinguiſhed, and the words are ſtrangely lengthened out in a drawling and whining manner. This change of voice affords a pretty certain prognoſtic; every alteration towards the natural tone being an almoſt certain ſign of a favourable change, and the contrary if the voice becomes farther removed from it.

The pains felt in this fever were in a great meaſure peculiar to it, and ſeem to have been of a ſpaſmodic nature. In the head the pain ſhot from the forehead, to which it was confined, invariably towards the bottom of the orbits, where it was generally exquiſite. Sometimes it extended to the temples, where there was always a throbbing; but in no caſe did it extend to the back part, or over the whole head. This pain extended alſo to the balls of the eyes, which were protruded, and ſeemed ready to ſtart from their orbits, with an inflammation externally, and a ſenſation of pain internally, rendering the admiſſion of light intolerable. In the legs the pain had its ſeat at the top of the great tendon, immediately below the calf, and in the point where it was ſeated a gnawing ſenſation was felt, occaſioning exquiſite torture, with an involuntary contraction of the limb; ſo that, on the whole, our author concludes that this pain much reſembles the cramp, differing only in being more permanent.

With regard to the pulſe, our author obſerves, that in this diſeaſe " it never intermits. Even at the ap- " proach of death it has not intermitted, but has gene- " rally been remarkably tremulous, and ſo ſlow as to

" beat

" beat no more than thirty times in a minute. On the " whole, it has not been found quicker than 130, or " ſlower than 30, in a minute." In violent caſes the pulſe was hard, quick and ſmall, but ſometimes full; and when it was ſo it was a good ſign. It was however ſubject to exceſſive variations; and it frequently happened, " eſpecially in the robuſt, that, after the firſt " ſtage, fluſhing and chillneſs have often alternated in " leſs than a minute; and that, although the ſkin felt " conſiderably warm, the pulſe has been no more than " 52; but that, even when the low ſtate came on, in " which there was always a diſagreeable coldneſs of the " ſurface, it has been as quick, and nearly as full, as " during the preceding febrile ſtage, although unaccom- " panied with thirſt, or any other evident ſymptom of " the exiſtence of fever."

In the ſtate of delirium, Dr. Chiſholm obſerves, that, whatever was the ſubject of the patient's raving thoughts, he was always ſtrongly under the impreſſion of fear; and a word from the phyſician always reduced him to implicit obedience, however reſtleſs he might have been before. During this ſtate he complained of no pain, even from bliſters, nor was he ſenſible of the operation of laxative medicines. On being aſked about his ſituation, he always anſwered that he was very well, and ſenſible of no pain, as in the yellow fever already deſcribed. It is obſervable, however, that the yellow colour, ſo remarkable in the former, ſeldom took place in the Boulam fever; but indeed this ſymptom, as has formerly been noticed, is by no means a characteriſtic either of the one diſeaſe or the other; but Dr. Chiſholm obſerves " that in ſome protracted caſes on ſhore, and in " ſome among the ſailors, which might have been a " combination of the peſtilential and yellow fevers, this " ſymptom appeared about the 5th, 7th or 9th day."

Beſides the petechiæ and vibices, already mentioned, Dr. Chiſholm takes notice of two other ſorts of eruptions, which appeared about the lips: the one was ſuch as frequently appears at the termination of the common remittents, and was favourable; the other reſembling

ſpots

ſpots made by the fine black pencil of a painter, all round the mouth, but eſpecially the upper lip, and certainly affording a fatal prognoſtic.

This diſeaſe was attended with a ſuppreſſion of urine, a violent pain above the os pubis, a ſcalding in the urethra, a ſenſe of fulneſs, without any viſible ſwelling, a contraction and diſtortion of the penis; the urine generally of a deep red, ſometimes browniſh, green, very often bloody, and in a few caſes much inclining to black, and of an oily conſiſtence. Its ſmell was generally very offenſive. All the excretions were exceedingly offenſive, but the fæces moſt remarkably ſo towards the latter end of the diſeaſe; for in the beginning they had no remarkable fœtor. The ſick were almoſt univerſally coſtive, which our author ſuppoſes to have ariſen from a ſuſpenſion of tone in the inteſtinal canal; for by exciting action in the fibres a large evacuation generally enſued. The colour of the fæces varied from yellow, or a yellowiſh white, to black; and from a conſiderable degree of thickneſs, to the exact appearance of coffee-grounds. The matter diſcharged by vomit alſo varied from porraceous to black, and reſembling coffee badly boiled.

In this diſeaſe, as in the plague deſcribed by Thucydides, moſt other diſeaſes degenerated into it, or partook of its nature. Dyſenteries ſuddenly ſtopped, and were immediately ſucceeded by the ſymptoms of peſtilential fever. A remarkable inſtance of this is given in twenty-ſeven recruits, who had been ſeized with dyſentery, in conſequence of being expoſed to rain, receiving the infection in the hoſpital to which they were carried. The medicines exhibited with a view to cure the dyſentery ſeemed to be attended with ſurpriſing effect; but in a ſhort time ſymptoms of peſtilential fever came on, even in a few hours after thoſe of dyſentery had diſappeared. In like manner catarrhal complaints ſoon changed their nature. Convaleſcents from other diſeaſes, ſuch as laboured under chronical complaints, particularly rheumatiſm and inflammation of the liver, were particularly ſubject to it. "The puerperal fever became malignant,

"and

" and of courſe fatal; and even among pregnant negro " women, who might otherwiſe have had it in the uſual " mild degree peculiar to that deſcription of people, many " were reduced to a very dangerous ſituation by it. In " ſhort, every diſeaſe in which the patient was liable to " infection, ſooner or later aſſumed the appearance, and " acquired the danger, of the peſtilential fever."

This fever was ſaid to be propagated from Grenada to others of the Weſt India iſlands, and to the United States, where in the ſame year, 1793, it raged with great violence in Philadelphia. Without entering into any inquiry at preſent concerning the truth of this report, or the origin of the fever itſelf, let us ſee whether from the ſymptoms enumerated by Dr. Ruſh, who hath written a very lengthy diſſertation upon the diſeaſe, it was the ſame with the Boulam fever already deſcribed. According to him the fever in 1793 was frequently preceded by " coſtiveneſs, a dull pain in the right ſide, defect of ap- " petite, flatulence, perverted taſte, heat in the ſtomach, " giddineſs or pain in the head, a dull, watery, brilliant, " yellow or red eye, dim and imperfect viſion, hoarſe- " neſs, or ſlight ſore throat, low ſpirits, or unuſual viva- " city, a moiſture on the hands, a diſpoſition to ſweat at " nights, or after moderate exerciſe, or a ſudden ſup- " preſſion of night ſweats. . . . . On entering a ſick " room the phyſician was firſt ſtruck by the *counte-* " *nance* of the patient. It was as much unlike that " which is exhibited in the common bilious fever, as the " face of a wild animal is unlike that of a domeſtic one. " The eyes were ſad, watery, and ſo inflamed in ſome " caſes as to reſemble two balls of fire. Sometimes they " had a moſt brilliant or ferocious appearance. The " face was ſuffuſed with blood, or of a duſky colour, and " the whole countenance was duſky and clouded. After " the 10th of September, when the determination of " blood to the brain became univerſal, there was a pre- " ternatural dilation of the pupil. Sighing attended in " almoſt every caſe. The ſkin was dry, and frequently " of its natural temperature. . . . . The pulſe at the " beginning of the attack was ſometimes full, tenſe and " quick,

" quick, but frequently weak; ſometimes ſo low that " it could not be perceived without preſſing the wriſts; " and ſometimes it had no preternatural quickneſs. In " many it intermitted after the fourth or fifth, and ſome- " times after the fourteenth ſtroke. In ſome it was ex- " tremely ſlow; even as low as thirty ſtrokes in a mi- " nute. The pulſe was alſo *tenſe* and *chorded*. The " ſlow intermitting pulſe was obſerved more frequently " in children than adults, and ſuppoſed to proceed from " a collection of water in the brain. Impreſſed with " this idea, I requeſted Mr. Coxe, one of my pupils, to " aſſiſt me in examining the ſtate of the eye. For two " days we diſcovered no change in it; but on the third " day after we began to inſpect the eyes, we both per- " ceived a preternatural dilatation of the pupils in different " patients; and we ſeldom afterwards ſaw an eye in " which it was wanting. In Dr. Say it was attended " with ſquinting, a ſymptom which marks a high de- " gree of a morbid affection of the brain. Had this " ſlowneſs or intermiſſion of the pulſe occurred only af- " ter ſigns of inflammation or congeſtion had appeared " in the brain, I ſhould have ſuppoſed that it had been " derived wholly from that cauſe; but I well recollect " having felt it ſeveral days before I could diſcover the " leaſt change in the pupil of the eye. I am forced " therefore to call in the operation of another cauſe, to " aſſiſt in accounting for this ſtate of the pulſe, and this " I take to be a ſpaſmodic affection, accompanied with " preternatural dilatation or contraction of the heart. " Lieutaud mentions this ſpecies of pulſe in ſeveral pla- " ces, as occuring with an undue enlargement of this " muſcle. Dr. Ferriar deſcribes a caſe, in which a low, " irregular, intermitting and hardly perceptible pulſe " attended a morbid dilatation of the heart. . . . . " After the 10th of September this undeſcribable or *ſulky* " pulſe became leſs obſervable, and, in proportion as " the weather cooled, it diſappeared. It was gradually " ſucceeded by a pulſe full, tenſe, quick, and as frequent " as in pleuriſy or rheumatiſm. It differed, however, " from a pleuritic or rheumatic pulſe, in imparting a

" very different ſenſation to the fingers. No two ſtrokes " ſeemed to be exactly alike. Its action was of a hob- " bling nature. . . . It was an alarming ſymptom. . . . " The pulſe moſt frequently leſſened in its fulneſs, and " became gradually weak, frequent and imperceptible " before death ; but I met with ſeveral caſes in which it " was full, active, and even tenſe, in the laſt hours of " life.

" Hæmorrhages occurred in the beginning of the " diſorder, chiefly from the noſe and uterus. Sometimes " only a few drops of blood diſtilled from the noſe. As " the diſeaſe advanced, the diſcharges of blood became " univerſal. They occurred from the gums, ears, ſto- " mach, bowels, and urinary paſſages. Drops of blood " iſſued from the inner canthus of the left eye of Mr. " Joſiah Coates. Dr. Woodhouſe attended a lady who " bled from the holes of her ears which had been made " for ear-rings. Many bled from the orifices which had " been made in performing veneſection, ſeveral days af- " ter they appeared to have been healed ; and ſome from " wounds in veins made in unſucceſsful attempts to draw " blood. Theſe laſt were very troubleſome, and in ſome " caſes precipitated death. . . .

" I was ſurpriſed to find ſo few marks of hepatic af- " fection. I met with but two caſes in which the pa- " tient could lie only on the right ſide. Many com- " plained of a dull pain in the region of the liver, but " very few complained of that ſoreneſs to the touch, " about the pit of the ſtomach, which is taken notice of " by authors, and which was univerſal in the yellow fe- " ver of 1762. In proportion as the cool weather ad- " vanced, a preternatural determination of the blood " took place to the brain and lungs. Many were affect- " ed with pneumonic ſymptoms, and ſome appeared to " die of ſudden effuſions of blood or ſerum in the lungs. " . . . The diſeaſe ſeldom appeared without nauſea or " vomiting. In ſome caſes they both occured for ſe- " veral days, or a week, before any fever took place. " This was more frequently the caſe where the diſeaſe " *was taken by exhalation from the putrid coffee, than by* " *contagion.*

" *contagion.* The ſtomach was ſo extremely irritable as " to reject drinks of every kind. Sometimes green or " yellow bile was rejected on the firſt day of the diſorder; " but I much oftener ſaw it continue for two days with- " out diſcharging any thing from the ſtomach, but the " drinks which the patient had taken. If the fever in " any caſe came on without vomiting, or if it had been " checked by remedies that were ineffectual to remove it " altogether, it generally appeared or returned on the " 4th or 5th day of the diſorder. I dreaded this ſymp- " tom on thoſe days; for, though it was not always the " forerunner of death, yet it generally rendered the reco- " very more difficult and tedious. In ſome caſes the " vomiting was more or leſs conſtant from the beginning " to the end of the diſorder, whether it terminated in " life or death. The vomiting which came on about " the 4th or 5th day was accompanied with a burning " pain in the region of the ſtomach. It produced great " anxiety and toſſing of the body from one part of the " bed to another. In ſome caſes this painful burning " occured before any vomiting took place. Drinks were " now rejected ſo ſuddenly as often to be diſcharged " over the hand that lifted them to the head of the pa- " tient. The contents of the ſtomach were ſometimes " thrown up with a convulſive motion which propelled " them in a ſtream to a great diſtance, and in ſome ca- " ſes all over the clothes of the by-ſtanders. . . . On " the firſt and ſecond days many puked from half a " pint to nearly a quart of yellow or green bile. In " four (three of whom recovered) the bile, even at this " time, was black. On the 4th or 5th day a matter re- " ſembling coffee-grounds was diſcharged. . . . Many " recovered in whom this ſymptom appeared. Towards " the cloſe of the diſeaſe there was a diſcharge of a deep " or pale-coloured black matter, with flaky ſubſtances " frequently ſwimming on the top of it."

A quantity of grumous blood, dark coloured on the outſide, was frequently diſcharged by vomit towards the end of the diſeaſe; and, along with all the diſcharges from the ſtomach, there was occaſionally a large worm,

and

and frequently large quantities of mucus and tough phlegm. Our author ſuppoſes the black blood and coffee-coloured matter to be different from that which conſtitutes the true *black vomit*. This laſt he ſuppoſes to ariſe in ſome caſes from matter formed in conſequence of a mortification of the ſtomach.

The bowels were generally coſtive, ſometimes with extreme pain, teneſmus, and mucous and bloody diſcharges. Sometimes the diſeaſe came on with diarrhœa, principally in thoſe who had weak bowels. Sometimes there was a tenſion of the abdomen, with pain in the lower part of it. Flatulency, chiefly in the ſtomach, was almoſt univerſal in the diſorder throughout all its ſtages.

The colour and conſiſtence of the fæces was various according to the mode of treatment the patient had undergone. Where they were ſpontaneous, or brought away only by gentle purgatives, their appearance was natural; but when the patient was ſtrongly purged, they were dark-coloured, fœtid, and in large quantity. The colour was ſometimes green, ſometimes olive. Their fœtor was proportioned to the time they had been detained in the bowels. In one caſe, where tonics had been uſed, and the patient had no ſtool for ſeveral days, a purge produced ſuch an exceſſively fœtid diſcharge, that the ſmell produced fainting in an old woman who attended. Their acrimony was ſo great that the rectum was excoriated, and an extenſive inflammation ſometimes produced round its extremity. In ſome caſes the ſtools were as white as in the jaundice. Large round worms were frequently diſcharged with them.

The urine in this diſeaſe was ſometimes plentiful and high-coloured, ſometimes clear, and ſometimes turbid; ſometimes diſcharged with a burning pain, as in a gonorrhœa; ſometimes it was ſuppreſſed; and in one caſe the patient voided ſeveral quarts of limpid urine juſt before he died.

Many were relieved on the firſt day by ſweats, ſometimes ſpontaneous, and ſometimes produced by diluting drinks, or ſtrong purges; ſometimes of a yellow colour, and offenſive ſmell. Sometimes they were cold, though the

the pulſe was full at the ſame time. In general, however, the ſkin was dry, and there were but few inſtances of the diſeaſe terminating by ſweat after the third day. In ſome there was a great diſcharge of mucus from the throat, occaſioning an almoſt conſtant hawking and ſpitting; and thoſe always recovered.

In this fever, as in that of Boullam, and in the true plague, people ſometimes fell down ſuddenly in apoplexy, ſyncope or univerſal convulſions. Some had numbneſs and immobility of their limbs. Some had a coma (a continual ſleepineſs) or an obſtinate wakefulneſs; the latter chiefly attended a ſtate of convaleſcence. In ſome the diſtemper began with a violent cramp in the legs or arms. The laſt ſtage was attended with a ſtrong hiccup, which was a very dangerous ſymptom, as indeed it is in all fevers. In ſome caſes there was a deficiency of ſenſibilty, in others too much, ſo that the mere motion of the limbs was attended with pain.

In this, as in the Boullam fever, the patient often manifeſted a conſiderable degree of ſtrength, even without any delirium. One of Dr. Ruſh's patients ſtood up before a looking-glaſs, and ſhaved himſelf, the day on which he died. A delirium, however, was common, alternating in ſome caſes with the *exacerbations and remiſſions* of the fever, but in ſome continuing without intermiſſion to a few hours before death. Some had maniacal ſymptoms, without any appearance of fever; but in many the underſtanding was not impaired throughout the whole courſe of the diſeaſe.

In this diſeaſe the pains in almoſt every part of the body were very diſtreſſing. In thoſe caſes, however, "where the ſyſtem ſunk under the violent impreſſion of the contagion, there was little or no pain." In other caſes the patients were diſtreſſed with pains in their head, particularly affecting the eyeballs. Sometimes it extended from the back down the neck. A pain was felt in the ears, as if they were drawn together by ſtrings. The ſides, ſtomach, liver and bowels were all affected. A burning pain in the ſtomach was ſometimes ſo exceſſive that the patient ſhrieked out violently. The back

was

was often the ſeat of violent pain, which ſometimes extended from the back to the thighs; and the arms and legs were ſometimes affected in ſuch a manner that one patient ſaid his limbs felt as if ſcraped with a ſharp inſtrument.

The thirſt was generally moderate, but ſometimes otherwiſe; and, when exceſſive thirſt came on in the laſt ſtage of the diſorder, it was a dangerous ſymptom. Water was preferred to all other drinks. The appetite for food returned much ſooner in this than in other fevers, and was exceſſively keen. Coffee was reliſhed in the remiſſions, in every ſtage of the diſorder. Wine was diſliked, but malt-liquors were agreeable. In ſome caſes the recovery was attended with a great propenſity to venery, as in the true plague, but in an inferior degree.

In ſome caſes the diſeaſe was attended with buboes and glandular ſwellings. "I met with three caſes (ſays "our author) of ſwellings in the inguinal, two in the pa-"rotid, and one in the cervical glands: all theſe patients "recovered without any ſuppuration of their ſwellings. "They were extremely painful in one caſe, in which no "redneſs or inflammation appeared. In the others there "was conſiderable inflammation, and but little pain.

"Several caſes of carbuncles, ſuch as occur in the "plague, came under my notice. They were large, hard "ſwellings on the limbs, with a black apex, which, upon "being opened, diſcharged a thin, dark-coloured, bloody "matter. From one of theſe malignant ſores an "hæmorrhage took place, which precipitated the death "of an amiable lady. A large and painful anthrax on "the back ſucceeded a favourable iſſue of the fever in "another patient. I met with a woman who ſhowed "me the marks of a number of ſmall boils on her face "and neck, which accompanied her fever. . . . Not-"withſtanding the diſpoſition to cutaneous eruptions in "this diſorder, it was remarkable that bliſters were much "leſs diſpoſed to mortify than in the common nervous "fever. Such was the inſenſibility of the ſkin in ſome "people, that bliſters made no impreſſion upon it. . . .

"In

" In every caſe of this diſorder which came under my " notice, there were evident remiſſions or intermiſſions " of the fever, or ſuch ſymptoms as were ſubſtituted for " fever."

The yellow colour rarely appeared before the third day, and generally about the fifth or ſeventh day. The eyes were not always affected with this colour. Sometimes it appeared firſt on the neck and breaſt; and in one caſe it appeared behind the ears and on the crown of the head, which had been bald for ſome years. It varied in the deepneſs of the tint, and ſometimes diſappeared altogether; but, though ſome caſes of great malignity and danger appeared without any yellowneſs, it was always a dangerous ſymptom when it appeared early. The cauſe of this yellowneſs is by our author ſuppoſed to be an abſorption and mixture of the bile with the blood.

After death the body appeared of a deep yellow colour, ſometimes a few minutes after death; ſometimes it was purple or black; and in one caſe yellow above, and black below, the middle. In ſome it was pale, as in common diſeaſes, and many died with a placid countenance as in natural ſleep. In ſome the body grew cold ſoon after death, in others not till ſix hours afterwards, and in like manner ſtiffneſs occurred ſometimes in one hour, in others not till ſix. Where evacuations had been procured, ſymptoms of putreſcence were longer in making their appearance than in thoſe who had uſed no medicines for that purpoſe. Many diſcharged large quantities of black matter from the bowels, others, of blood from the noſe, mouth and bowels.

" The morbid appearances of the internal parts of the " body (ſays the Doctor) as they appear by diſſection " after death, from the yellow fever, are different in dif- " ferent countries and in different years." Dr. Mitchill, in his hiſtory of the yellow fever in Virginia, in 1737 and 1741, informs us, that, in a female ſlave of forty, the gall-bladder was outwardly of a deep yellow, but within, full of a black, ropy, coagulated *atrabilis* (black bile) obſtructing

obſtructing the biliary ducts. It was ſo thick, that it retained its figure when the gall-bladder was opened. It more reſembled bruiſed and mortified blood than bile, though it would ſtain a knife or probe of a yellow colour. Two thirds of the liver on its concave ſurface were of a deep black colour, and round the gall-bladder it ſeemed to be mortified and corrupted. A viſcid bile, like that juſt deſcribed, was found in the duodenum near the gall-bladder. The villous coat being taken off, the other parts were found red and inflamed. The whole was lined with a thick fur or ſlime. The omentum was ſo much waſted, that nothing but its blood-veſſels could be perceived. The ſtomach appeared to be diſtended or ſwelled, lined like the duodenum, containing a quantity of bile even blacker than that in the bladder. It was inflamed both on the outſide and inſide. The lungs were inflated and all full of black or livid ſpots; and on theſe ſpots were ſmall bliſters like thoſe of an eryſipelas or gangrene, containing a yellow humour. The blood-veſſels in general were empty; only the vena portarum ſeemed full and diſtended as uſual. On cutting the ſound part of the liver, the lungs or the ſpleen, blood iſſued freely.

Dr. Mackittrick found the liver ſphacelated, the gall-bladder full of black bile, and the veins tinged with a black *fluid* blood. In all caſes the ſtomach, duodenum and ilium were remarkably inflamed. The pericardium contained a viſcid yellow ſerum, and in larger quantity than uſual. The urinary bladder a little inflamed; the lungs ſound.

Dr. Hume, of Jamaica, found the liver enlarged and turgid with bile, and of a pale yellow colour; the ſtomach and duodenum ſometimes inflamed; and, in one caſe, the former had black ſpots of the ſize of a crown-piece. He had ſeen ſome bodies in which there was no appearance of inflammation of the ſtomach, though the patients had been afflicted with exceſſive vomiting.

Dr. Lind's account is given p. 394.

Drs. Phyſic and Carthrall, of Philadelphia, found the brain in a natural ſtate; the viſcera of the thorax perfectly

fectly ſound; the blood in the heart and veins fluid, ſimilar in its conſiſtence to the blood of perſons who have been hanged, or deſtroyed by electricity. "The "ſtomach and beginning of the duodenum are the parts "that are moſt diſeaſed. In two perſons, who died of "the diſeaſe on the 5th day, the villous membrane of "the ſtomach, eſpecially about its ſmaller end, was found "highly inflamed; and this inflammation extended "through the pylorus into the duodenum ſome way. "The inflammation here was extremely ſimilar to that "induced in the ſtomach by acrid poiſons, as by ar-"ſenic, which we have once had an opportunity of ſee-"ing in a perſon deſtroyed by it. The bile was of its "natural colour, but very viſcid."

In others the ſtomach was ſpotted with extravaſated blood; and it contained, as well as the inteſtines, a black liquor like that which had been vomited and purged before death. The gentlemen were of opinion that this muſt have been a ſecretion from the liver, as a fluid of the ſame kind was found in the gall-bladder, of ſuch an acrid nature that it inflamed the operator's hands, and the inflammation laſted ſome days. The liver was of its natural appearance, or nearly ſo. Theſe diſſections were made early in the ſeaſon; and at that time Dr. Ruſh is of opinion that the diſeaſe was not attended with any congeſtion in the brain, though it was ſo afterwards; and accordingly we are informed that Dr. Annan attended a diſſection at Buſh-hill, in which the veſſels of the brain were remarkably turgid. Dr. Ruſh, however, is likewiſe of opinion, that the morbid appearances in the brain may ceaſe after death, as well as the ſuffuſion of blood in the face diſappears after the retreat of the blood from the extremities of the veſſels in the laſt moments of life. "It is no new thing for morbid affections "of the brain to leave either ſlender or no marks of diſ-"eaſe after death. Dr. Quin has given a diſſection of "a child that died with all the ſymptoms of hydrocepha-"lus internus, and yet nothing was diſtinguiſhed in the "brain but a ſlight turgeſcence of the blood-veſſels. "Dr. Girdleſtone ſays, that no injury appeared in the

" brains of thoſe perſons who died of the ſymptomatic " apoplexy which occurred in a ſpaſmodic diſeaſe which " he deſcribes in the Eaſt Indies; and Mr. Clark in- " forms us that the brain was in a natural ſtate in every " caſe of death from puerperal fever, notwithſtanding it " ſeemed to be affected in many caſes ſoon after the at- " tack of the diſorder."

With regard to the ſtate of the blood in this diſtemper, Dr. Ruſh ſays, that when drawn from a vein, it was, " 1. In the greateſt number of caſes, denſe, and of a " ſcarlet colour, without any ſeparation into craſſamen- " tum and ſerum. 2. In many caſes it did ſeparate in- " to craſſamentum and yellow ſerum. 3. In a few ca- " ſes the ſerum was of a natural colour. 4. There were " many caſes in which the blood was as ſizy as in pneu- " mony and rheumatiſm. 5. In ſome inſtances the " blood was covered with a blue pellicle of ſizy lymph, " while the part which lay in the bottom of the bowl " was diſſolved. In two caſes the lymph was mixed " with green ſtreaks. 6. It was in a few inſtances of a " dark colour, and as fluid as *molaſſes*. Both this and " the 5th kind of blood occurred chiefly where bleeding " had been omitted altogether, or uſed too ſparingly, in " the beginning of the diſorder. 7. In ſome patients " the blood in the courſe of the diſeaſe exhibited nearly " *all* the appearances which have been mentioned. " They were varied by the time in which the blood was " drawn, and by the nature and force of the remedies " which had been uſed in the diſorder."

From this account of the different appearances of the blood, it appears to have varied at the very firſt attack from an healthy ſtate, and to have gradually deviated from that ſtate more and more, as the diſeaſe advanced. Dr. Ruſh ſays,* from Dr. Mitchill's Hiſtory of the Yellow Fever in Virginia, in 1741, that " blood drawn " from a vein was always diſſolved. The ſame ſtate of " the blood was obſerved in many perſons who had been " expoſed to the contagion, who diſcovered no other " ſymptom of the diſeaſe." In p. 70 Dr. Ruſh gives

* Account of the Bilious Remitting Fever, &c. p. 106.

gives his own opinion in the following words: "I ſhall ſay, hereafter, that the blood was ſeldom diſſolved in this fever;" and p. 73, ſpeaking particularly of the blood, he enters into an argumentation againſt the putreſcency of that fluid. "It" (the blood) ſays he, "has been ſuppoſed to undergo a change from a healthy "to a putrid ſtate; and many of the ſymptoms which "have been deſcribed, particularly the hæmorrhages and "eruptions on the ſkin, have been aſcribed to this ſup-"poſed putrefaction of the blood. It would be eaſy to "multiply arguments to prove that no ſuch thing as "putrefaction can take place in the blood; and that "the ſymptoms which have been ſuppoſed to prove its "exiſtence are all effects of a ſudden, violent and rapid "inflammatory action, or preſſure upon the blood-veſ-"ſels; and hence the external and internal hæmorrha-"ges. The petechiæ on the ſurface of the ſkin depend "on the ſame cauſe. They are nothing but effuſions "of ſerum or red blood, from a rupture or preternatu-"ral dilatation of the capillary veſſels. The ſmell emit-"ted from perſons affected with this diſeaſe was far from "being of a putrid nature; and, if this had been the "caſe, it would not have proved the exiſtence of putre-"faction in the blood; for a putrid ſmell is often diſ-"charged from the lungs, and from the pores in ſweat, "which is wholly unconnected with a putrid, or per-"haps any other morbid, ſtate of the blood. There are "plants which diſcharge an odour which conveys to the "noſe a ſenſation like that of putrefaction; and yet "theſe plants exiſt at the ſame time in a ſtate of moſt "healthy vegetation: nor does the early putrid ſmell of "a body which periſhes with this fever prove a putrid "change to have taken place in the blood before death. "All animals which die ſuddenly, and without loſs of "blood, are diſpoſed to a ſpeedy putrefaction. This "has long been remarked in animals that have been kil-"led after a chace, or by lightning. The poiſon-"ous air called *famiel*, which is deſcribed by Chardin, "produces, when it deſtroys life, inſtant putrefaction. "The bodies of men who die of violent paſſions, or af-

"ter

" ter ſtrong convulſions, or even after great muſcular " exertion, putrefy in a few hours after death. The " healthy ſtate of the body depends upon a certain ſtate " of arrangement in the fluids. A derangement of theſe " fluids is the natural conſequence of the violent and ra- " pid motions, or of the undue preſſure upon the ſolids, " which have been mentioned. It occurs in every caſe " of death from indirect debility, whether it be induced " by the exceſſive ſtimulus of contagion, by the volatile " vitriolic acid which is ſuppoſed to conſtitute the deſtruc- " tive *famiel* wind,* or by violent commotions excited in " the body by external or internal cauſes. The practice a- " mong fiſhermen in ſome countries of breaking the heads " of their fiſh as ſoon as they are taken out of the water, " in order to retard their putrefaction, proves the truth " of the explanation I have given of its cauſe ſoon after " death. The ſudden extinction of life in the fiſh pre- " vents thoſe convulſive or violent motions which induce " ſudden *diſorganization* in their bodies. It was re- " markable that putrefaction took place moſt ſpeedily " after death from the yellow fever, where the commo- " tions of the ſyſtem were not relieved by evacuations. " In thoſe caſes where purges and bleeding had been " uſed it was much ſlower. There is a fact mentioned " by Dr. Ferriar, from Dr. Hamilton, late profeſſor of " anatomy at Glaſgow, which may ſeem at firſt to mili- " tate againſt the facts I have mentioned. He ſays that " he had obſerved that bodies which were brought into the " diſſecting room that had petechiæ on them were " longer in putreſying than any others. The fevers of " which the poor (the common ſubjects of diſſection) " die, are generally of the low nervous kind. Great *di-* " *rect* debility is the characteriſtic of thoſe fevers. The " petechiæ which occur in them appear in the laſt ſtage " of this direct debility. They are the effect, not of " *too much* impetus in the blood, as in the yellow fever, " but of a defect or total abſence of it in the laſt hours of " life. The ſlow progreſs of the body to putrefaction " after

* See p. 126, n. where an account is given of the famiel, and another hypotheſis concerning its nature.

" after death, in the inſtances mentioned by Dr. Ha-
" milton, ſeems to depend upon the ſame cauſe as that
" to which I have aſcribed it in thoſe caſes of death
" from the yellow fever in which evacuations had been
" uſed, viz. direct debility. In the former caſes this
" ſlowneſs of putrefaction is induced by nature, in the
" latter by art. The effects of debility from both cauſes
" are, notwithſtanding, the ſame."

From this long detail, in which the author's meaning ſeems rather involved in obſcurity, we may gather that in the fever of 1793 the blood had no determinate appearance, but that, according to the action of the vaſcular ſyſtem, it was ſizy or otherwiſe. This poſition, which in my opinion is the meaning of the paſſage juſt now quoted, is not ſupported by any facts. It is mentioned indeed that the blood in ſome was ſizy, in others quite fluid, but as the caſes in which it was ſo are not particularly related, we do not know whether the action of the veſſels was ſtronger in thoſe where the blood was fluid than where it was not. Certain it is, that the blood may be made fluid by certain ſubſtances mixed with it, without any action of the veſſels at all. The poiſon of the ticunas, as well as all other animal poiſons, renders the blood fluid, yet this will kill inſtantaneouſly when injected into a vein, before the veſſels have time to act in ſuch a manner as could be ſuppoſed to change the texture of any of the fluids.* Or if this ſtill will not ſatisfy, we are aſſured that the poiſon of ſerpents, as well as many other ſubſtances, which are not poiſons, when mixed with the blood taken out of the body, will prevent it from coagulating. Granting, therefore, what hath not been proved, that the greater the action of the veſſels, the more fluid the blood will be, yet we cannot know whether this fluidity be occaſioned by the action of the veſſels, or the action of the veſſels by the tendency to fluidity in the blood. But it matters not which of the two is cauſe or effect: the queſtion is, Whether in the yellow fever does the ultimate effort of the diſeaſe tend to produce any alteration in the texture of the blood to fluidity, or otherwiſe?

* See p. 221—223.

wiſe? This can be known only from conſidering the ſymptoms which take place in the laſt ſtage of the diſorder, and from diſſections. Now, from the concurrent teſtimonies of all the writers quoted in this treatiſe, it appears that towards the end of the diſeaſe there is ſuch a tendency to diſſolution, that the whole body ſeems ready to fall down into a putrid maſs; or at leaſt into what is commonly called ſo, whether with ſtrict propriety of language or not, ſignifies little. In ſhort, the difference between the plague and yellow fever ſeems to be entirely of the ſame kind with that taken notice of in this treatiſe, p. p. 269, 270, where the bile of a perſon dying of a malignant fever was injected into the veins of a dog. Here the blood was very fluid. In capt. Mawhoods caſe (p. 385) the blood flowed from his noſe, eyes and gums, beſides what he diſcharged by vomit. Dr. Lining (p. 389) atteſts a ſimilar tendency to diſſolution in the blood in a moſt remarkable manner. See alſo Dr. Lind's opinion to the ſame purpoſe, p. 393, Dr. Hillary's, p. 395, Dr. Jackſon's account, p. 399, Dr. Chiſholm's, p. 411; and laſtly, Dr. Ruſh's own teſtimony concerning the hæmorrhages from all parts, lately quoted.

As we have formerly ſeen, that in the plague there was no ſuch tendency to diſſolution, but rather to coagulation, in the blood, it was thence concluded that the immediate cauſe of the ſymptoms of plague is a tendency in the blood to throw out the latent heat it contains, by which means the parts on which theſe diſcharges fall, are burnt up to a kind of cinder. In the yellow fever the reverſe takes place. The blood has a tendency to abſorb heat, and if it does ſo it muſt of courſe become thinner, for this is the nature of all fluids, and indeed it is abundantly manifeſt that fluidity in all caſes is an effect of the abſorption of heat.* In conſequence of this abſorption, the body towards the latter end feels cold, the heat ſeems to retire from the extremities towards the vital parts, and the veſſels contracting and loſing their power by reaſon of the abſtraction of ſenſible heat, the pulſe ceaſes entirely ſome time before death. Dr. Huxham

* See p. 450.

ham takes notice of this exceſſive coldneſs in the limbs taking place in a lady who died of a malignant fever, and likewiſe that an intolerable ſtench iſſued from her body for ſome time before her death, though kept clean with all poſſible care. As the plague therefore is the higheſt of all inflammatory diſeaſes, ſo the yellow fever ſeems to be the higheſt of the malignant claſs.

It may be objected, however, that as hæmorrhages, petechiæ, black vomiting, and convulſions, ſometimes take place in the plague, we cannot from the exiſtence of ſimilar ſymptoms in the yellow fever, conclude that they are different diſeaſes. But, with regard to the firſt, it muſt be obſerved, that an hæmorrhage may enſue from a rupture of veſſels as well as from an oozing of blood in conſequence of an acrimonious thinneſs of blood. It is indeed to be queſtioned, except in caſes where blood is diſcharged by the pores of the ſkin, whether any hæmorrhage takes place but by a rupture of veſſels. In an healthy ſubject, hæmorrhages very frequently take place from the noſe where the blood is of a very proper conſiſtence; and Dr. Ruſſel ſays that he had occaſion to ſee hæmorrhages from the noſe and uterus only; that in the advanced ſtages of the diſeaſe though the blood was paler and of a *thinner* conſiſtence, the hæmorrhage was ſeldom profuſe. It was, however, of very bad omen; moſt of the caſes in which it appeared having terminated fatally.

That towards the end of this diſeaſe the blood ſhould begin to abſorb the heat which it had before thrown out, is not wonderful. A tendency to diſſolution very probably does in all caſes take place in a greater or leſſer degree; but we have not any reaſon to ſuppoſe that in the true plague hæmorrhages ever are as frequent, violent, or attended with ſuch an apparent tendency to putrefaction, as in the yellow fever, and conſequently we muſt ſuppoſe that there is ſome *ſpecific* difference between the ſtate of the blood in the one diſeaſe and in the other.

Convulſions, though very frequent in the yellow fever, yet, according to Dr. Ruſſel, were very rare attend-

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ants on the acceſs of the peſtilential fever. Even hiccup was ſeldom obſerved, and ſneezing not once. However, he ſays that convulſive motions of the limbs were frequently obſerved in the courſe of the diſeaſe; but this is far from what Dr. Chiſholm ſays of the Boullam fever, where the patient expired in a violent convulſive fit; or what Dr. Ruſh ſays of the fever of 1793, in which the patient ſometimes fell down in univerſal convulſions. In ſhort, the abſence, or much leſs frequency, of nervous ſymptoms in the plague, ſeems to conſtitute another *ſpecific* difference between the two.

With regard to black vomiting, it is neither peculiar to the plague nor yellow fever. Dr. Miller* has ſhown that it may be occaſioned by almoſt any kind of acrid poiſon taken into the ſtomach. In proof of this he quotes from Sauvages the caſe of a man who died in conſequence of taking a drachm of white arſenic inſtead of cream of tartar, in whoſe ſtomach was found, on diſſection, a black liquor which depoſited a ſediment like powdered charcoal. The villous coat of the ſtomach was likewiſe abraded. For other caſes of the ſame kind he refers to Wepfer de cicuta aquatica, Morgagni, &c. Another caſe of poiſon by arſenic occurred in New-York hoſpital, in which the patient had a black vomiting. In another caſe in which corroſive mercury was ſwallowed by miſtake, the patient, after being to appearance in a fair way of recovery, began to vomit a dark-coloured matter, and died in a day or two. The agaricus clypeatus, a kind of poiſonous muſhroom, brought on bilious ſtools, locked jaw, vomiting, delirium, oppreſſion of the breaſt, ſighing, anxiety, great proſtration of ſtrength, yellowneſs on ſome parts of the ſkin, and death on the ſixth day. On diſſection the ſtomach was found to be inflamed, the duodenum diſtended with flatus, and the gall-bladder full of green and black bile.

But the principal diſtinctions between the plague and yellow fever ſeem to be the eruptive nature of the former, and the propenſity in the latter to attack ſtrangers newly arrived from colder climates; alſo in being more eaſi-

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* Med. Repoſitory, vol. ii, p. 412.

ly checked by cold than the plague. It has already been remarked from Dr. Ruſſel, that of *two thouſand ſeven hundred* patients, whoſe caſes he noted, every one had buboes. Theſe, however, were not all the caſes he ſaw; for he mentions ſome that had no eruptions; but from this it is impoſſible to avoid drawing the concluſion, that eruptions are the true characteriſtics of the plague. Of theſe two thouſand ſeven hundred, eighteen hundred and forty-one had buboes in one or both groins; five hundred and ſixty-nine had them in the arm-pit; two hundred and thirty-one had parotids; four hundred and ninety, carbuncles; and ſeventy-four, ſpurious buboes. Now, in all the number of caſes of fever which Dr. Ruſh attended in 1793, he had only two with buboes, and one parotid; and as to the carbuncles they do not anſwer the deſcription of thoſe in the former part of this work.* It is impoſſible therefore that any more clear line of diſtinction can be drawn between the plague and yellow fever. The following table, however, exhibiting at one view the ſymptoms of the plague, the yellow fever, fever of Boullam, and fever of 1793, will perhaps ſet this matter in a ſtill clearer light.

From a mere inſpection of the detail of ſymptoms in this table, the difference between the ſeveral diſtempers is obvious. It is evident that none of them can with any kind of propriety be called higher and lower degrees of the reſt. The plague is *eſſentially* different from the other three, which ſeem indeed to be nearly allied; the Boullam fever being only attended with more violent and malignant ſymptoms. We ought now to enter into a particular inquiry concerning the origin and nature of theſe fevers; but, as a knowledge of this is in ſome meaſure dependent on the queſtion, whether or not they are contagious, we ſhall in the firſt place preſent the reader with the following extract from a French treatiſe, in which the queſtion ſeems to be handled in an agreeable and judicious manner, and then make another attempt, by an inveſtigation of matter of fact,

* See p. 257.

fact, to determine whether the diſeaſe has ever been excited by imported contagion or not:

" A very important queſtion is—whether this diſeaſe " is contagious. The greater part of the American phy- " ſicians are of opinion that it is, and are perſuaded that " it is brought from the Weſt Indies, by the ſhips which " arrive here in the beginning of every ſummer. It is " even from that opinion, and on their vigorous repreſen- " tations, that quarantines have been eſtabliſhed, which " every veſſel from the Weſt Indies is obliged to perform " during 10 and ſometimes 20 days at Fort Mifflin, ſe- " veral miles diſtance from Philadelphia. This forma- " lity, ſo troubleſome to navigation, was obſerved this " year (1798) with more ſeverity than ever it was; but " without anſwering any good purpoſe for the veſſels; " for very few ſhips' companies appeared taken with the " *yellow* or *putrid fever*. Nevertheleſs the epidemic, " whatever name it aſſumes, raged this year in Phila- " delphia with more fury than even in 1793. Beſides, " if the quarantine was a ſure preſervative, if almoſt all " the ſhips' crews coming from the Weſt Indies brought " the *yellow fever* with them, why ſhould not CHARLES- " TON, NORFOLK, ALEXANDRIA, BALTIMORE, BOS- " TON and SALEM, where no quarantines are performed, " be affected with the contagion, as well as New York " and Philadelphia? The American phyſicians are ſo " convinced that the *yellow fever* is contagious, that they " ſcrupulouſly prohibit perſons in health from all com- " munications with thoſe diſeaſed; they order frequent " *waterings* in the ſtreets and about the houſes where " the fever has manifeſted itſelf, and aromatic fumiga- " tions. They even order the clothes of thoſe who have " fallen by it to be burned, as is practiſed with reſpect " to thoſe who die with the plague. It muſt be confeſ- " ſed that their precautions, in this reſpect, have in " ſome ſort been juſtified, on ſeeing all the individuals " of one family ſucceſſively taken with it, and often at " the ſame time, their neighbours, and ſo on, to a num- " ber of people who might be authoriſed to attribute " their misfortunes only to their vicinage with the firſt " victims. " Nevertheleſs,

" Nevertheleſs, if this diſtemper was as contagious as " certain phyſicians pretend, why ſhould they not be the " firſt to be taken with it; they who ſee, examine and " touch many patients every day? Why ſhould not " thoſe who nurſe them day and night, who continually " breathe thoſe putrid miaſmata; why ſhould not thoſe " who attend the hoſpitals, thoſe who daily carry 30 or " 40 coffins to the grave, be taken with it? We do not " hear, however, that the phyſicians, ſurgeons, nurſes and " ſextons have enlarged the funeral liſt more than any " other claſs of citizens. Some doubtleſs have fallen, " and perhaps they owed their death to their frequent " communications with the ſick; but would the epi- " demic have ſpared them in any other condition, more " than a number of unfortunate people who are neither " phyſicians nor nurſes?

" Another particular not leſs remarkable is, that the " *yellow fever* ſeems hitherto to have ſpared the French- " men who have reſided in the Weſt India colonies, the " greateſt part of whom have nevertheleſs ſtaid in New " York and Philadelphia during the *yellow fever*, and " have lived in the midſt of the contagious air which " proves ſo fatal to the Americans. The reſult of all " this is, that, notwithſtanding four years' experience, " notwithſtanding the public and private reſearches and " diſcuſſions which took place between the phyſicians " and philoſophers of the American continent, there is " ſtill much uncertainty on the nature of the diſtemper " which ſo rapidly depopulates New York and Philadel- " phia. Every opinion, every ſyſtem, preſents palpable " contradictions, and is liable to objections which it is " difficult, not to ſay impoſſible, to anſwer in a ſatisfac- " tory manner. If the diſeaſe be contagious, why are " not the phyſicians, the nurſes, the ſervants of the hoſ- " pitals, taken ſooner than perſons who have no ſort of " communication with the ſick?

" If it be not contagious, how happens it that the na- " tives of every age and ſex, many of which, the women " and children eſpecially, live in a pretty ſober manner, " and ſeldom drink any of thoſe liquors ſo liable to in- " flame the blood, are taken with it, and fall, in ſpite of

" all

" all the efforts of medicine ? How happens it that the " Europeans and Frenchmen who have never been in " the colonies are attacked like the Americans, whilſt " the planters in the Weſt Indies are ſpared ?

" On the other hand, if, as the French phyſicians pre- " tend, this is nothing elſe than the malignant putrid " fever, often prevalent in Hiſpaniola, how happens it " that thoſe medicines and that mode of treatment " which were ſo frequently ſucceſsful in the colonies have " no ſort of ſucceſs when adminiſtered to Americans, " and ſeldom with Europeans ? Why is this fever at- " tended, in its very firſt ſtage, with vomitings of blood, " bile, black ſpots, *purples* and other alarming ſymptoms, " which they frequently have at Hiſpaniola ? How " comes it that the Weſt India planters, who, while " they reſided in the colonies, had frequent attacks of " putrid and often inflammatory fevers, enjoy the moſt " blooming health ever ſince they have been on the " American continent ? And why are they not taken " with thoſe putrid and inflammatory fevers, at a time " when thoſe who have given them an aſylum are the " daily victims of it ? Finally, if we muſt attribute the " epidemic to no other cauſe than the immoderate heat " of the ſummer, which is really greater here for two or " three months than at Hiſpaniola, where a land and " ſea breeze tempers its violence, why does it not ſtop " its ravages when the heat moderates ? We have ob- " ſerved in the epidemics of New York and Philadel- " phia, that they were leſs deſtructive in the burning " dog-days than in the months of September and Oc- " tober, when the mornings, evenings and nights begin " to be cool, and even cold enough to allow people to " go clothed as warmly as in winter.

" We have now a recent and ſtriking example that it " is not heat only which cauſes the epidemics ; ſince " there were only, in the month of September, three or " four days of great heat. The reſt were very cool. It " may even be ſaid that from the 22d it was cold, eſpe- " cially on the 28th and 29th, when a violent north " wind obliged many people to have a fire. The num-

" ber

" ber of deaths never were, however, ſo numerous as they " have been ſince the 20th of September. The funeral " liſt, which in July and Auguſt amounted to 40 per day, " reached on the 20th of September to 78, the 22d, 68, " the 23d, 71, the 24th, 63, the 25th, 80, the 26th, " 77, the 27th, 96, the 28th, 106, the 29th, 76, and " from the 29th at twelve o'clock, to the 1ſt of Octo- " ber, ſame hour, the number was 170 ; a number as " prodigious as it is frightful : we could not therefore " even flatter ourſelves that the ſevereſt froſts of the end " of October would diſpel the epidemic, did not expe- " rience afford us that comforting hope.

" What then is the phyſical cauſe of this ſcourge, " which all human prudence and ſcience are unable to " avert ? The miniſters of religion will not fail to aſ- " cribe it to celeſtial wrath, and to adviſe prayers, faſt " and charity to appeaſe it. Thoſe pious practices can- " not aſſuredly do harm ; but the philoſophical obſerver, " who does not conceive that Philadelphia and New " York ſhould have excited the Heavenly wrath more " than thoſe of other cities of the continent, will ſeek for " more natural cauſes, and will examine whether they " ſhould not be attributed to ſome local and peculiar " vice of thoſe two unfortunate cities, and perhaps to " the temperament, the diet, the mode of life, of their " inhabitants. Reſpecting this, we do not find, in the " *localities* of New York and Philadelphia ſufficient " reaſons, nor in the conſtitutions or mode of life of their " inhabitants ſufficient variations, to mark them as the " victims of the *yellow fever*, while the inhabitants [of " other places] are free from it.

" I am however inclined to think that New York and " Philadelphia, more than any other cities, contain " cauſes of corruption or putridity, occaſioned by their " ſize and the extent of their commerce, which, added " to the high mode of life of the Americans, may be " the ſource of the calamity which now affects them.

" In effect, we obſerve that in theſe two cities the " epidemic has conſtantly manifeſted itſelf in thoſe parts " which are not only the moſt commercial, but alſo

" where

" where the *common* ſinks of the city meet; where the " houſes, inhabited by the poorer claſs of people, being " ſmaller, and more crowded together; where the ſtores " contain moſt proviſions liable to fermentation and pu- " tridity; where the ſhipping crowded in the *wharfs* " render the water ſtagnant; where immenſe quantities " of dirt and litter are brought from every quarter for " the purpoſe of filling up new wharves and other places " deſigned to be taken from the ſea, to enlarge lands " to build upon; finally, where the water uſed to drink " does not reach the pumps of the lower part of the " city until it has filtrated through the burying-grounds " and privy-houſes of the upper parts, moſt of which " have no walls, and are never emptied.

" Let us add to all thoſe cauſes of infection the dead " dogs, cats, pigs, and rats, which are thrown into the " common ſinks and docks, the rotten fiſh, and the pri- " vies, which in ſeveral houſes, eſpecially at New York, " are nothing but *tubs*, which are emptied weekly on " the ſea ſhore, and we ſhall have leſs reaſon to won- " der at the putrid exhalations which iſſue on the eaſtern " part of New York, and at Philadelphia on that part " contiguous to the Delaware, and which are capable of " infecting the whole atmoſphere, and to impair the " health of thoſe who live in it. If the people who " dwell in thoſe parts are not ſcrupulouſly ſober, if they " frequently indulge in the uſe of ſpiritous liquors, if " they feed on ſuch food as is generally known to be " unhealthy, is it to be wondered that, with ſuch a " mode of life, their blood ſhould be more diſpoſed to " inflammation and to be diſſolved and corrupted, in " the midſt of an air already corrupted and loaded with " deſtructive miaſmata?

" Now every man knows that thoſe who live conti- " guous to the river at New York, and the Delaware at " Philadelphia, moſtly ſailors, ſhipwrights, truckmen, " labourers, tavernkeepers, &c. ſeldom trouble them- " ſelves about the quantity of their foods and drinks, " but indulge copiouſly in the uſe of ſtrong liquors, of " which an aſtoniſhing conſumption is made in thoſe " parts.

" parts. They are not in other reſpects more careful as " to cleanlineſs in their narrow and low houſes. There, " in a *hole* called a *bedroom*, and on a feather-bed half " rotted, in a heap of rags half devoured by inſects ſtill " more diſguſting, two and ſometimes three individuals, " covered with ſweat, often drunk, ſleep, and ſtill in- " creaſe the filth by their ſhameful and dirty mode of " life. Shall we find it ſtrange that thoſe infected haunts " ſhould ſhed forth in the morning a mephitic air, ca- " pable of ſuffocating the moſt robuſt and vigorous men? " Shall we wonder that thoſe who breathe this peſtilen- " tial gaz are ſuddenly ſeized with a fever? in itſelf perhaps " not very dangerous, if it were treated in a ſuitable " manner. But what is their method of treating it? " They do not even know the name of *ptiſan*, ſtill leſs " the uſe of *anodynes*, nor that of *ſalt of nitre*, nor of " *camphor*, ſo proper to prevent putridity. Punch, " made with rum; water mixed with gin and molaſſes; " a ſort of ſoup made with Madeira wine; fiſh; raw oyſ- " ters, &c. theſe are their firſt medicines. If their wives or " friends go to conſult the apothecary, he adviſes the " *caſtor-oil*, or the famous calomel pills or powders, whoſe " virtues the quacks extol for every diſeaſe. Finally, " if the fever increaſes, the doctor is called, who admi- " niſters a light puke of 12 or 15 grains of tartar eme- " tic, a plenty of laudanum to procure ſleep, and who, " ſeeing the caſe deſperate, withdraws, ſaying that he " was called too late!* " Although

* In Dr. Ruſh's account of the fever of 1793, we find the following remarks on the French mode of practice, to which it ſeems remarkable that our author has given no anſwer: " I proceed with reluctance to inquire into the com- " parative ſucceſs of the French practice. It would not be difficult to decide " upon it from many facts that came under my notice in the city; but I ſhall " reſt its merit wholly upon the returns of the number of deaths at Buſh-hill. " This hoſpital, after the 22d of September, was put under the care of a " French phyſician, who was aſſiſted by one of the phyſicians of the city. The " hoſpital was in a pleaſant and airy ſituation; it was provided with all the " neceſſaries and comforts for ſick people that humanity could invent, or libe- " rality ſupply. The attendants were devoted to their duty, and cleanlineſs " and order pervaded every room in the houſe. The reputation of this hoſ- " pital, and of the French phyſician, drew patients to it in the early ſtage of " the diſorder. Of this I have been aſſured in a letter from Dr. Annan, who " was appointed to examine and give orders of admiſſion into the hoſpital to " ſuch of the poor of the diſtrict of Southwark, as could not be taken care of in " their own houſes. Mr. Olden has likewiſe informed me, that moſt of the " patients who were ſent to the hoſpital by the city committee (of which he " was

" Although the inhabitants of the other parts of the " city who are in better circumſtances follow a mode of " life more regular, feed on more wholeſome aliment, " and are much more cleanly in their houſes (except how- " ever *feather-beds* and *lower bedrooms*) it is nevertheleſs a " fact that they are much inclined, the men eſpecially, to " eat ſalt meat, meat half cooked, green fruit, and ſtill " more to drink ſpiritous wines. Several of them allow " themſelves an immoderate uſe of the latter between din- " ner and tea-time, the ſtrength of which, added to that of " the high-ſpiced food, and liquors, muſt neceſſarily in- " creaſe in their blood that fermentation already exci- " ted by the heat of the ſeaſon. Now, ſhall we not " concede that bodies thus prediſpoſed ought to be " more ſuſceptible than others of the impreſſion of the " corrupted *miaſmata* which are conſtantly exhaled from " every thing that ſurrounds them; from the common " ſewers, the wharves or the docks; from the dirt and " litter of the alleys and lanes; from the ſulphureous " bilge-water of ſhips; from the cellars and from the " ſtores; in ſhort, from thoſe houſes which contain ſick, " dying and dead perſons?

Here the author, after ſtating objections on both ſides, ſeems at laſt to determine that the diſeaſe is produced by putrid effluvia. The diſpute on this ſubject, however, hath continued ſo long, that we can by no means expect to ſettle it in this treatiſe. At firſt view one would think that nothing could be more eaſy than to determine whether the diſeaſe aroſe ſoon after the arrival of foreign veſſels, or in places which had no connexion with maritime affairs. But when we come to particulars there is ſuch a ſtrange diſagreement and contradiction

" was a member) were in the firſt ſtage of the fever. With all theſe advan- " tages, the deaths, between the 22d of September and the 6th of November, " amounted to 448 out of 807 patients who were admitted into the hoſpital " within that time. Three fourths of all the blacks (nearly 20) who were pa- " tients in this hoſpital, died. A liſt of the medicines preſcribed there may be " ſeen in the minutes of the proceedings of the city committee. Calomel and " jalap are not among them. Moderate bleeding and purging with glauber " ſalts, I have been informed, were uſed in ſome caſes by the phyſicians of " this hoſpital. The proportion of deaths to the recoveries, as it appears in " the minutes of the committee from whence the report is taken, is truly me- " lancholy!"

tradiction concerning facts, that we are in every inſtance driven back into the wide field of theory and argumentation. One inſtance of this we have already had in the caſe of the Boullam fever ſaid to be imported by the *Hankey*. Let us now try another. Dr. Currie of Philadelphia, in a letter to Mr. Wynkoop of date October 10th, 1797, ſays that the fever at New-York, of 1795, was proved "by unqueſtionable facts," to have been introduced from Port au Prince by the brig Zephyr; and for a proof of this he refers to a letter of the health committee of New York to the governor, dated September 8th of that year. From this letter it appears that Dr. Treat viſited this veſſel on the 28th of July, where he found three men ill of what he called a bilious *remitting fever*, and the body of one who died that morning. Two days after, the Doctor was taken ill, and died in eight days, with unequivocal ſymptoms of yellow fever. On the 25th, four perſons from on board the ſhip William, from Liverpool, which arrived ſeveral weeks before (the crew of which till this time had been healthy) were taken ill of fever, and died with ſimilar ſymptoms in ſeven days. Nothing can be more direct than this evidence, yet it did not give ſatisfaction.

The fact was impugned by the late Dr. E. Smith, in a letter to Dr. Buel,* who produces ſuch evidence as, in his opinion, "eſtabliſhes it beyond a contradiction, "that neither Dr. Treat nor any other perſon con-"tracted a fever, ſuch as prevailed in New York in "1795, from any ſick or dead man, or any thing elſe "connected with the veſſel in queſtion."

The evidence brought forward is the declaration and depoſition of capt. Bird. In a letter to Dr. Dingley, the captain "thinks it his duty to contradict the report" that Dr. Treat "caught the diſeaſe of which he died on board the Zephyr." He contradicts it by a depoſition, that "the mate and one mariner had the *fever and ague* "ſeventeen days on ſhore, and came on board with the "ſame diſeaſe; and the captain himſelf had a dyſen-"tery

* Webſter's Collection, p. 98.

" tery on his arrival in New York; and John Wheeler, " aged 16 years, died on the day of the arrival of the brig " in New York, by *worms crawling up into his throat, and* " *choking him.* He was ſewed up in a piece of canvaſs, " and ready to be committed to the deep, when Dr. " Treat came on board, who deſired the captain to have " the canvaſs opened, that he might inſpect the body; " and he only cut the canvaſs over the face, but did not " make any other examination of the body."

How far this proves captain Bird's aſſertion, that Dr. Treat *did not* catch the diſeaſe on board the Zephyr, the reader will judge. It is, however, inconſiſtent with the plan of this treatiſe to enter into an examination of contradictory evidence concerning matters of fact. Accounting as *nothing*, therefore, all that has been ſaid, *by either party*, concerning the brig Zephyr, let us proceed to other teſtimonies.

In a collection of *facts* and *obſervations* by the College of Phyſicians, publiſhed laſt year, we find the following remarkable accounts tending to prove that the diſeaſe was introduced by the ſhip Deborah, from Port au Prince and Jeremie in St Domingo: 1. In a letter from Dr. Stevens to Dr. Griffiths it is ſtated, that " the " yellow fever prevailed in almoſt all the ſea-port towns " in the French part of Hiſpaniola, particularly at Cape " Nichola Mole, where it raged ſo violently that it " obliged the Britiſh to abandon the poſt ſooner than " they intended. About the ſame time it appeared in " the harbour of St. Thomas, and was ſo deſtructive to " foreigners, that it obtained the name of *the plague.*" The Doctor ſaw ſeveral caſes of it in St. Domingo, during the months of Auguſt and September, 1798, and " theſe were entirely confined to *American ſeamen*, while " the native inhabitants of the city were totally exempt " from it." 2. From this very ſickly coaſt arrived the Deborah on the eighth of July. 3. On the 12th of Auguſt John Lewis, mate of the Deborah, informed Dr. Currie, that the veſſel had loſt *ſeven* perſons with fever on board during her paſſage, and one by accident; *and that ſhe had been employed as a tranſport in the Britiſh ſervice*

vice previous *to her taking in her cargo at Jeremie.* 4. Mr. Thomas Town informed Dr. Wiſtar, that, on the firſt of Auguſt, 1798, he was told by Alexander Philips, of Water-ſtreet, that he (Mr. Philips) had brought up two or three ſick people from the Deborah, in one or two boats. Some of them he had brought to his own houſe; and one was dead. Philips himſelf was ſick at the ſame time, and died a day or two after. 5. Mr. Purdon informed Dr. Currie that he had a ſimilar account from Mr. Philips, whom he ſaw on the firſt or ſecond of Auguſt in apparent good health, and that he died on the Saturday following.

All this, and further evidence ſeemingly equally ſtrong, was ſet aſide with the greateſt facility by bringing counter-evidence, particularly that of Mrs. Philips, who denied that there were any ſick people in the houſe; and by bringing inſtances of the fever exiſting in town before the veſſel arrived. It is needleſs therefore to trouble the reader with any further diſcuſſion of this evidence more than the reſt. As the ancient Britons, in their letter to Aetius, lamented that the *barbarians* drove them to the ſea, and the *ſea* drove them back to the barbarians, ſo may we lament, in the preſent inveſtigation, that the uncertainty of theory drives us to *facts*, and the uncertainty of ſuppoſed facts drives us to *theory*. Still, however, we ſhall not deſpair. The introduction of a diſeaſe into a large city is much more difficult to be traced than in a ſmaller one. In the year 1794 the diſeaſe appeared in the town of New Haven in Connecticut. Dr. Monſon of that place informs us, that it appeared on the 10th of June, when Mrs. Gorham, reſiding on the *Long wharf*, was viſited by Dr. Hotchkiſs, who found her affected with ſymptoms of the yellow fever. In three days her complaints ſuddenly vaniſhed, and ſhe was ſuppoſed to be in a fair way of recovery, but the ſame evening ſhe vomited matter reſembling coffee-grounds, and died next day. On the ſame day that Mrs. Gorham died, Dr. Monſon viſited her niece, a girl of eight years of age, who had ſtaid a week with her aunt, and was taken ill three days before. The day after the Doctor ſaw her

her ſhe was ſuddenly relieved as her aunt had been, but in a few hours vomited matter like coffee-grounds, and died next day. Theſe and ſome other ſimilar caſes having alarmed the ſelect men, inquiry was made, when "it appeared, that, in the beginning of June, capt. "Truman arrived from Martinico, in a ſloop that was "infected with the contagion of the yellow fever; that "this veſſel lay at the *wharf*, within a few rods of Mrs. "Gorhams reſidence; that ſhe had on board a cheſt of "clothes which had belonged to a mariner who died "of the yellow fever in Martinico; and that his cheſt "was carried into Mr. Auſtin's ſtore, and opened in "preſence of Capt. Truman, Mr. Auſtin, Henry Hub-"bard, and Polly Gorham: the three laſt died in a "ſhort time after their expoſure to the contents of the "cheſt. Hence it is highly probable that Mrs. Gor-"ham caught the diſeaſe from the infected ſloop or "clothing. Mr. Auſtin's ſtore ſtands within three or "four rods of Mr. Gorham's houſe; and no perſon in "town was known to have the yellow fever previous to "capt. Truman's arrival."

In his further account of this fever Dr. Monſon ſhows that it was contagious in the higheſt degree, and that Mr. Gorham's houſe proved a kind of ſeminary from whence the diſeaſe ſpread itſelf. "June 26 (ſays he) "Iſaac Gorham loſt an infant child with the yellow fe-"ver; and ſoon after his ſon and daughter were affected "with it: the former died. Solomon Mudge died "on the 30th; Jacob Thomſon's negro woman on the "1ſt of July; Archibald M'Neil on the 9th; Polly "Brown on the 3d of Auguſt; John Storer, jun. and "John Hide, on the 8th; and widow Thomſon on the "10th. Jacob Thomſon's negro woman, Solomon "Mudge, John Storer, jun. and John Hide, had vi-"ſited Mr. Gorham's houſe a few days before their ill-"neſs; Polly Brown and Mrs. Thomſon nurſed in Mr. "Gorham's family; and Archibald M'Neil nurſed "Solomon Mudge. Elias Gill died on the 12th of "Auguſt, and Samuel Griſwold's wife on the 7th: "the former viſited Mr. Gorham's houſe, the latter "nurſed in his family. "There

"There were a number of perſons who caught the "diſeaſe at Mr. Gorham's houſe, and recovered.

"Mrs. Thomſon, on the firſt day of her illneſs, was "moved half a mile from Mr. Gorham's, into George-"ſtreet. Luther Fitch caught the diſeaſe from Mrs. "Thomſon, and communicated it to his ſervant maid. "Both recovered. Mr. Fitch lives in College-ſtreet, "nearly three quarters of a mile diſtant from Mr. Gor-"ham's houſe. I could trace the diſeaſe throughout "the town. No perſon had the yellow fever unleſs in "conſequence of attending the ſick, or of being expoſed "by nurſes, infected houſes, clothing, or furniture.

"I have inquired of ſeveral aged perſons in this town "relative to the yellow fever, whether they knew of its "having ever been here previous to June 1794, and "there is but a ſingle inſtance; the facts relating to "which are theſe: In the year 1743 a tranſient perſon, "by the name of Nevins, who came from the Weſt In-"dies, lodged at the houſe of Nathaniel Brown, an inn-"keeper in this city. The man was taken very ſick in "the night, and died ſhortly afterwards; and his body "was very yellow after death. Mr. Brown's wife ſickened "in a ſhort time, and died of the ſame complaint, which "was at that time ſuppoſed to be the yellow fever.

"I am credibly informed that ſeveral perſons at Mill-"river, in Fairfield county, and alſo at New London, "died with the yellow fever in Auguſt and September, "1795. It was propagated there by infected perſons "from New York.

"Capt. John Smith died in this town, the 20th of "Auguſt, 1795. He caught the diſeaſe in New York, "and communicated it to one of his negro ſervants."

On the whole, Dr. Monſon concludes, "that the yel-"low fever is ſeldom or never generated in this country, "and that it is always imported from abroad. An ob-"jection to the idea of its being generated in this coun-"try is, that it was never known in the interior of this "ſtate, or of the United States, ſo far as I can learn. "Had it ever appeared in Connecticut before the year "1743, and June 1794, we ſhould undoubtedly have

"had

" had ſome record of the fact. There is no ſuch " record, and no perſon remembers to have heard of " ſuch a diſeaſe, but at theſe periods, prevailing in any " part of the ſtate. There are numbers of aged perſons " in New Haven who remember the putrid ulcerous ſore " throat, ſmall pox, meaſles, dyſentery, &c. raging here " with great mortality, but have no recollection of any " yellow fever. Hence we may rationally conclude that " it never did appear in this ſtate but in the years 1743 " and 1794.

" It is evident, from facts before mentioned in this " letter, that the yellow fever was propagated in no other " way than by contagion, and that this is a *ſpecific con-* " *tagion*, and no more diverſified, in its operation on the " human ſyſtem, than that of the ſmall pox and " meaſles.

" If the citizens of large commercial cities were atten- " tive in tracing the origin of the yellow fever, on its " firſt appearing among them, they would often find " that the diſeaſe was imported. In ſome inſtances it " would be extremely difficult to diſcover the origin. " But the miſchief lies in this; that the inhabitants of " ſuch cities, whenever a contagious diſeaſe makes its " appearance among them, endeavour to ſuppreſs all " rumour of it, from an apprehenſion of alarming the " country, and injuring their commerce; unwilling " to believe that there is evil in the city, till the diſeaſe " ſpreads in every direction. Then, indeed, when it is " too late, they are ſolicitous in the uſe of means to ar- " reſt its progreſs. As it extends itſelf ſlowly at firſt, " ſeaſonable exertion might both detect its ſource, and " prevent its increaſe; but when it is diffuſed through " a city, it ſpreads with rapidity, and it is no longer poſ- " ſible to diſcover where it began. But as, whenever " the yellow fever has appeared in the United States, " it has always been in ſea-port towns, and originated " near wharves, docks, and warehouſes, there ſeems to " be high probability that the diſeaſe is imported."

The evidence here ſeems ſo ſtrong, that no counter-evidence that can be brought appears likely to invalidate it.

it. The coincidence of the commencement of the fever with the arrival of the ſhip hath not been denied, as in other caſes; and, though it has been attempted to prove that a fever might have ariſen from the quantity of putrid or putreſcent matters at that time in the town, yet the circumſtances of thoſe who were preſent at the opening of the cheſt of clothes being taken with the fever, and thoſe who were ſick of it in ſo many caſes infecting one another, cannot by any means be overthrown. But the fact is, that even thoſe who contend moſt violently againſt importation, do yet allow that it may in ſome caſes be ſo; but they contend that if proper care be taken it will not ſpread. Dr. Smith in his letter to Dr. Buel ſays, "that infection may be brought into any place "from abroad; that, under certain circumſtances of the "place where it is introduced, it becomes very deſtruc-"tive; but that, when theſe circumſtances do not ex-"iſt, however the perſon immediately affected, if it be "introduced by a ſick perſon, may ſuffer, it is harmleſs "ſo far as the general health of that place is concerned. "If the ſubject were viewed in this light, as moſt aſ-"ſuredly it ought to be, the queſtion of importation or "non-importation would ſink into its merited inſignifi-"cance." But, with due reſpect to the memory of Dr. Smith, this muſt ſurely be accounted a very inconſiderate mode of reaſoning. In the inſtance he ſpeaks of, that of the Zephyr lately mentioned, he allows that Dr. Treat *might* have caught the diſeaſe on board the veſſel,* "but (ſays he) as *no other* perſon is known to have been "infected by that veſſel, and as the Doctor communi-"cated it to no perſon, the advocates for importation "would not be greatly benefited by the conceſſion." Surely we muſt look upon the life of Dr. Treat himſelf to have been a matter not entirely inſignificant, and if he caught the fever by going on board, a number of others who went in full confidence of the *impoſſibility* of importation, might have done the ſame. As far therefore as the prevention of ſuch accidents can be accounted a matter of importance, it is alſo of importance to believe the

* Webſter's Collection, p. 98.

the doctrine of imported contagion. It is true, Dr. Smith, in the paſſage juſt quoted, adds immediately after, that "no ſuch conceſſion (with regard to Dr. Treat) is neceſſary;" but, in p. 104, he does make an ample conceſſion, as we have ſeen, viz. that the contagion may not only be imported, but, under certain circumſtances, *be very active and deſtructive*. The queſtion therefore reſts here: Can we at all times promiſe that, with the utmoſt care that can be taken, the circumſtances of a place may not be ſuch as to give activity to an imported contagion? In the nature of things it is impoſſible that the docks, wharves, ſtreets and alleys of a large town can be abſolutely clean. It is equally impoſſible that *all* men can be adviſed to be temperate, cleanly, and neat in their lodgings; and we are unable to determine how far people may deviate from the *rule of right* in thoſe reſpects without danger. Before any theory of this kind could be ſupported, it would be abſolutely neceſſary to bring an unequivocal proof that yellow fever had been in *one* inſtance at leaſt produced by local cauſes; but this cannot be done. Among the Hottentots, the dirtieſt people in the world, no ſuch diſeaſe exiſts. Among the peaſants of Poland, who likewiſe live in a very dirty manner, their mode of life is ſaid to produce not a fever, but a diſeaſe of the hair, called the *plica Polonica*. In the Medical Repoſitory, vol. i, p. 276, Dr. Mitchill of New York deſcribes a diſeaſe called *elephantiaſis, liktraa, or ſcurvy*, occaſioned by loathſome, putrefying diet, ſuch as rotten fiſh, fiſh-livers and roe, fat and train of whales and ſea-dogs, congealed ſour milk, with little or no vegetable proviſions, and by expoſure to wet and cold. This diſeaſe prevails in Iceland, in the Ferro iſlands, in two diſtricts of Sweden, and in *Madeira*; yet this diſeaſe is not the yellow fever, though it is ſaid to make the perſon afflicted with it more like "a putrefying corpſe than a living man." The *cold* ſeems to be aſſigned as a reaſon why the diſeaſe does not aſſume a febrile form; but, however this may hold with Iceland, it cannot with Sweden, where the ſummer is ſo hot, that the ſun has been ſaid to ſet foreſts on fire. This is probably

bably a fable; but we are aſſured by Pontoppiddan, in his Natural Hiſtory of Norway, a country to the full as cold as Sweden, that in ſummer the heat is very great. His expreſſion is, that it is enough to "make a raven gape." As to *Madeira*, where the climate is warm, there can be no ſuch objection. But a particularity of this diſeaſe is, that it is infectious. Suppoſing then that by any means it ſhould be exalted into a fever, have we any reaſon to imagine that in ſuch a caſe it would lay aſide its infectious property? Surely not. If this then is the caſe with a diſeaſe produced by the ſame cauſes with the yellow fever, we have the very ſame reaſon to ſuppoſe that the latter is infectious, as that the former would be ſo if it could lay aſide its preſent form, and aſſume that of fever. Another proof that mere dirtineſs cannot at all times produce a diſtemper, or even propagate its infection, may be deduced from the ſixth caſe quoted p. 355 from Dr. Ruſſel, where he ſays that a poor Jewiſh family lived in a place ſuch as he had always conſidered as one of the receptacles of contagion, yet only one in ſix of thoſe who remained in it was taken with the plague. In all caſes of plague, or of violent epidemic diſorders, it has indeed been obſerved that the poor were more ſubject to an attack than the rich. This was ſo remarkable in the plague of London in 1665 that Dr. Hodges ſays it was called the *poor's plague*; and Dr. Ferriar tells us from Diemerbroeck, that in ſome parts of Italy it was cuſtomary in the beginning of a peſtilence to drive out the poor; and likewiſe that this cruel expedient was uſed at Marſeilles. The bad ſucceſs of the experiment at this laſt place, however, ſhows that people of any deſcription, and in any circumſtances, may be attacked. A very probable cauſe, entirely diſtinct from any mode of living, may be aſſigned in this caſe, viz. that the poor are more expoſed to infection than others, both from their circumſtances and their raſhneſs; for it will be evident to thoſe who converſe with the moſt uninformed people of any country, that the Turkiſh notion of predeſtination is far from being confined to Mahometans. It is not, however, denied, that dirtineſs, as well as other local

cauſes, may do much hurt, and occaſion the ſpreading of a diſeaſe which otherwiſe would not ſpread; becauſe uncleanneſs of all kinds ſeems to be the proper vehicle of infection, in which it appears to delight to take up its abode. In the Medical Extracts, vol. ii, p. 174, we have from Goldſmith the following anecdote concerning the concentration of peſtilential infection in the plague of London:

"A pious and learned ſchoolmaſter, who ventured to "ſtay in the city during the plague, and took upon him-"ſelf the humane office of viſiting the ſick and dying who "had been deſerted by better phyſicians, averred, that, "being once called to a poor woman, who had buried "her children of the plague, he found the room where "ſhe lay ſo little, that it could ſcarce hold the bed on "which ſhe was ſtretched. However, in this wretched "abode, beſide her, in an open coffin, her huſband lay, "who had ſome time before died of the diſtemper, and "whom ſhe ſoon followed. What ſhewed the peculiar "*malignity* of the air, thus ſuffering from human miaſ-"mata or effluvia, was, that the contagious ſteams had "produced ſpots on the very *wall* of their wretched "apartment. And Mr. Boyle's own ſtudy, which was "contiguous to a peſt-houſe, was alſo ſpotted in the ſame "frightful manner." This ſhows not how infection may be *produced*, but how it may be concentrated in ſuch miſerable apartments. The appearance on the walls brings to remembrance what is ſaid in the book of Leviticus concerning the appearance of the leproſy in walls and clothes.

But, ſuppoſing we ſhould allow that dirtineſs may bring on a yellow fever (and it is plain that this cannot be proved) we have, in the caſe of the Buſbridge Indiaman, a *demonſtration* that cleanlineſs cannot keep it off.* This veſſel ſailed from England for the Eaſt Indies, in the year 1792, much about the ſame time that the Hankey ſailed for the coaſt of Africa. She had on board 264 people in all, viz. 109 belonging to the ſhip's company, 130 recruits, and 25 paſſengers. She had very

* Annals of Medicine, vol. i, p. 166.

very boiſterous weather at firſt ſetting out, but croſſed the equator on the 26th of May, where the weather was ſultry, with heavy ſhowers of rain. The diſeaſe now made its appearance firſt among the recruits, and in a fortnight ſpread among the ſhip's company. It was common for ſix or ſeven to be attacked with it daily from the commencement; "and in the ſpace of twelve weeks "almoſt every perſon in the ſhip not only had laboured "under it, but many had ſuffered repeated relapſes." For ſeveral weeks the weather was hot and ſultry; but, when in the vicinity of the Cape of Good Hope, they experienced a reverſe, and were driven by a ſtorm as high as S. lat. 42. Here the thermometer indicated a temperature only 13° above froſt, but no material change in the diſeaſe took place. Afterwards, when returning into the warm latitudes, they experienced the ſultry heats of the Atlantic without any change either for the better or the worſe, and this for no leſs a ſpace than three months.

As to the origin of the diſeaſe, Mr. Bryce the ſurgeon, though inclined to aſcribe it to contagion, could not trace it to any origin of that kind, as the veſſel had been ſix weeks at ſea before it appeared. It "could not be "aſcribed to want of air or cleanlineſs, as *every poſſible* "attention had been uſed to preſerve theſe: the different "apartments were thoroughly cleaned and fumigated "with wetted gun-powder; the decks were ſprinkled "with boiling vinegar; and the windſails were attentively kept in order at each hatchway. Mr. Bryce is in-"clined to conjecture that a peculiar combination in the "circumſtances of diet, ſituation, and ſtate of the atmo-"ſphere, may have given riſe to this calamity. But the "ſame combination of circumſtances ſo frequently takes "place *without any fever*, that it appears much more "probable the diſeaſe had its origin either from an "*imported fomes*, or from a *fomes generated in ſome indi-"vidual in* the ſhip, from whence it was afterwards "propagated to others by *contagion*." The diſeaſe produced on board the ſhip was not contagious to the people on board another veſſel with whom they had communication,

communication, nor to the people aſhore among whom the convaleſcents were put, nor to new paſſengers taken on board the veſſel in the Eaſt Indies; circumſtances certainly not a little ſurpriſing.

It doth not therefore appear, that, without the intervention of ſome other cauſe, mere dirtineſs can produce the yellow fever. Let us next ſee what can be done by confinement, want of air, or, as it has been lately called, abſtraction of oxygen. On this, however, we muſt obſerve, that in all caſes where people are allowed to breathe, their lungs muſt be filled with the due quantity of *ſome* elaſtic fluid. If the fluid they breathe contains a ſmaller quantity of oxygen, it muſt contain a greater quantity of ſomething elſe. If a diſeaſe therefore is produced, it muſt be occaſioned by the *preſence* of that other fluid, as well as by the abſence of oxygen. Now, in confined air, we know that not only the oxygen is diminiſhed, and conſequently a larger proportion of azote or ſepton mixed with it, but in addition to this increaſed proportion of azote, there is alſo a poſitive augmentation of the deleterious part of the atmoſphere by the effluvia from the bodies of thoſe who are confined. Theſe effluvia, as we have ſeen, p. 90, contain a great quantity of fixed air. Others have ſhown that they contain alſo azote; and it may be ſo; but ſtill we are ſure that the fixed air predominates. Beſides this, from the breath we know that a great quantity of aqueous moiſture proceeds. Experiments on the action of theſe different kinds of fluids are yet in an imperfect ſtate, yet ſome important facts relating to them are known. 1. Oxygen breathed in great proportion produces an augmentation of heat, and proves an univerſal ſtimulant. See p. 118. By itſelf it quickens the pulſe.* 2. Pure fixed air breathed by itſelf deſtroys life with the circumſtances of increaſed heat, rarefaction of the blood, and rupture of the veſſels. See p. 206. 3. The circumſtances attending death by breathing azote are not particulaly recorded;

* In the Medical Extracts we find it recorded, that a young gentleman having breathed pure oxygen for ſeveral minutes, his pulſe, which was before 64, ſoon beat 120, in a minute.

ed; but we know that by breathing an atmoſphere lowered by it the conſumptive fever is not increaſed, but diminiſhed; and there is an account in the Medical Annals of a perſon who was perfectly cured of a conſumption by the ſmell of the bilge-water of a ſhip. 4. It has formerly been ſhown, from Dr. Black's experiments, that, when the vapour of water is condenſed in the body, a great quantity of heat muſt be thus communicated to it. In confined air therefore there is a diminution of the oxygen which produces heat; but there is an augmentation of the fixed air and of the aqueous moiſture which increaſes it; ſo that, on the whole, the balance muſt be conſidered as in favour of the augmentation of heat in the human body; not to mention the quantity of ſenſible heat continually added to the atmoſphere by that which evaporates from the body. This poſition, however, doth not ſtand upon the uncertain ground of theory; it is confirmed by the following remarkable fact; Commodore Billings, who commanded a Ruſſian expedition fitted out by the late empreſs, found, in his travels through the northeaſtern part of Aſia, that the cold of the atmoſphere exceeded not only what was known in other climates, but even what moſt people had been able to produce by freezing mixtures. Dr. Guthrie informs us that he was unable to produce a greater degree of cold than 36 below 0 of *Reaumur*, though aſſiſted by 20 below 0 of natural cold, and the power of all the freezing mixtures he knew. "How much then "(ſays he) was I ſurpriſed to hear Mr. Billings aſſert, "that ſome ſpirit thermometers which he had with him, "graduated according to *Reaumur's* ſcale, were often as "low as 40° below the freezing point of water, that is, "8 deg. below the freezing point of mercury. And "once or twice he obſerved them at 42 deg. below the "*freezing point of quickſilver.** "During

* This account is taken from the Annals of Medicine for 1798, and appears in a letter from Dr. Guthrie at Peterſburg to Dr. Duncan at Edinburgh. It is drawn up with ſuch *aſtoniſhing* inaccuracy, that we may well be ſurpriſed how the one phyſician ſhould write, and the other print it. There ſeems in the firſt place to have been a miſtake of Reamur's thermometer for Fahrenheit's. But even this will not rectify the account. The *zero* or (0) on Reaumur's ſcale is the freezing point of water; on Fahrenheit's it is the cold produced

"During this ſevere cold (probably 42 below 0 of "Fahrenheit) the Nomade Tchutſki (a wandering na- "tion on the northeaſtern extremity of the Aſiatic con- "tinent) who were conducting him along the coaſt of "the Frozen ocean, in ſledges drawn by rein-deer, en- "camped every night on the frozen ſnow in low tents, "which they quickly formed with the ſkins of rein-deer, "ſpreading ſome of them on the ſurface of the ſnow, on "which they all ſlept; and he aſſured me, that, ſo far "from ſuffering from cold during the night, the heat "was ſo exceſſive in theſe fur tents, where from ten to "fifteen ſlept together, according to its dimenſions, that "no one could bear even a ſhirt; but all lay in a vio- "lent perſpiration, naked as they were born, till dawn "of day, without the aid of fire, excepting a train-oil "lamp, which lighted each tent."

From this account it ſeems pretty evident, that, by the accumulation of animal effluvia, a heat may be communicated to the atmoſphere greater than that of the human body. We cannot ſuppoſe the heat of the tent which put the people in a violent perſpiration to have been leſs than 90° of Fahrenheit; and, ſuppoſing the temperature of the external atmoſphere to have been at a medium 30° below 0, there muſt have been a generation of 120 degrees of heat; but the heat of the human body does not exeecd 97 degrees, and it cannot communicate more heat than it has. But we muſt ſuppoſe the tents to have been capable, had they been filled to the top, of containing twice the number who did ſleep in them. They could communicate to the air therefore only

duced by a mixture of ſalt and ſnow, 32 degrees below the freezing point of water. The freezing point of quickſilver has been fixed at 39, 39½ or 40 degrees below the cold produced by ſalt and ſnow. When the themometer therefore fell to 40 deg. below the freezing point of water, it was only eight degrees below the cold of ſalt and ſnow, and not equal to the congelation of mercury by more than thirty degrees. The difference between this and *forty-two* degrees below the freezing point of quickſilver is enormous and incredible. It indicates a degree of cold hitherto unobſerved on the face of the earth, and ſcarcely equalled by the lateſt experiments made at Hudſon's bay, where, by means of vitriolic acid and ſnow, the thermometer was made to indicate a degree of cold 40 degrees below the freezing point of quickſilver. The inaccuracy and confuſion of this account, however, does not affect the ſubſequent part relative to Mr. Billings's journey.

only one half of 97 degrees, or $48\frac{1}{2}$ °; the remaining $71\frac{1}{2}$ ° therefore muſt been derived from the breath and perſpiration of the body.*

Let us now attend to the conſequences which muſt naturally and undeniably follow from this fact. If, in ſuch a violently cold climate, the effluvia of fifteen human bodies could produce a heat ſufficient to induce a violent perſpiration, what would they not have done had they been in a climate where the heat of the atmoſphere was upwards of an hundred degrees greater, or between 70 and 80 above 0 of Fahrenheit? Perhaps this was never thoroughly tried except in the black hole at Calcutta. Here an hundred and forty-ſix men and one woman were encloſed in a dungeon only 18 feet ſquare, and conſequently affording ſcarce eighteen inches ſquare to each. This happened in a very hot climate, in the month of June; ſo that we cannot ſuppoſe the temperature to have been leſs than 80° of Fahrenheit.

On being confined in this manner, the vital powers endeavoured, by a moſt profuſe perſpiration, to ſend off the ſuperfluous quantity of heat thrown into the body. This was exactly what took place with Dr. Guthrie; but, in the caſe of the black hole, there was, beſides the quantity of heat produced by the warmth and perſpiration of the body, *an hundred and ten* degrees more to be added, on account of the natural heat of the atmoſphere. For we cannot ſuppoſe the heat at Calcutta, in a ſultry evening in the month of June, to have been leſs than 80, which added to —30, ſuppoſed to be the temperature among the Tchutſki, makes 110°. The perſpiration was extremely profuſe, and was ſoon accompanied with exceſſive thirſt; nature being unable to ſupply ſuch a quantity of liquid, or this liquid to carry off the heat from the body. The want of pure air began then to be felt by a difficulty of breathing; and Mr. Holwell, having in deſpair retired from the window, found the difficulty of breathing increaſe, attended by a palpitation of the heart. Arouſed by his ſufferings, he returned and was relieved by

* Here no account is made of the heat that the very cold ſnow upon which they lay muſt have abſorbed, which we know muſt have been very conſiderable, though it cannot be calculated.

by drinking ſome water, and having air at the window. The difficulty of breathing diminiſhed, and the palpitation ceaſed; but, finding the thirſt not to be quenched by water, he ſucked his ſhirt-ſleeves, which were wet with ſweat, and endeavoured as much as poſſible to catch all of it that he could. The taſte was ſoft and agreeable. A pungent ſteam was now felt like ſpirit of hartſhorn. A number had died, and Mr. Holwell, once more rendered deſperate, retired from the window, and lay down upon a bench, where he ſoon loſt all ſenſe. Next morning only 23 ſurvived, of whom Mr. Holwell was one. He revived on being brought out to the freſh air, but was inſtantly ſeized with a putrid fever, as well as all the reſt of the ſurvivors. In this ſituation they were obliged to walk, loaded with fetters, to the Indian camp; at night they were expoſed to a ſevere rain, and the day following to a ſultry ſun; yet, notwithſtanding this ill treatment, they all recovered; having an eruption of large and painful *boils* all over the body. Mr. Holwell, however, ſaid that he never afterwards enjoyed good health.

Another melancholy proof of the bad conſequences reſulting from a want of freſh air we have in the evidence given by Dr. Trotter, when the queſtion concerning the ſlave trade was agitated before the Britiſh Houſe of Commons. He depoſed that the ſlaves were confined 16 hours out of 24, and permitted no exerciſe while on deck. They were kept in rooms from 5 to 6 feet high, imperfectly aired by gratings above, and ſmall ſcuttles in the ſides of the ſhip, which could be of no uſe at ſea. The temperature of theſe rooms was often above 96 of Fahrenheit, and the Doctor ſays that he never could breathe in them, unleſs juſt under the hatchway. "I have often (ſays he) obſerved the ſlaves drawing their breath with all the laborious and anxious efforts for life which are obſerved in expiring animals ſubjected by experiment to foul air, or in the exhauſted receiver of an air-pump. I have often ſeen them, when the tarpaulings have been inadvertently thrown over the gratings, attempting to heave them up, crying

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" ing out, in their own language, 'We are ſuffocated!'
" Many I have ſeen dead, who, the night before, had
" ſhown no ſigns of indiſpoſition; ſome alſo in a dying
" ſtate, and, if not brought up quickly on the deck,
" irrecoverably loſt. Hence, in one ſhip, before her ar-
" rival in the Weſt Indies, out of 650 ſlaves, more than
" 50 had died, and about 300 were tainted with the
" ſea ſcurvy."

A third example of the effects of want of air, though conjoined with other cauſes, may be reckoned the caſe of the Hankey, formerly related. The people there were not indeed confined as much as in the black hole, but it is impoſſible to ſuppoſe that there could be a proper circulation of air, and the length of time the paſſengers were confined might be equivalent to the violence of the cauſe in the caſe of the black hole. In the latter, however, the diſeaſe produced was not the yellow fever, but ſeems to have been a kind of non-deſcript eruptive one, more reſembling the ſmall pox, or rather *Job's diſeaſe*, than any other. From Dr. Chiſholm's account of the Boullam fever alſo, it ſeems to have been more of an eruptive nature than the common yellow fever; ſo much, that Dr. Chiſholm is of opinion that it partook "in no ſmall degree of the nature of the true plague." He ſays that in it he "did not obſerve *carbuncles* on any who died; but that in many who recovered they were numerous, large, and very troubleſome." He conſidered them alſo as a critical diſcharge, and the *only* one in this fever; but in the plague they certainly are not; neither is it at all probable that they were of the ſame nature with the peſtilential carbuncles.

In p. 207 of this treatiſe it is inferred, from ſome experiments of Dr. Davidſon and Dr. Chiſholm, that the fevers in warm climates *are not* owing to a deficiency of oxygen in the atmoſphere; but in a treatiſe on the yellow fever in Dominica by Dr. Clarke, we have other experiments, which, if they can be depended upon, certainly overthrow that doctrine, or at leaſt render it very dubious. Dr. Clarke endeavoured to aſcertain the purity of the air by Mr. Scheele's apparatus, and which was

likewiſe uſed by Dr. Davidſon, viz. filling gallipots with flowers of ſulphur and iron filings well mixed and moiſtened, and putting theſe upon a ſtand under a glaſs veſſel, which was placed on a ſtool in a pail of water. The glaſs veſſel was marked and divided on the outſide, and, allowance being made for the ſpace occupied by the gallipot, the water roſe only one fifth in the glaſs veſſel, after ſtanding 24 hours. When the diſeaſe abated, it roſe near one fourth; and upon many trials afterwards it never roſe above one fourth. When the emigrants fled towards the mountains, where the air is very pure, they always avoided an attack of fever, or ſoon recovered if in a convaleſcent ſtate. This is ſimilar to what is ſtated by Van Swieten concerning the plague at Oczakow, viz. that the atmoſphere was ſo loaded with ſome kind of vapour, that in certain parts of the town poliſhed ſword-blades were turned black. This ſeems to have indicated a great prevalence of inflammable or hepatic air, or both, in the atmoſphere; but it is extremely doubtful whether this could produce a *fever*, much leſs the true *plague*. In Dr. Clarke's experiments it were to be wiſhed that he had examined the nature of that part of the atmoſphere which was left after the abſorption of the oxygen. It is by no means probable that at any rate the addition of a fifth part of azote could have rendered the air ſo unwholeſome; and beſides, we are entirely at a loſs whence to derive ſuch an immenſe quantity; for certainly the quantity of air which ſurrounds us, even for a few miles extent, is ſo great, that any conſiderable alteration in its compoſition could not take place without a very evident cauſe. The probability therefore is, that the experiments did not give an accurate ſtatement of the quantity of oxygen contained in the atmoſphere. Experiments on this ſubject muſt always be uncertain; and of all the modes of trying the qualities of the air, perhaps that with ſulphur and iron filings is moſt liable to variation. It may vary, from the nature of the ſulphur,* from the cleanneſs or the impurity

* If ſulphur be a *ſimple* ſubſtance, as the new chemiſts pretend, there ought never to be any variation in its properties, except what ariſes from mere impurity;

rity of the iron filings, or laſtly from the accuracy of the mixture. It is alſo a misfortune in this caſe, that though a great abſorption proves the exiſtence of a large quantity of oxygen in the atmoſphere, yet a ſmall one does not prove the contrary; for it is more reaſonable to ſuppoſe that we have failed in our experiment, than that the conſtitution of the atmoſphere has changed. Dr. Clarke's experiments therefore cannot prove any thing, until more accurate methods of inveſtigating theſe things be found out.

We muſt now proceed to inveſtigate a third cauſe aſſigned for the production of fever, and that is the putrefaction of animal and vegetable ſubſtances. This hath been very much inſiſted on. Dr. Ruſh aſcribes the fever of 1793 to the exhalations of putrid coffee, but allows alſo the diſtemper to have been contagious, and ſays, that "for ſeveral weeks there were two ſources of infec-"tion, viz. exhalation and contagion. The exhalation "infected at the diſtance of three or four hundred yards, "while the contagion infected only acroſs the ſtreets. "The more narrow the ſtreet, the more certainly the "contagion infected. Few eſcaped it in alleys. After "the 15th of September the atmoſphere of every ſtreet "was loaded with contagion; and there were few citi-"zens in apparent good health, who did not exhibit one "or more of the following marks of it in their bodies: "1. Yellowneſs in the eyes, and ſallow colour on the "ſkin. 2. Preternatural quickneſs in the pulſe. 3. Fre-"quent and copious diſcharges by the ſkin of yellow "ſweats. 4. A ſcanty diſcharge of high-coloured or "turbid urine. 5. A deficiency of appetite, or a pre-"ternatural increaſe of it. 6. Coſtiveneſs. 7. Wake-"fulneſs. 8. Head-Ach. 9. A preternatural dilata-"tion

rity; but the following is a remarkable inſtance to the contrary: Dr. Crawford (brother to the celebrated Adair Crawford) informed me, that for his oil of vitriol works at Liſburn, in Ireland, he had purchaſed *five tons* of ſulphur produced from copper mines in the iſland of Angleſey. The ſulphur looked well, and was not more impure than what he commonly uſed; but, on trial, the produce of acid fell ſo much ſhort of what he had been accuſtomed to receive, that it would not afford the expenſe of manufacturing. An experiment on ſuch a large ſcale could not be erroneous. If ſulphur is a ſimple ſubſtance, the fact is unaccountable: if it is compoſed of phlogiſton and acid, an over proportion of the former will eaſily account for it.

" tion of the pupils. . . . . Many country people who " ſpent but a few hours in the ſtreets in the day, in attend- " ing the markets, caught the diſeaſe, and ſickened and " died after they returned home; and many others, whom " buſineſs compelled to ſpend a day or two in the city " during the prevalence of the fever, but who eſcaped " an attack of it, declared that they were indiſpoſed " during the whole time with languor or head-ach."

Thus, according to our author, the fever of 1793 *began* from putrid effluvia, and *was continued* by contagion. But many attempts have been made to prove that putrid effluvia *alone* both begin and continue it. The limits of this treatiſe would not allow (even were it but beginning) of a particular account of all that has been ſaid upon the ſubject; neither indeed is it needful. A ſingle well atteſted inſtance would decide the matter; but we have already ſeen the difficulty of procuring that inſtance on either ſide. Certain it is, that we have inſtances of the yellow fever ariſing where it is not pretended that there was any conſiderable collection of putrid matters. In the Medical Repoſitory, vol. ii, p. 149, we find an account of the yellow fever appearing " in a coun- " try village, near a freſh river, *on low marſhy ground*, ſeven " miles from Portland, ſo that no ſuſpicion could ariſe " of the diſeaſe being imported. *Several other caſes of* " *yellow fever* occurred *in different parts of the coun-* " *try*." This ſtands on the authority of Dr. Jeremiah Barker of Portland, ſo that there can be no doubt of its authenticity; and though it cannot prove that the yellow fever *may not* ariſe from putrid effluvia, yet it certainly ſhows that it *may* ariſe without them. It does the ſame with marſh effluvia; for though we may, in the caſe of the village, ſuppoſe that the marſhy ground on which it ſtands occaſioned the diſeaſe there, yet what ſhall we aſſign as the cauſe of its being diſperſed in different parts of the country, where there were neither marſhes nor rotten beef? The proofs indeed of animal effluvia being the cauſe of yellow fever are ſo equivocal, that Dr. Davidſon* ſuppoſes putrid *vegatable* matters to be

* Medical Repoſ. vol. i, p. 170.

be more active in this way than the former. For this ſuppoſition he gives as a reaſon, that Dr. Ruſh has obſerved, that butchers, and thoſe who lived in the neighbourhood of ſhambles, ſcavengers, grave diggers, and others of ſimilar employments, eſcaped the yellow fever in Philadelphia. Theſe, the Doctor juſtly obſerves, were more expoſed to what he calls the *gazeous oxyd* of azote, than any other claſs; and he likewiſe takes notice, that ſailors, who during long voyages feed on putreſcent food, which might be ſuppoſed to produce a great quantity of this acid, are thence ſubject to ſcurvy, a diſeaſe not only different from fever, but entirely oppoſite to it. This exemption of people converſant among the dead has been alſo taken notice of by Dr. Mitchill,* who brings as an argument againſt the contagious nature of the diſeaſe, that "ſeven men belonging to the alms-houſe of New "York were employed, during the whole of the ſickly "ſeaſon of 1798, in putting the perſons dead of the "plague (yellow fever) into coffins, and though they "handled in the courſe of their ſervice upwards of *five* "*hundred* corpſes, in different ſtages of putrefaction, and "though they were much incommoded with the peſti-"lential quality of the air in the rooms they entered, and "frequently were obliged to vomit, not one of them was "ſo much indiſpoſed, during the whole ſeaſon, as to "diſcontinue his employment." This is no doubt a very remarkable fact, but in the preſent inſtance it proves too much; for if, from it, we conclude that the diſeaſe is not contagious, we muſt alſo conclude that it cannot be produced by putrid animal ſubſtances. Yet in the very next ſentence Dr. Mitchill aſſures Dr. Currie, "that exhalations from corrupting *beef* and *fiſh* "have excited ſickneſs as malignant, and as deadly, as "any which has occurred." If exhalations from putrefying beef and fiſh have produced this ſickneſs, why did not exhalations from putrefying *human bodies* do the ſame? and if we are aſſured that the latter *did not*, we have as little reaſon to ſuppoſe that the former *did*; unleſs we eſtabliſh a difference between the corrupting fleſh of one animal

* Medical Repoſ., vol. ii, p. 313.

animal and of another, which no experience hath countenanced in the leaſt.

The exemption of thoſe employed in burying the dead, even in the true plague, is obſervable. Dr. Caneſtrinus ſuppoſed it might be owing to the uſe of garlic, which they were wont to bruiſe and rub their hands, face and breaſt with, and likewiſe to chew, before they entered into an infected houſe; but this cannot be ſuppoſed a very powerful antidote. Dr. Ruſh is of opinion that grave diggers eſcaped in Philadelphia by the circumſtance of their digging in the earth; and he ſays alſo that ſcarce an inſtance was heard of thoſe employed in digging cellars being attacked with the diſeaſe. "There "ſeems to be ſomething (ſays he) in the freſh earth, "which attracts, or deſtroys, by mixture, contagion of "every kind. Clothes infected by the ſmall pox are "more certainly purified by being buried under ground "than in any other way. Even poiſons, are rendered "inert by the action of the earth upon them. Dogs "have long ago eſtabliſhed this fact, by ſcratching a "hole in the ground and burying their limbs or noſes "in it, when bitten by poiſonous ſnakes. The practice, "I am told, has been imitated with ſucceſs by the "ſettlers upon new lands in ſeveral parts of the United "States."

This reaſon is very plauſible for the exemption, of ſuch as work in the ground, from contagion; but it cannot do for ſcavengers and butchers, who by the nature of their employment are frequently expoſed to ſteams from the vileſt matters. We may, on the contrary, derive from thence a very ſtrong argument that theſe ſteams are by no means eſſentially connected with contagion. We have already ſeen from Dr. Fordyce (p. 169 of this treatiſe) that contagion or infection is not the object of ſenſe. Dr. Ruſh, though he doth not abſolutely ſay that the contagion of the yellow fever hath no ſmell, yet informs us, that "the ſmell of the "contagion, as emitted from a patient in a clean room, "was like that of the ſmall pox,* but in moſt caſes of "a leſs

* Account of the Bilious Yellow Fever, p. 107.

"a leſs diſagreeable nature. Putrid ſmells in ſick "rooms were the effects of a mixture of the contagion "with ſome filthy matters. In ſmall rooms, crowded "in ſome inſtances with four or five ſick people, there "was an effluvium that produced giddineſs, ſickneſs at "the ſtomach, a weakneſs of the limbs, faintneſs, and, "in ſome caſes, a diarrhœa. The contagion adhered "to *all kinds of clothing*. It was in no inſtance commu- "nicated by paper." From ſo great authority we may certainly conclude that, *according to the beſt obſervation*, there is an *eſſential difference* between the contagion of a diſeaſe and the effluvia of a putrefying carcaſe; and that, though the latter may be the vehicle of the former, and may increaſe its virulence, either by being partly aſſimilated to its nature, or by affording it a proper *nidus* for concentrating itſelf; yet that originally the one is not the other; and, though contagion may bring on a fever without putrid effluvia, yet putrid effluvia cannot do ſo without contagion. With regard to pure contagion, I ſhall here, to the evidences already produced, ſubjoin the teſtimony of Dr. Davidſon, formerly quoted. "I muſt declare* (ſays he) I have ſeen the diſeaſe evi- "dently propagated in this way (by contagion;) but in "many inſtances it could not be traced. I have known "three caſes of the fever brought on by perſons bathing "in the ſea along ſide the veſſel, ſome diſtance from the "ſhore, and neglecting to dry themſelves properly af- "terwards. The ſeminia of the diſeaſe were here pre- "ſent, and, like the electrical jar charged, required "only the approach of a conductor." This ſhows an amazing ſubtilty and diffuſibility in the contagion, ſcarcely indeed credible, if it were not known to be equally ſubtile in other caſes. In the correſpondence between Dr. Haygarth, of Cheſter in England, and Dr. Waterhouſe, profeſſor of medicine at Cambridge near Boſton, the latter informs us, from Dr. Rand, that by burning, in a field near Charleſtown, the bedding, furniture, &c. belonging to a perſon who had been ill of the ſmall pox, the people who lived in the wake of the ſmoke

* Med. Repoſ. vol. i, p. 171.

ſmoke proceeding from it were attacked with the ſmall pox, and the diſeaſe ſpread. This is ſimilar to an obſervation formerly quoted from Huxham; but the following are much more remarkable: "A veſſel arrived at "Charleſtown from Liſbon, laden with ſalt, and lemons "in boxes.* A perſon had the ſmall pox on board, "and the ſmall pox officers would not ſuffer the lemons "to be ſold, without being firſt unpacked and the paper "ſurrounding each lemon taken off. Theſe papers were "kept by themſelves in a ſtorehouſe for ſeveral weeks; "and after this, by order of the overſeers, they were "brought out and burnt; when, of two children playing round the fire, one, named Manning, took the "diſorder, and broke out at the uſual time. . . .

"Dr. Rand was called to a lady, whom he found hot "and feveriſh with a violent pain in her head and back; "but he had no ſuſpicion of the ſmall pox. He bled "her, and a Mrs. Brandon held the veſſel to receive the "blood, ſome of which ſpirted on her hand and arm. "Next day the ſmall pox appeared on the lady who "was bled; and ſhe was of courſe immediately ſeparated "from Mrs. Brandon; notwithſtanding, in twelve or "fourteen days, Mrs. Brandon was ſeized with the "ſmall pox, and died. Several other perſons preſent "were alſo liable to the infection, yet no one took the "diſeaſe but this woman, who ſtood over the blood "while it was running, and received ſome on her arm, "except Mrs. Benjamins, to whom the baſon of blood "was handed over the bed, who alſo took the ſmall pox "from the effluvia of the blood. The ſame phyſician "was called to the child of Manning (who was ſuppoſed "to have taken the ſmall pox from the burning of "lemon-papers as aforeſaid;) he found the child bleeding at the noſe in its mother's lap, who was then in "the ninth month of her pregnancy. The next day "the ſmall pox appeared on the child, and it was of "courſe immediately ſeparated from its mother and all "the family; nevertheleſs, in about fourteen days the "mother was ſeized with the diſorder, and not long "after

* Haygarth's Sketch of a Plan to exterminate Caſual Small Pox, vol. ii, p. 270.

" after delivered of a dead child, which child *had diſtinct* " *eruptions over its whole body.*"

Theſe facts are of the utmoſt importance in determining the nature of contagious diſeaſes. In conjunction with others, they ſhow that ſuch diſeaſes originate in the blood, and from thence are communicated to the reſt of the body. They ſhow alſo, that the contagion is in all caſes truly *ſpecific*, and *immutable*. Thus the contagion of the ſmall pox, whether exiſting in the matter of a puſtule, in the ſmoke of burning clothes or paper, or in the effluvia of blood, is invariably the ſame, and never produces any other diſeaſe. It is the ſame whether applied to the human body, or to that of a brute animal; of which we have a remarkable inſtance in the Medical Repoſitory, vol. i, p. 258. " A peaſant of the " county of Eſſex, in England, ſeeing a great many " children carried off by the natural ſmall pox, was de- " ſirous of inoculating his two boys; one nine, and the " other twelve years old. Not being able to employ a " ſurgeon, he collected the ſcabs of a child then ſick of " the diſeaſe, powdered them, and ſprinkled the powder " upon ſlices of bread and butter. The two ſons ate " them, and gave a bit to the houſe-dog. They had a " mild ſmall pox, and got well without any remarkable " accident. The dog remained ſick for two or three " days, drank a great deal, and refuſed to eat: on the " fourth he had a very decided variolous eruption: on " the ninth the puſtules were full ripe, and dried up and " fell off like thoſe of the two children. An Engliſh " author ſays he has ſeen the ſame epidemic in a flock " of ſheep, the greater part of which were infected, and " communicated it to two cows, one of which died. " The ſypmtoms that manifeſted themſelves in theſe " animals in the courſe of the diſeaſe were in every reſpect " the ſame as in the human ſpecies."

This inſtance, partly quoted in the former part of this treatiſe, likewiſe is a ſtrong proof of the contagion of ſmall pox being firſt communicated to the blood; for, by ſwallowing it along with the aliment, it would, in the common courſe of digeſtion, be abſorbed by the lacte-

als, and enter the blood with the chyle. The experiments with dogs made by M. Deidier, of which an account is given p. 268, ſhow that the contagion of the plague is equally ſpecific with that of the ſmall pox; and we ſee that it acted in all caſes in which it was tried by being mixed with the blood. Being thus firſt mixed with the blood, it is plain that the contagion muſt have paſſed from this fluid to all the other parts of the body; and, if diſeaſed blood is capable of communicating its diſeaſe to all the ſound parts of the body in which it circulates, we muſt own that this ſtrongly corroborates Dr. Waterhouſe's ſuſpicion, "that the blood is capable of producing the infection before the diſeaſe is ſo far advanced as to be apparent on the ſurface." If the diſeaſe originates in the blood, the latter ſhould indeed ſeem more capable of communicating it at firſt than afterwards; becauſe we muſt ſuppoſe that the diſeaſed parts would be thrown off to the ſurface, and ſo paſs off altogether. On this ſubject Dr. Waterhouſe alſo quotes the opinion of Dr. Holyoke of Salem, "who, for his "learning, profeſſional abilities and integrity, is juſtly "eſteemed one of the firſt phyſicians in this country, "and whoſe extenſive practice has afforded him ample "experience in the ſmall pox." He writes to Dr. Waterhouſe, "that, although he has reaſon to believe that "an infected perſon ſeldom gives the diſeaſe till after "the eruption is conſiderably advanced, yet there are "facts which make it probable that it is ſometimes "communicated earlier."

In the ſame letter Dr. Waterhouſe gives other inſtances of the inconceivable ſubtilty of variolous contagion, no leſs remarkable than thoſe already mentioned. One is of Dr. Brattle, who, having viſited patients infected with the ſmall pox, "uſed the common precaution of "covering his clothes with a looſe gown, &c. but neg-"lected his *wig*. In conſequence of this ſmall neglect, "after riding ſix miles on horſeback, he gave the diſeaſe "to a perſon in a room through which he paſſed, where "he did not ſtay to ſit down." Another is, if poſſible, ſtill more remarkable: "David Anthony, eſq. one of "the

" the overſeers of the ſmall pox in Rhode Iſland, after " going into the hoſpital, and uſing the common pre- " cautions, neglected to *ſmoke his wig*. In his way home, " two miles from the hoſpital, he called at the houſe of " his daughter. He did not diſmount, but ſat on his " horſe, and talked to her through an open window; " and, at the common period (by which we uſually un- " derſtand about fourteen days) ſhe took the diſeaſe " and died. Many ſuch inſtances, adds the Doctor, " could I relate, where wigs have given the infection, " after being expoſed to the open air during the paſſage " of ſeveral miles."

From all this it appears how difficult a taſk they undertake who contend for the domeſtic origin of the yellow fever, without contagion. In all caſes they muſt have recourſe to ſomething viſible and obvious to the ſenſes. Thus putrid beef, putrid fiſh, ponds of water, marſhes, &c. are all eaſily ſeen, and we are able to prove their abſence as well as their preſence. But we certainly know that the yellow fever has ariſen where none of thoſe ſuppoſed cauſes have exiſted, as in the Buſbridge Indiaman; and, on the other hand, all the ſuppoſed cauſes have exiſted without the production of any fever. Of this laſt Dr. Chiſholm, in the concluſion of his defence againſt Dr. Smith, gives the following remarkable inſtance:* " During a conſiderable part of the years " 1776 and 1778 my duty led me very much to reſide " in New York; and during my reſidence, particularly " in the ſummer and autumn of 1778, which were re- " markably hot, and inſufferably ſo in the lower ſtreets " of New York, no diſeaſe of a very alarming nature, and " none which aſſumed the form of an epidemic, appeared " among the troops or inhabitants. The ſmell from all " the ſhips, and from thoſe in particular delineated by " Dr. Seaman (who has written a treatiſe on the ſub- " ject) was in the higheſt degree offenſive. The police " at that time was by no means ſtrict: putrid ſubſtan- " ces of every deſcription were accumulated in the ſlips, " and

* Med. Repoſ. vol. ii, p. 291.

"and in many parts of the city unconnected with "wharves, and yet no diſeaſe was the conſequence."

Some particulars above related may perhaps appear, to thoſe who deny the exiſtence of contagion, in rather a ludicrous point of view. It is indeed too common for people to laugh at what they cannot anſwer; but if we conſider the inſtantaneous and inexplicable action of the poiſon of ſerpents, and in how little time they produce a mortal diſorder, or even death itſelf; when we conſider that contagion is only a volatile poiſon, and that it for the moſt part takes up an incomparably longer time to bring on death than the bites of ſome venomous animals; we cannot be ſurpriſed that a quantity of this volatile matter inconceivably leſs than that of animal poiſon ſhould be capable of bringing on the diſorder; for the length of time may be ſuppoſed to make up for the deficiency of quantity. Yet, if we conſider the extreme activity of ſome animal poiſons, the wonder at the ſmall quantity of contagion neceſſary to produce a deleterious effect will in a great meaſure ceaſe. In the former part of this treatiſe it has been obſerved, from Dr. Mead, that the whole quantity of poiſon emitted by a viper, when it bites, does not exceed the bulk of a *good drop*. An ordinary drop from a vial weighs half a grain, ſo that we cannot ſuppoſe a large drop to be more than a whole grain. But there are inſtances in which effects equally deleterious are occaſioned by the bites of animals the whole bulk of which is ſcarcely equivalent to that of the poiſon of the viper. In the northern climates of the Old World, *ſpiders* do not grow to any remarkable bulk, yet the bite of the poiſonous ſpider of Ruſſia is as mortal as that of the rattleſnake.* The effect of the *furia infernalis* of Linnæus is ſtill more to our purpoſe. It is an inſect found in the foreſts of Kemi in Lapland, and likewiſe in Sweden and Ruſſia; and, if we can give credit to Mr. Pennant, in ſome of the Weſtern Iſlands of Scotland. This inſect falls down out of the air, and, if it happens to light upon any uncovered part of the human body, it almoſt inſtantly penetrates down to

* See Medical Annals, vol. iii, p. 409.

to the bone, occaſioning the moſt excruciating pain, and death in a *quarter of an hour*.* Now, ſhould we ſuppoſe the whole body of this inſect to be poiſon, as it is probable that it is not, it is ſo minute, that though the whole were volatilized into contagion, it might be well ſuppoſed to adhere to a *wig*, or even a more diminutive part of the clothing; and, conſidering the virulent effects of even this ſmall quantity of contagion when concentrated, it would eaſily follow by fair calculation, that a very *minute proportion* of even this *ſmall quantity* might bring on a dangerous diſeaſe.

Laſtly, it may be urged on the ſide of contagion that, when a veſſel arrives from a ſickly country, it is no proof that ſhe has not brought a diſeaſe with her, that the people aboard are in health. There is abundance of evidence

* The following account of the poiſonous inſects of Ruſſia, extracted from Dr. Guthrie's letter to Dr. Duncan (Med. Annals, vol, iii, p. 396) may be not unacceptable to the reader: "I have lately ſeen (ſays Dr. Guthrie) a woman "with her hand and arm in a moſt violent ſtate of irritation, from the lodgement of the lumbricus melitenſis, a worm not much thicker than a horſe-"hair, which had entered her thumb whilſt at work in a marſhy ſpot, and "was, when I ſaw her, a day after the accident, on its way up the arm, with "excruciating pain. I muſt own that I ſhould not have known the nature "of the diſeaſe, if a fellow-peaſant had not immediately declared that "it was produced by the dangerous worm; which many of theſe people are "acquainted with to their coſt, as an inhabitant of the ſtagnant pools and "marſhes in that diſtrict, about ſixty verſts to the ſouthweſt of Peterſburgh. "I muſt farther acknowledge, that I was happy to hear the patient was to "be inſtantly tranſported to another village, where a famous operator lived, "well ſkilled in the art of extracting the venomous inſect; as I ſhould certainly have gone very awkwardly to work if I had been obliged to operate: "though the ſimple peaſants perform it with ſucceſs and ſafety, gradually "winding the worm round a quill, till the whole animal be extracted; a work "of much patience and perſeverance. I was very ſorry that duty obliged me "to be in town the ſame evening, a drive of ſixty verſts. It was therefore "impoſſible for me to accompany the patient, though I was very deſirous of "witneſſing this village-operation.

"But Ruſſia is peſtered with a ſtill more dangerous worm; the furia infernalis. It is ſtill ſmaller than the former, not being thicker than a human "hair. This infernal inſect, from its extreme lightneſs, is often carried up "into the air, with the duſt, by whirlwinds; and, if it unfortunately falls on "the uncovered part of a man or beaſt, it enters the fleſh in an inſtant, and "ſoon proves mortal, if a remedy be not quickly applied.

"Our new vice-governor of Peterſburg lately came down from Siberia, "where he was commandant of a fort. He tells me, that in the diſtrict of "Nerchinſk, where he commanded, the peaſants, as well as their cattle, are "often deſtroyed by an inſect falling upon them. To prevent this accident "from proving fatal, the part is inſtanly ſcarified, and rubbed with a mixture of ſnuff and ſal ammoniac.

"This I am convinced muſt be the furia infernalis; more eſpecially as he "aſſured me, that the inſect was ſo very minute, that none of the peaſants "had ever ſeen it when it fell upon them, and that they had no idea of its "nature

dence that very dangerous maladies may be communicated by thoſe who do not labour under the ſame. The priſoners at the Oxford aſſizes were not ſick at the time they communicated a dreadful diſtemper to thoſe around them. Dr. Brattle and Mr. Anthony were in perfect health when they communicated the contagion of the ſmall pox, yet the effect was not leſs fatal. In ſhort, *contagion* being a power certainly known to exiſt, though inviſible and imperceptible, it is impoſſible ever to prove that it is abſent; neither after the contagion of any diſeaſe has once got into a country can we be aſſured that it may not revive. The experience, we may ſay, of the whole world teſtifies that it does adhere particularly to clothing. Dr. Lind thinks it may adhere to the timbers of

"nature and form. But one circumſtance of his, recited, almoſt ſtaggered "my belief; that the carcaſe of an animal killed by this inſect is almoſt as dan- "gerous as the inſect itſelf. This phenomenon I cannot account for in any "other way but by ſuppoſing, as the accident always happens in the hot months "of the year, that a high degree of putridity is produced by the venomous "worm, when the caſe proves fatal.

"I informed the vice-governor of the manner in which the Dalecarlian pea- "ſants in Sweden treat the accident, in order that he might communicate their "mode of cure to his Siberian acquaintance, which is merely applying to the "part affected a piece of ſweet curd. The inſect poſſibly prefers this to fleſh, "and leaves the one for the other. I am, however, much afraid that this ſim- "ple remedy will ſeldom be at hand in Ruſſia, as the peaſants are unacquaint- "ed with the uſe of rennet, but prepare a ſour curd by means of heat, through- "out the whole empire; evidently taking its origin in the Tartar Koumis, "and ſhewing them to be a people of Scythian extraction. They likewiſe "ſeparate butter from milk by heat, inſtead of the churn; a curious circum- "ſtance, probably unknown to you before.

"Theſe two dangerous inſects are, however, not all which threaten the "life of man in this empire: the ſouthern provinces are infeſted with a third, "the bite of which is as mortal as that of the deadly rattleſnake, if the part "be not inſtantly ſcarified, and rubbed with freſh butter. This is a ſpecies "of crab-ſpider, the phalangium acaroides, reſembling the tarantula, but ra- "ther thinner and ſmaller. It however kills and devours that formidable "ſpider in a few minutes, which, when compared with it, is an innocent "animal.

"Your acquaintance, Mrs. Guthrie, lately returned from a tour on account "of health, along the north ſhore of the Black Sea. Among much important "and curious information, ſhe gave me ſome account of the cure employed "for the bite of this mortal ſpider, which finds many lurking-places among "the ruined buildings of the ancient Cherſoneſus Taurica, or Crimea, laid "waſte in the laſt Turkiſh war. It is a curious fact, that animal oil coun- "teracts the venom of the ſpider tribes, as vegetable oils do the venom "of ſerpents. I ſuſpect, however, that either of them would counteract both "poiſons; indeed, I think we have a proof of animal oil acting wonderfully "on ſerpents, in the anecdote related by Bruce, when the deadly ceraſtes, or "viper of the Nile, turned away its head from the oily breaſt of the prime "miniſter of Fenaar, when he careleſsly took it up in his hand, and applied "it to his naked boſom, to ſhew Mr. Bruce how innocent it was to men of his "colour, whoſe very ſkin ſickened the animal, and made it avoid all contact."[a]

of ſhips; and there is the greateſt reaſon to believe that it may alſo adhere to the walls of apartments in houſes. The appearance of fever therefore without any new importation cannot prove that it has not ariſen from contagion. But it is now time to ſtate the evidence on the oppoſite ſide.

In Webſter's Collection we find the domeſtic origin of yellow fever ſupported by Drs. Valentine Seaman, and E. H. Smith of New York; and by Drs. Taylor and Hansford, and Dr. Ramſay of Norfolk. Dr. W. Buel of Sheffield has alſo given an account of a fever, but ſo unlike that of which we treat, that what is ſaid of the one cannot be applicable to the other.

The arguments uſed by Dr. Seaman are, 1. Several perſons were infected, who had taken the utmoſt care to avoid all communication with the ſick, who had not been for ſeveral weeks out of their houſes, or within *eighty* feet of an infected perſon. 2. The nurſes and attendants in ſome places were infected, but in others generally eſcaped. Neither did the diſeaſe ſpread into the country, as was reported; the Doctor having inquired into theſe reports, and found them groundleſs. 3. Dr. Lining ſays in his letter to Dr. Whytt,* "If any perſon from the country received it in town, and ſickened on his return home, the infection ſpread no further, not even to one in the ſame houſe."†

Several other arguments of the ſame negative kind are adduced, which, being not eſſentially different from thoſe already quoted, it is needleſs to detail. The following are rather of a different nature: 4. Some contagions are propagated by contact only, others at a diſtance; but at any rate we may ſuppoſe that contact will propagate contagion more readily and more powerfully than any other mode that can be imagined. Yet multitudes of diſſections have been made, and thoſe who made them are ſtill alive. 5. "Specific and ackowledged contagions all ſeem to ariſe from themſelves only: hence "it

* See p. 387.

† The ſame phyſician, in the very letter quoted by Dr. Seaman, ſays that all the times this fever had appeared in Carolina, the origin of it was evidently traced to ſome veſſel arrived from the Weſt Indies.

" it would be almoſt as hard for me to believe that the " ſiphylis, ſmall pox, or meaſles, could be produced " from any other cauſe than their own proper virus, ob- " tained from perſons affected with the like diſeaſe, as " it would be for me to conceive of the formation of a " plant without its having received its ſeed, or *radical*, " from one of the ſame nature.* Contagions ſeem to " fix in the ſoil of our bodies, and there ſeed, as natu- " rally and regularly as vegetables do on the earth. But " the yellow fever has been produced from *other cauſes* " *than contagion.*† Does it not then admit of a doubt, " whether it *can poſſeſs* a power of propagating itſelf?" 7. Contagions reſpect no perſons, but all of every clime and colour are equally attacked with them; but the yellow fever is known to attack ſome much more readily than others. 8. Contagious diſeaſes generally have a determined time of invaſion after an expoſure to their cauſe: but the advocates for contagion in the yellow fever cannot be confined in this manner. " Their doctrine re- " quires that it (the contagion of yellow fever) be per- " mitted to act at any time between that of the expoſure " and the ſixteenth day; otherwiſe it would not em- " brace caſes enough to give it a currency."‡ 9. " Contagions

* Arguments of this kind involve us in an endleſs diſpute ſimilar to that relative to the *equivocal generation* of plants and animals; that is, the production of plants without a ſeed, and animals without parents. As ſome diſeaſes are confeſſed to ariſe from ſome kind of ſeed, we are puzzled to account for the origin of the *firſt* diſeaſe of that kind. Nevertheleſs, as theſe diſeaſes do exiſt, the difficulty ariſing from a conſideration of their origin is overlooked. In the yellow fever, which is not of ſo long ſtanding, the origin is more diſputed. But it is likewiſe undeniable, that ſome contagious diſtempers (the itch particularly) though capable of being propagated by contagion, may yet ariſe from want of cleanlineſs, and living on particular kinds of food. May not this alſo be the caſe with the yellow fever? And is it not the ſafe and rational way to act as though it might not only be produced at home, but imported from abroad?

† This is the very point in queſtion; but our author, inſtead of enumerating the facts by which his poſition may be ſupported, refers to Dr. Lind, whoſe evidence ſhall be afterwards conſidered.

‡ No greater latitude, or very little more, is required by the advocates for the contagious nature of the yellow fever than Dr. Seaman muſt allow in a diſtemper which he himſelf owns to be contagious. It is well known, on the eaſtern continent at leaſt, that a gonorrhœa will come on at any time between the firſt and *fifteenth* day after the infection is received. Dr. Guthrie ſuppoſes the time intervening between the reception of peſtilential contagion and the appearance of the ſymptoms to be four days; and Dr. Chiſholm thinks that in the Boullam fever it is ſomewhat ſhort of two days: but it is plain that much muſt depend on the quantity of contagion, and the prediſpoſition of the body to receive it.

" tagions act more or leſs at all places and ſeaſons, ſim-
" ply of themſelves, without the aid of any particular
" circumſtance of air or climate; but the ſupporters of
" the yellow fever being contagious are obliged, *by the*
" *force of the foregoing obſervations*, to acknowledge their
" *imaginary fondling* to be but a *half-formed monſter*, and
" perfectly inactive without being aſſiſted by the con-
" currence of a prediſpoſing conſtitution of the air.
" (Ruſh on yellow fever.) This fever exiſts only in
" warm weather: hence its cauſe in this city (New
" York) was perfectly extinguiſhed by the froſty nights
" in the 10th month. It is confined moſtly to low ſitua-
" tions in thick-ſettled places; otherwiſe our almshouſe
" and the ſurrounding country would have ſadly experi-
" enced its deleterious effects."

This argument merits a particular conſideration, as involving a queſtion of very great importance, namely, concerning the conſtitution of the atmoſphere, which we have had occaſion formerly to ſpeak of, and which is by ſome thought to be ſufficient of itſelf to produce epidemics, without the intervention of any other cauſe. This conſtitution of the atmoſphere is, it is true, ſomething *unknown*; and, when people appeal to it, it is only in other words owning their ignorance; but the neceſſity of recurring to ſome cauſe imperceptible by our ſenſes has in all ages been obvious. So much indeed has been ſaid in this treatiſe on the cauſes of plague (which may apply alſo to yellow fever)* that more would be ſuperfluous, even if our limits would admit of it. The dilemma (and it is equally inſoluble let us ſay what we will) ſtands thus: If the yellow fever is produced by the effluvia of marſhes, by putrid ſteams, or by any thing elſe, how comes it to paſs that it has been ſo frequent in the United States ſince the year 1792 in compariſon of what it was for 30 years before? Have the American cities all at once become ſinks of filth and naſtineſs? Have the ſeaſons been changed, or have the inhabitants given themſelves up at once to ſwiniſh intemperance and gluttony,

* See p. 166, & ſeq.

gluttony, devouring, like ſavages, their meat half-rotten, half-roaſted or half-boiled? From ſome declamatory publications indeed one might be apt to think that the authors certainly meant to bring ſuch accuſations againſt them. But it undoubtedly will be found an hard matter to prove that the general cleanlineſs of the country is inferior to what it was, or that the people are leſs virtuous than they were before. Beſides, has not the vigilance of the magiſtrate, ever ſince 1793, been exerted to the utmoſt to procure a removal of thoſe nuiſances from which the diſeaſe might be ſuppoſed to ariſe? Yet their efforts have not availed; for it is confeſſed that the attack in 1798 was the moſt ſevere ever experienced. If cold could have exterminated the diſeaſe, certainly the three laſt winters have been abundantly ſufficient to do ſo; yet it is certain that caſes of the fever did appear in the end of December laſt, when the cold muſt certainly have been deemed ſufficiently intenſe to put a ſtop to putrefaction of every kind. No wonder then that people, unable to ſee the cauſes of theſe things, ſhould have recourſe to ſomething inviſible, which they called the *conſtitution of the atmoſphere*. On this ſubject Dr. Haygarth of Cheſter makes the following objections to the commonly received opinions concerning epidemic conſtitutions of the atmoſphere:*

"1. Dr. Odier of Geneva, in a letter to Dr. Hay-
"garth, writes thus: 'I believe it would not be difficult
"to prove that the ſtate of the atmoſphere is in no re-
"ſpect the cauſe (of the regular epidemics of that city;)
"for the villages and towns which ſurround it do not
"experience the ſame epidemic all years as Geneva, al-
"though they are ſituated under the ſame heavens, and
"expoſed to the ſame viciſſitudes of atmoſphere.' 2. Sy-
"denham conjectures that ſome effluvia, iſſuing from
"the bowels of the earth, produce epidemics. Were
"this true, it might advance one ſtep towards a ſolution
"of the difficulty by diſcovering a local difference in the
"atmoſphere. But it has never yet been pretended that
"any ſuch vapour was perceived. Yet every part of
"the

* Sketch of a Plan to exterminate Caſual Small Pox.

" the earth muſt be capable of furniſhing it; as no por-
" tion of the whole habitable globe has been diſcovered
" where the air could not propagate the ſmall pox. . . .
" 3. Hence we may ſafely conclude, that the ſlight varia-
" tions of the ſame climate, and the ſame ſeaſon, muſt
" be altogether inſignificant and nugatory. What im-
" portant difference of atmoſphere can be ſuppoſed to
" exiſt for weeks or months together in two neighbour-
" ing villages, or in the adjacent ſtreets of the ſame
" town? This remark is plainly applicable to the pro-
" pagation of the plague and other infectious diſtempers.
" Yet the lateſt and moſt reſpectable authors continue
" to be miſled by this groundleſs hypotheſis."

Objections of this kind do not ſolve the difficulty. The exceſſive diſparity of ſeaſons with reſpect to the ſpreading of epidemic diſeaſes, the long ceſſation of them at ſome times, and their ſudden revival, as if with redoubled fury, at others, indicate the operation of ſome cauſe inviſible to us; but whether that cauſe reſides in the earth or in the air, cannot eaſily be known. As contagious matter ſeems to operate by being received with the air into the lungs, it would ſeem rather probable that the ultimate cauſe of epidemics reſides alſo in the air. Dr. Haygarth complains that the *vapour* ariſing from the earth, ſuppoſed to produce epidemics, ſhould be inviſible; but the contagion of the ſmall pox, or of any other infectious diſorder, is equally ſo. It muſt, he ſays, be diffuſed all over the earth. The electric fluid is ſo; it iſſues from the earth in every part of its ſurface, as is demonſtrated by the common experiments of electric machines; and there are the ſtrongeſt reaſons to believe that it iſſues at ſome times and in ſome places in much greater abundance than others. But enough has been ſaid on this ſubject; we muſt now conſider matters a little more obvious.

Though it is not eaſily ſeen in what manner the proportion of the ingredients which compoſe the atmoſphere can be changed, and we are unable to diſcover the operation of the more ſubtile fluid contained in it, yet we are certain that its conſtitution muſt be different in different

ferent parts of the world. Iſlands, from their being ſurrounded on all ſides by the ſea, muſt of conſequence have an atmoſphere conſiderably different from that of the internal parts of continents, where the air always paſſes over large tracts of land. Hence the continent of America, being ſituated between the two vaſt oceans called the *Atlantic* and *Pacific*, muſt poſſeſs a conſtitution of atmoſphere conſiderably different from that of the Eaſtern. Of conſequence, the diſeaſes of Europe and Aſia, when tranſplanted to America, or to the American iſlands, will probably, ſooner or later, aſſume a type different from that which they had in their own country. Dr. Waterhouſe has taken notice of this in his letter to Dr. Haygarth, and thinks that it may hold good even in the ſmall pox. "May not the ſmall pox "(ſays he) operate differently in the two countries? It "has certainly had a different appearance, and required a "ſomewhat different treatment, almoſt every time it has "come among us. That the difference in the virulency "of the ſmall pox, obſerved at different periods, when "epidemic here, may be attributed to a peculiar con-"ſtitution of the atmoſphere, no one ſeems to doubt; "and why may not the difference, ſo reaſonably to be "expected between the atmoſphere of your iſland and "this continent, allow us to ſuppoſe that there is ſome "difference in the facility of receiving the infection?" This is alſo an important conſideration, and may throw ſome light on the cauſe, as well as the mode of prevention, of this diſeaſe.

Laſtly, Dr. Seaman attempts to diſprove the authenticity of ſome caſes which have been brought as poſitive proofs of the diſeaſe having been received by infection. Theſe belong not to us to conſider; it being impoſſible, by reaſon of the inviſible nature of contagion, to determine from a ſimple conſideration of any patient's caſe whether it was infectious or not. Dr. Fordyce has laid down the proper rule for judging in ſuch caſes.* One only of the inſtances brought by Dr. Seaman therefore we ſhall mention, and that, not becauſe it proves any thing,

* See p. 169.

thing, but on account of its ſingularity. "Daniel Phœ-
"nix, city-treaſurer of New York, is ſuppoſed without
"doubt to have taken his complaints from contagion:
"the corporation, ſome time paſt, having iſſued into cir-
"culation, for the accommodation of the inhabitants,
"a great number of paper penny bills, it has been con-
"cluded that he muſt have received contagion through
"the medium of ſome bundles of theſe bills, which he
"opened, that had been nearly worn out, to be exchang-
"ed, and which he opened and examined to aſcertain
"their amount ſome days after he had received them."
The Doctor allows that he might have been infected by the bills, but aſcribes it to putrid effluvia.*

Dr. Smith, in his letters to Dr. Buel, inſiſts much on the vitiated ſtate of the atmoſphere, and is at ſome pains to deſcribe the perſons who were moſt ſubject to it. Theſe, in 1795, were for the moſt part *foreigners*; under which denomination the Doctor comprehends thoſe who came from other ſtates, from the Weſt Indies, and from Europe, or who had not been many months or years ſettled in the city. The number of citizens who ſuffered he does not ſuppoſe to have exceeded one in ſeven; but he remarks, that, both among foreigners and citizens, the ſeverity of the diſeaſe fell chiefly on the poor. This mixture of different nations he accounts, and with great probability, one of the cauſes of the diſtemper.

* Dr. Seaman, having at laſt, as he thinks, completely overthrown his adverſaries, and ranked himſelf with the *more conſiderate* and *reaſonable* part of the community, likens thoſe who differ from him to ſuch as believe in the *power of imagination* to mark the child in the womb; and which he is of opinion that the women of America would not diſbelieve, though all the phyſicians on the continent were to unite in perſuading them to the contrary. On this ſubject the writer of this treatiſe is happy at having it in his power to declare himſelf of the ſame opinion with the ladies, and to offer, in ſupport of their opinion and his, the following fact. A pregnant woman, having been employed in dyeing ſome cotton yarn, and rinſed it, after it had got the colour, in cold water, threw it, while wet and cold, about her neck. It touched the ſkin on the back part of the neck, and part of her arm. The woman ſtarted, ſhivered, and inſtantly ſaid that her child would be *marked*. It happened exactly according to her prediction. The back part of the neck, and correſponding part of the arm to that which the cotton touched, being covered with purple ſpots in the child, exactly ſimilar to what might have been made by drops of the purple liquid in which the yarn was dyed falling upon the ſkin. Of this fact I am as certain as of my own exiſtence; having been preſent when the cotton was dyed, having heard the woman call out as above related, and ſeen the child after it was born, and particularly inſpected the marks.

temper. In confirmation of it he quotes Dr. Blane, on the diſeaſes of ſeamen, remarking, "that it ſometimes "happens that a ſhip, with a long-eſtabliſhed crew, ſhall "be very *healthy*; yet if ſtrangers are introduced among "them, who are alſo *healthy*, ſickneſs will be mutually "produced." The ſame obſervation is made by Dr. Ruſh, who, beſides a general reference to the hiſtory of diſeaſes, adds the following remarkable fact: "While "the American army at Cambridge, in the year 1775, "conſiſted only of New England-men, whoſe habits "and manners were the ſame, there was ſcarcely any "ſickneſs among them. It was not till the troops of the "eaſtern, ſouthern and middle ſtates met at New York "and Ticonderoga, in the year 1776, that the typhus "became univerſal, and ſpread with ſuch peculiar mor-"tality in the armies of the United States."

This confirms the obſervation made in the former part of this treatiſe, when ſpeaking of the Engliſh embaſſy to China. It may likewiſe with probability be aſſigned as one reaſon why large manufactories are generally ſo unhealthy. In them there always is a collection of people from many different and diſtant parts; and what holds good on a large ſcale muſt alſo do ſo on a ſmaller one. But this does not diſprove the doctrine of contagion, but rather confirms it; for, if the diſcordant effluvia riſing from healthy bodies of different *conſtitutions* can *generate* a diſeaſe, much more may we ſuppoſe the effluvia from ſick perſons capable of continuing and propagating it.

Now, let us conſider the account, imperfect as it is, which we have been able to collect concerning the appearance of the yellow fever on the Weſtern Continent. We have ſeen (p. 377, n.) that, at the time the plague was in England, five of the Americans were tranſported to that country; two of whom, after ſtaying ſome time in England, were ſent back, with other ſtrangers, to America. This firſt colony having failed, another was ſent; the Indians went to war among themſelves, and the yellow fever is ſuppoſed to have made its appearance. Here a ſuſpicion naturally ariſes, that a ſlight peſtilential

peſtilential taint had been imported by ſome of theſe ſtrangers, and that what would have been the *true plague* in Europe or Aſia, by reaſon of the peculiar conſtitution of the atmoſphere in the New World, there became the *yellow fever*. The ſame may be ſaid of the original importation of it into Martinico. Sauvages expreſsly ſays it was the *plague* which was imported. Moſeley and others deny that any ſuch diſeaſe as the yellow fever exiſts in Siam; and indeed it ſeems at any rate to be a new diſeaſe. It ſeems *poſſible* that diſeaſes may change their nature; and Dr. Ferriar has given a diſſertation on the converſion of diſeaſes. As therefore the true plague never made its appearance in America or the Weſt Indies, it ſeems not unreaſonable to ſuppoſe that theſe countries are incapable of receiving it, but that the peſtilential poiſon, when tranſported to the Weſtern Continent, may aſſume a different, and in many reſpects an oppoſite, nature; the two diſeaſes being thus like the oppoſite poles of a magnet, ſcarce agreeing in any thing but the common work of deſtruction.

It is needleſs to ſpend time in attempting to inveſtigate the cauſe of this diſeaſe appearing at different periods. That of 1793 has been the moſt remarkable and the moſt deſtructive; the diſeaſe having never ſince that time ceaſed its ravages. Previous to its appearance at Philadelphia that year, Dr. Ruſh obſerves, that, "during the latter part of July, and the beginning of Auguſt, a number of the diſtreſſed inhabitants of St. Domingo, who had eſcaped the deſtruction of fire and ſword, arrived in the city. Soon after their arrival the influenza made its appearance, and ſpread rapidly among the citizens." The yellow fever quickly followed; for on the 5th of Auguſt the Doctor mentions his being called to his firſt patient. To the ſame purpoſe we are informed by Dr. Clarke that "the fever made its appearance in Dominica about the 15th of June, 1793, a few days after the arrival of a great number of French emigrants. They were not ſick, and the fever had not made its appearance in Martinique when they left it. From the 1ſt of July to the 1ſt of October it

was

" was computed that eight hundred emigrants, including " their ſervants and ſlaves, were cut off by this fever; " and about two hundred Engliſh, including new com- " ers, ſailors, ſoldiers and negroes, all fell victims to it " in the ſame ſpace of time. Few new comers eſcaped " an attack, and few recovered. It ſpared neither age " nor ſex among the Europeans and emigrants; and not " only the people of colour from the other iſlands, but the " new negroes who had been lately imported, were all " attacked. Such as had been long on the iſland " eſcaped."*

Theſe facts ſeem to point out one of the cauſes, and very probably a principal cauſe, of this dreadful diſtemper. They ſhow very evidently that there is a connexion between war and diſeaſes. It has formerly been attempted to point out a natural connexion between the horrid practices of men, on theſe occaſions, and the production of diſeaſe. Theſe inveſtigations, however chimerical they may be reckoned, are yet ſupported by many facts, which undoubtedly prove that mankind cannot always maltreat and torment one another with impunity. The affair of the Black aſſizes, and Old Bailey ſeſſion, in 1750, ſhows, that by confinement and bad uſage the human body, without being apparently deprived even of health, may become poiſonous to thoſe around it, and produce dreadful diſeaſes. In like manner the inhabitants of St. Domingo, having been put to the moſt dreadful diſtreſs, became properly fitted for ſpreading deſtruction whereever they went.† It is even probable that, in proportion to the degree of diſtreſs ſuffered by theſe people, the diſeaſe communicated by them will be malignant; nay, that new diſeaſes may ſpring up, which cannot be treated with ſucceſs by any method

* Medical Review, vol. iv.

† Dr. Moſeley who has written at ſome length on the interruption given to military operations by diſeaſes, gives an account of general Dalling's expedition in 1780, where the Engliſh troops, confined in the caſtle of St. Juan, in an unhealthy ſituation on the river Niearagua, were cut off by diſeaſes; but theſe were fluxes and intermittents. He doth not mention the yellow fever among them. He tells us indeed that the troops under general Garth brought the jail fever along with them, and that thoſe who returned to Jamaica were haraſſed with obſtinate intermittents, with diarrhœa, dyſentery, or painful enlargements of the liver and ſpleen.

method yet known to phyſicians. With regard to the diſeaſe in queſtion, it ſeems plainly to have from ſome cauſe or other received an additional malignity. Dr. Chiſholm ſays that what he calls the Boullam fever was ſuppoſed in Grenada to have been the common yellow fever of the Weſt Indies engrafted on the jail fever. Dr. Lind, Dr. Jackſon, and even Dr. Chiſholm himſelf, agree that the former is not infectious: but from what has been already ſaid the evidence ſeems to prevail in favour of the opinion that the latter is ſo. Should we then allow that two kinds of this fever might exiſt at the ſame time, in one city, the difficulty would be at once removed. But this has been reckoned by many, particularly by Dr. Ruſh, as totally inadmiſſible; and indeed it is a maxim conſonant to general experience, that two epidemics cannot exiſt in one place at the ſame time, or that two diſeaſes can ſcarcely exiſt at once in the human body. This however muſt be underſtood, principally at leaſt, of acute diſeaſes, or ſuch as affect the whole ſyſtem; for if any diſeaſe of a particular part ſhall take place, it does not ſeem impoſſible that a fever may be ſuperadded to ſuch local diſeaſe. The following conſiderations may perhaps throw ſome light on the ſubject:

It appears from the experiments of Dr. Adair Crawford, that, when animals are immerſed in hot water, the blood drawn from a vein is of a florid red colour. In ſummer it is likewiſe obſerved to be of a more florid colour than in winter. If heat thus gives a more bright red to the blood, it undoubtedly alſo makes it more fluid, and in proportion to its fluidity it will likewiſe become acrimonious; though this acrimony is not neceſſarily connected with a florid colour, as the blood of the arteries is not more ſo than that in the veins. In the yellow fever, however, the blood ſometimes, towards the end of the diſeaſe, becomes endowed with extreme acrimony. Dr. Smith, in one of his letters to Dr. Buel, obſerves, that "blood drawn in the fever of 1795 was "remarkably *wanting* in floridity; eſpecially what was "evacuated towards the cloſe of the diſeaſe, whether by "art, or ſpontaneous effuſion. In one inſtance it ſeemed

" endowed with a cauſtic quality, and affected a lancet " ſo as to leave a permanent diſcolouration and inequality " on its ſurface." He obſerves alſo, nay, conſiders it as *demonſtrated*, that the yellow fever *is not* a diſeaſe of vaſcular debility, and he ſays that it is attended with an aſtoniſhing *fluidity*, or, as it is called, *diſſolution* of the blood. Every one therefore who comes from a cold to a warm climate muſt in ſome degree or other have his blood liquefied, and in a certain proportion rendered more acrimonious than before. This acrimony may be undoubtedly augmented by certain cauſes, and by none more probably than immoderate drinking of ſpiritous liquors. Every one therefore who comes from a cold country to a warm one, eſpecially where the air is alſo moiſt, may conſider himſelf as already diſeaſed, at leaſt in compariſon with what he was when at home. For the blood is now expoſed to a greater degree of heat, and conſequently is about to abſorb, or rather may be conſidered as in the act of abſorbing, more, and conſequently of changing from a thicker to a thinner or more fluid ſtate; the latter being the natural ſituation of the blood in warm countries. Dr. Ruſh, in his inquiry into the proximate cauſe of fever, has accounted for the diſſolved appearance of the blood in malignant fevers to a tendency in the blood-veſſels to paralytic affection. He ſays that " it (the diſſolution of the blood) " begins in the veins, in which muſcular action is more " feeble than in the arteries. This has been proved by " Dr. Mitchill in his account of the yellow fever in Vir- " ginia in 1741. He found the blood to be diſſolved " when drawn from the veins, which, when drawn from " the arteries of the ſame perſons, exhibited no marks " of diſſolution." This, as the Doctor obſerves, " is a fact of great importance;" only we muſt remember, that, in every thing relative to the human body, when we find two phenomena conſtantly accompanying each other, it is extremely difficult for us to determine which is cauſe or effect. Inſtances of this often occur; and in the preſent caſe the dilemma is as great as any other. Though, from the teſtimony of Dr. Mitchill, we cannot doubt

" that

that in yellow fever the diſſolution begins in the veins; and though it is likewiſe extremely probable that this diſſolution is attended with a paralytic tendency, we cannot know whether the diſſolution is the cauſe of the paralytic tendency, or the paralytic tendency the cauſe of the diſſolution. The point, however, is of no importance. We ſee that in warm climates the blood of a perſon newly arrived has a natural tendency to diſſolution, and of courſe the veins to the paralytic affection juſt mentioned. The liver therefore, which is ſupplied with blood by a large vein branched out like an artery, and terminating in other veins to carry back the blood from the former,* muſt be much more affected than any other part of the body; and this indeed ſeems a very probable reaſon why all thoſe who come to warm countries become much more inclined to bilious complaints, which denote an affection of the liver, than they were before. This hepatic affection may very probably be greatly augmented, in new comers, by various cauſes. One of theſe is hard labour under a greater heat than they have been accuſtomed to; a ſecond, that in the Weſt India iſlands they have not acceſs to that plentiful ſupply of fermented liquor, abounding in fixed air, which they had at home. This, though not generally taken notice of, is far from being a matter of little conſequence; for, though emigrants from Britain and Ireland have been for the moſt part accuſtomed to drink ſpiritous liquors, yet fermented malt liquors certainly conſtitute the principal part of their drink. The total want of theſe, and the ſubſtitution of ardent ſpirit and water, muſt certainly be detrimental, even though they keep within the bounds of moderation, and much more if they do not. Dr. Moſeley relates,† from Dr. Irving, that, in a bad kind of intermittent which broke out among the troops in ſervice on the Spaniſh main in 1780, "nothing was ſo grateful as *London bottled porter*. Wine was neither ſo much deſired "by the ſick, nor ſo ſerviceable in corroborating and "keeping up the powers of the ſtomach; which, like "the

* See p. 94. † Treatiſe on Tropical Diſeaſes, p. 173.

" the reſt of the body, was ſoon reduced, from the " ſlighteſt indiſpoſition, to the loweſt ſtate of debility." A third cauſe is no doubt their frequently drinking too freely of ſpiritous liquors, perhaps not of the beſt quality; and which, as they are neither conjoined with the fixed air nor with the mucilage which as it were inviſcate and blunt their force in malt liquors, cannot fail of exerting their deleterious properties in a very remarkable manner.

From theſe and other cauſes there muſt neceſſarily ariſe a prediſpoſition to hepatic diſeaſes; and this prediſpoſition cannot be removed until the blood has aſſumed the ſtate of fluidity proper to the climate in which they are, and the body has acquieſced in the change. They are then ſaid to be *ſeaſoned* to the climate; and it is ſeldom that this ſeaſoning takes place without a diſeaſe; indeed ſo ſeldom, that the firſt illneſs which happens to ſeize them after their arrival is called the *ſeaſoning*. Dr. Trotter indeed gives a very different account of this ſeaſoning. He conſiders thoſe who come from a cold to a warm climate as having a redundancy both of excitement and excitability, and ſays that " to *wear* " *out this accumulated excitability* by ſlow and gentle gra- " dations is the grand explanation of the word *ſeaſoning:* " it is the *ſecret* which conſtitutes the only difference be- " tween the inhabitants of England and Jamaica. The " yellow fever of the Weſt Indies therefore, as it appears " in the body of a raw European, is a diſeaſe of the " *utmoſt excitement*, in a conſtitution of *accumulated excita-* " *bility*; where a tenſe fibre and denſe blood permit it " to be carried to the higheſt pitch of inflammatory " tendency; which, from the nature of the animal eco- " nomy, ſpeedily exhauſts the powers of life, even in a " day or two, inducing putrefaction and death."

Explanations of this kind may edify thoſe who underſtand them; but, though we ſhould declaim ever ſo much about excitement and excitability, it is plain, that, in every one who comes from a cold country to a warm one, the liver is affected in a manner that the reſt of the body is not. In ſome conſtitutions, or from exciting

citing cauſes in any conſtitution, this affection of the liver may be augmented, and no doubt at laſt produce a bilious fever, which may be varied in a number of ways, according to the nature or the energy of theſe cauſes. The pure bilious fever, being of itſelf properly a local affection, may not be contagious; and we find it generally agreed among phyſicians that the common yellow fever of the Weſt Indies is not infectious. Nevertheleſs, it ſeems by no means improbable that from certain circumſtances contagion may be joined with it, and it may then ſpread and infect, even as the moſt deadly plague. Dr. Crawford relates, that, in the year 1770, a new kind of fever broke out in the Middleſex Indiaman, of which many died. It is not ſaid that the diſeaſe was contagious; but, on opening the bodies of ſome who died, the liver was found enlarged, and of a more florid colour than it ought to be. It cannot be deemed impoſſible that contagion, even that of the true plague, might be mixed with this fever, which (as the affection of the liver was probably the original diſeaſe, might have been accounted little other than ſymptomatic) would then have aſſumed very malignant ſymptoms.

We might now ſay that we have got to the end of our ſubject. Having ſo amply diſcuſſed the queſtion concerning contagion, and ſtated the principal part of the evidence againſt it, it ſeems proper to conclude the ſection with a ſhort hiſtory of the diſeaſe in the malignant form it has aſſumed in the United States ſince the year 1792. Still, however, it is neceſſary to ſay ſomething further of one or two of the cauſes which have been commonly aſſigned as neceſſarily inducing this diſeaſe. Theſe are, 1. Extreme heat, and, 2. Marſh effluvia. The effect of the former has already been partly conſidered as a prediſponent cauſe of yellow fever: but it doth not appear that merely from this cauſe the diſeaſe has ever been produced. It hath indeed been obſerved by very intelligent phyſicians, that in Virginia the remitting fever has often been brought on by mere expoſure to the ſun. Dr. Oliver of Salem hath obligingly

gingly informed me, that he has "in more than one inſtance been ſeized with that diſeaſe after riding in the ſun;" and that an eminent practitioner in Virginia had informed him that he had alſo more than once ſuffered in the ſame way. Drs. Taylor and Hansforth obſerve, that, when the remitting fever proves mortal, it is generally attended by ſickneſs and perpetual vomiting; which is the termination of the yellow fever. The above evidence is deciſive with regard to heat being able to produce a remittent, but cannot exactly apply to the yellow fever, which has no remiſſions. Two ſailors indeed, lately brought from a coaſting veſſel to the Salem hoſpital, were attacked with violent ſymptoms of yellow fever without having been, as is ſaid, expoſed to any infection. But evidence of this kind cannot be ſuppoſed to be incontrovertible. We have already ſeen the difficulty of aſcertaining *facts*; and if it is difficult to prove that contagion *has* been received, it muſt be ſtill more ſo to prove that it *has not*. The perſons in queſtion had both worked during a very hot day in a veſſel's hold, they afterwards ſat expoſed in the damp air of the evening on the deck until 10 o'clock at night, and then ſlept in the veſſel's cabin with the windows open. One of them was ſeized in the night with a moſt violent pain, and the other on the morning ſucceeding. It is ſaid that about 11 months ſince this veſſel was at New York, and that a perſon on board had the yellow fever; it is alſo alleged that the veſſel was not purified, and that the beds remained on board. It has therefore been by ſome conjectured that the diſeaſe might have been derived from this ſource.

Dr. Ramſay, in a letter to Dr. Currie of Philadelphia, cenſures Dr. Lining for ſaying that the yellow fever was imported into South Carolina. "The greater yellowneſs of the ſkin (ſays he) appears to be the only circumſtance in which it differs from the bilous remittent fevers of hot climates, or very hot ſeaſons of any climate." Our author alſo cenſures Dr. Lind of Haſlar,* who, he ſays,

* If phyſicians cenſure one another at this rate, how is it to be determined who gives a true ſtate of the matter?

ſays, has been miſled by the *miſrepreſentations* of Dr. Warren and others. He alſo gives into the opinion that contagion acts only by contact, or at a very little diſtance; but this ſubject we cannot enter farther into at preſent. If we can believe Dr. Moſeley, the ſure criterion by which the yellow fever may be diſtinguiſhed from any other is, that the former hath no remiſſions.* If ſolitary caſes of it appear in Carolina and the ſouthern States every year, this will not prove that the diſeaſe was generated in the country, any more than that the plague was generated in London, becauſe it appeared there for many years ſucceſſively.

But, if the heat of the ſun cannot produce the true yellow fever, it can kill ſuddenly without any fever whatever. This is ſaid by Dr. Moſeley to be leſs frequent in the Weſt India iſlands than on the eaſtern and weſtern continents. He ſays that he has felt as great inconvenience from the ſun's heat at Venice, Naples, Rome, Montpelier, and in Virginia, as in the Weſt Indies;† but he concludes that the *tranſitions* from heat to cold are more pernicious to the human body than any continued heat, however violent.

With regard to the effluvia of marſhes, it is not denied that they produce fevers, but thoſe fevers are of the intermittent or remittent kind. Dr. Smith indeed, in the firſt volume of the Medical Repoſitory, labours to prove that the plague deſcribed by Thucydides was not eſſentially

* This poſition of Dr. Moſeley is not univerſally received. The meaning of the word *remiſſion* certainly is a temporary abatement, and implies a recurrence, of the ſame ſymptoms which originally took place. Dr. Moſeley deſcribes the yellow fever as beginning with one kind of ſymptoms which ſuddenly ceaſe and are ſucceeded after a certain interval by others of a quite different kind; and he claims the diſcovery as his own. If he be right in this deſcription, the yellow fever is certainly not a remittent; if otherwiſe, it muſt be difficult to eſtabliſh any true diſtinction between them.

† At Straſburg, in Germany, our author ſays that he ſaw a man who had been an idiot for more than a year from a ſtroke of the ſun. The 8th of July 1707 was ſo hot in England that many people died at their work, and many horſes and oxen were killed by the ſun's rays. In 1743, *eleven thouſand* people periſhed from the 14th to the 25th of July in the ſtreets of Pekin in China. On the 30th of July, 1705, the heat at Montpelier was ſo great, that eggs were roaſted by it. Chalmers, in his account of the weather and diſeaſes of South Carolina, ſays, that he has ſeen a beef-ſteak, laid on a cannon for twenty minutes, deprived of its juices, and overdone by the exceſſive force of the ſun's rays.

eſſentially different from the fevers which ſometimes prevail in North America, and that it had its origin from marſh effluvia and the ravages of war. That this diſtemper was not the plague deſcribed by Ruſſel we may gather from a ſingle circumſtance: for Ruſſel tells us that *ſneezing* never occurred in the plague deſcribed by him,* while Thucydides ſays that it was one of the common ſymptoms of his. Neither does the deſcription of it (Appendix No. 1) at all agree with any of the accounts of the yellow fever we have. The climate of Attica no doubt was variable, and may in this reſpect reſemble that of North America; but ſo is the climate of China, yet no ſuch diſeaſes are there produced. The Doctor concludes that the diſtemper originated from *local* cauſes; but the difficulty we find in proving ſuch origin of diſeaſes in our own days, and in the country where we reſide, muſt certainly make us look upon the proofs which can be brought for the local origin of a diſeaſe which happened two thouſand years ago, and in a diſtant country, as very equivocal. The following extract from the Paris Medical Memoirs may be adduced as a proof of the intrinſic power of marſh mud to produce fevers. It is contained in a paper written by Dr. Perkins of Boſton. "A farmer was in the practice of ſpreading, upon about "thirty acres of land, ſome new marſh mud, from Octo-"ber to April annually, to increaſe the fertility of the "ſoil. In the ſummer of the third year, thoſe inhabi-"tants who lived to the northward and eaſtward of the "place were attacked with a very malignant fever, which "generally proved mortal. What is a proof that the "marſh mud was the cauſe of the diſeaſe is, its extent, "which was not more than a mile and an half from the "farmer's houſe, in the direction of the ſoutherly and "weſterly winds. Perhaps had this marſh mud been "waſhed by plentiful rains, the danger would have "been leſs. Something like it happened to the inhabi-"tants of the marſhes *in Eaſt Sudbury*, (les marais ſitues "a l'eſt dans le Sudberg) where the paſſage for the wa-"ters was too deep, and too confined. In regular ſea-"ſons

* See the Table.

" ſons they were attacked with ſimple intermittent fevers; " but, after wet ſeaſons, there prevailed among them ma- " lignant fevers, and very obſtinate remittents. Since " the marſhes have been drained, the inhabitants are no " longer ſubject to fevers, and are as healthy as thoſe of " others places. We know that there are local epi- " demics, which are produced by a low, wet, and rich " ſoil; ſuch are, probably, thoſe which prevail in the " lower part of New York, which, according to the in- " formations obtained by Mr. Perkins, is more unheal- " thy towards the end of the ſummer than the other part " of the city, and whoſe inhabitants are ſubject to diſeaſes " of a putrid *caractere*.

" It appears, from ſeveral obſervations, that the moſt " mortal epidemic fevers are not commonly produced " by cauſes operating immediately: the cauſe often ex- " iſting ſeveral months before the diſeaſe even appears."

The other arguments uſed by Dr. Smith in his letters to Dr. Buel proceed upon the ſtate of the city, the mode of living, &c. and the condition of moſt of the emigrants, their bad accommodations, and eſpecially their abuſe of ſpiritous liquors. The neglect of bathing is alſo much complained of, and a compariſon made with the conduct of the French in this and other reſpects, greatly to the advantage of the latter.

Drs. Taylor and Hansforth conſider the diſeaſe which took place in Norfolk in Virginia as only an higher degree of the common remittent fever which uſually prevails, and aſcribe it to the long-continued heat, putreſcence, &c. Some French ſhips were ſaid to have brought the diſeaſe, but theſe arrived " ſo long before the diſeaſe appeared, that (the Doctors think) it would be abſurd to ſuppoſe even a poſſibility of its being derived from them." Mr. Webſter adds, in a note, that the French corvettes, three of which ſquadron were taken by the Thetis, capt. Cochran, " anchored in " Hampton Roads, May 18th. The fever did not " appear in Norfolk till Auguſt. captain Cochran's " crew, however, *took the fever from the French priſoners*, " and twelve of them died before the Thetis reached " Halifax."

"Halifax." This is certainly a ſuſpicious circumſtance.

Dr. Ramſay, in his letter to Dr. Mitchill concerning the ſame diſtemper, obſerves that it was confined almoſt entirely to foreigners, of whom he gives a very unfavourable account. The ſituation of the town, putreſcence, &c. are likewiſe brought in for a ſhare, as well as the ſeaſon, which had been uncommonly warm.

Theſe are the principal evidences that have been brought for and againſt the origin of the diſeaſe which ſince 1792 has raged with ſuch violence in the United States. Innumerable pieces have appeared in the Newſpapers on both ſides of the queſtion, the moſt remarkable of which are the letters of Mr. Noah Webſter to Dr. Currie. Theſe, however, we cannot now conſider, as we cannot expect indeed that they ſhould contain any thing elſe than a fuller detail of what has already been ſet forth. Mr. Webſter beſides, in his letters, owns that he is not a medical man; nay, that he had not "read above three or four medical books." I hope therefore the reader will excuſe the preference given in this treatiſe to the writings and arguments of thoſe who are acquainted with medicine both by reading and practice. The diſpute between the College and Academy of medicine can be ſettled only by themſelves; the only ſafe line of conduct ſeems to be to admit both doctrines, and to take every method of preventing the introduction of the diſeaſe, whether ſuppoſed to be generated or imported.

Whether the diſtemper which has ſo fatally prevailed ſince the year 1793 be naturally connected with the troubles in Europe and the Weſt Indies or not, it is certain that it has been cotemporary with them. In New York the diſeaſe appeared in 1791, but we are not furniſhed with any particular accounts of it at that time; nor does it appear to have made any great ravages, either on the continent or the Weſt India iſlands, till 1793. At this time the war raged in Europe with fury; the French royaliſts were every where driven out, and diſtreſſed in every poſſible way. Deſolation and ſlaughter prevailed at St. Domingo, while an unbounded intercourſe

courſe took place between the United States and all thoſe nations who were involved in the calamities reſulting from the unbridled paſſions of man excited to their utmoſt pitch of ferocity. In the midſt of this general commotion the fever broke out in the Weſt India iſlands, appearing firſt in the iſland of Grenada. We have ſeen, that, according to Dr. Chiſholm, this diſeaſe was brought to Grenada in the Hankey, from the coaſt of Africa, on the 18th of February. About the middle of April it began to appear on land. In the beginning of May it reached a detachment of the royal artillery lying at a diſtance from the focus of infection, "but "(ſays Dr. Chiſholm) by the communication which the "gunners in Fort George had with the 45th regiment, "and the prediſpoſition of the men to receive the infec-"tion as far as that could be induced by exceſſes in "drinking, and other irregularities." About the firſt of June the diſeaſe began to appear among the negroes of the eſtates in the neighbourhood of the town, but never attacked them with the ſame violence that it did the white people. During the months of May, June and July, it appeared in different parts of the country; being, as our author ſuppoſes, carried thither by infected perſons. From Grenada, the Doctor ſays, the diſeaſe ſpread to the iſlands of Jamaica and St. Domingo, and from the latter to Philadelphia, "by veſſels on which "the infection was retained by the clothes, more eſpe-"cially the woollen jackets, of the deceaſed ſailors."

This account of the origin of the fever at Philadelphia, as we have already ſeen, is inadmiſſible by thoſe who deny the contagious nature of the diſeaſe; but as the latter have never given any diſtinct account of its riſe, or ſhown why it ſhould firſt appear in one iſland and then in another, inſtead of beginning in them all at once, we muſt adhere to that of Dr. Chiſholm, till we are furniſhed with a better.

In Philadelphia it has already been obſerved, that Dr. Ruſh was called to his firſt patient on the 5th of Auguſt; but Mr. Carey mentions a child of Dr. Hodges "as probably the firſt victim;" who was taken ill on the

26th

26th or 27th of July. This ſame month the unfortunate fugitives had arrived from Cape Francois; and we have already ſeen, from Dr. Clarke, that the arrival of ſome of their fellow-ſufferers in Dominica had the ſame dreadful attendant. Whether the diſorder is to be aſcribed to the arrival of theſe people in either place, the reader will judge. Other veſſels are charged with having imported the ſame; but, facts being diſputed, we cannot enter into the controverſy.

The diſeaſe began in Water-ſtreet, to a particular part of which, near to that where the ſuſpected ſhips lay, it was for ſome time confined, but did not excite public alarm till about the 19th of Auguſt. From this time to the 25th of the month the attention of the citizens was ſo much aroufed, that they began to move into the country; and on the 22d, the city commiſſioners were peremptorily ordered by the mayor to keep the city clean. On the 26th the College met, and addreſſed the citizens on the ſubject; recommending ſuch means of preventing the ſpreading of the ſickneſs as to them ſeemed moſt proper. Among theſe were, to avoid any intercourſe with the infected, to live temperate, keep their minds eaſy, and to avoid fatigue. Lighting of fires was particularly diſapproved of; but the burning of gunpowder, and the ſteams of vinegar and camphor, were recommended for infected rooms, and for uſing on handkerchiefs, and in ſmelling-bottles.

In conſequence of this addreſs alſo the bells were ſtopped from tolling, the conſtant noiſe of which had greatly contributed to increaſe the public alarm. The people, who had been in uſe to light large fires in the corners of the ſtreets, being forbid on the 29th by proclamation to do ſo, had recourſe to firing of guns; which was at laſt carried to ſuch exceſs, that it alſo was prohibited by proclamation on the 4th of September.

Notwithſtanding all theſe precautions, the diſtemper continued to increaſe in ſuch a manner as to produce the moſt dreadful terror and diſmay. "Indeed (ſays Mr. "Carey) it is not probable that London, at the laſt ſtage "of the plague, exhibited ſtronger marks of terror than "were

" were to be ſeen in Philadelphia, from the 26th or 27th " of Auguſt, till pretty late in September." This produced ſcenes of diſtreſs unparalleled till this time in the city, and of which many inſtances are to be met with in Mr. Carey's account. It cannot, however, be doubted that the violence of the diſtemper, its contagious nature, and the conſequent danger of viſiting the metropolis, were greatly exaggerated. Thus terror was ſtruck throughout all the adjacent ſtates. At Cheſter-town, in Maryland, a meeting was held, on the 10th of September, in conſequence of which the Eaſtern ſhore line of ſtages was quickly ſtopped. On the 11th of the ſame month it was ordered by the mayor of New York that the names of all ſuch perſons as had arrived or ſhould arrive from Philadelphia or other place, by land or water, that were or *ſhould be ſick*, ſhould be reported to him, that thoſe who were ſick of infectious diſeaſes might be removed out of the city. Next day the governor proclaimed that all veſſels from Philadelphia ſhould approach no nearer than Bedlow's iſland, about two miles from the town, till licenſe was given. But theſe precautions not being deemed ſufficient, a night watch was eſtabliſhed, and next day an addreſs was publiſhed by delegates, purporting the inſufficiency of all that had been done, and again calling upon their fellow-citizens to exert their utmoſt vigilance in detecting the fugitives from Philadelphia. Various other reſolutions were paſſed in New York; and throughout the whole continent ſuch meaſures were taken as ſeemed moſt likely to proſcribe the unhappy Philadelphians, and to prevent their having any place of refuge from the ſickneſs they ſo much dreaded. On the 1ſt of October, however, the inhabitants of Springfield, in New Jerſey, paſſed a reſolve, offering their town as an aſylum for the people of Philadelphia, and directing an hoſpital to be provided for the reception of ſuch as might fall ſick. Similar reſolutions were paſſed by the inhabitants of Elizabethtown, and Elkton in Maryland.

The diſtemper in the mean time arrived at the moſt dreadful height in Philadelphia, and almoſt all thoſe who

who could take the charge and burthen of public affairs were abſent. An hoſpital had been eſtabliſhed at Buſh Hill, but, for want of ſuperintendence, had fallen into ſuch diſorder, that the poor choſe rather to deny their illneſs than to be ſent to it. On the 15th of September, however, Stephen Girard, a native of France, and a wealthy merchant, together with Peter Helm, a native of Pennſylvania, offered their ſervices as ſuperintendants. By their exertions the credit of the hoſpital was ſoon retrieved, and ſuch numbers demanded admittanc, that it became neceſſary for each candidate to procure a certificate from a phyſician, that the patient really laboured under a malignant fever. In a ſhort time the affairs of the city went on, in every reſpect, with as much regularity as could be expected; but the mortality increaſed throughout the month of September, and the three firſt weeks of October. Great hopes were entertained from ſome cold and rainy weather in the end September; but they proved illuſive, and the diſeaſe became even more fatal than before, till the 26th of October, when it ſuddenly ceaſed, as Mr. Carey ſays, with hardly any rain, and a very moderate degree of cold. "That day (adds "he) was as warm as many of the moſt fatal ones in the "early part of the month. To account for this is per- "haps above our power. In fact, the whole of the diſ- "order, from its firſt appearance to its final cloſe, has ſet "human wiſdom and calculation at defiance." During the time of this calamity Mr. Carey computes that *ſeventeen* thouſand left the city, and *four* thouſand and thirty-one periſhed.

This city ſuffered another attack in 1794, but far leſs ſevere than before. In 1795 and 1796 the diſeaſe ſeems ſcarcely to have made its appearance; but in 1797 it revived, and, in 1798, broke out with greater fury than even in 1793. No particular hiſtory hath been publiſhed of this laſt ſevere attack. We know only in general, that, though a much greater number of the inhabitants fled out of town in 1798 than in 1793, the number of deaths was almoſt as great; being eſtimated at three thouſand eight hundred and forty-one. Great diſputes, as

as has been obſerved, have taken place concerning the origin of theſe diſeaſes; on which we ſhall only further remark, that if, after ſuch repeated and dreadful experience of the bad effects of allowing putrid matters to accumulate, ſuch quantities could be collected as to produce the very fatal ſickneſs of laſt year, it argues a moſt unaccountable, and indeed incredible, inſenſibility on the part of the people, as well as remiſsneſs on that of the magiſtrates; and this perhaps may be accounted as ſtrong an argument in favour of contagion as can be adduced.

That ſuch a violent diſtemper ſhould ceaſe all at once, is indeed not to be expected; and we have already heard of its again appearing in the city. Fear has been very juſtly excited, there and in other places; but it is to be hoped that the remarkable coolneſs of the ſeaſon will operate favourably in preventing any very violent attack for this year.

New York has alſo ſuffered very conſiderably from this diſeaſe. Here it appeared in 1791, in the autumn, and in a part of the town remarkable for its vicinity to a collection of filth. In 1792 it made no progreſs; and in 1793, though ſome died of it who fled from Philadelphia, it did not ſpread. In 1794 it returned with conſiderable violence, and with ſtill greater in 1795. In the hiſtory of this diſeaſe by Dr. Seaman,* he takes notice that in July and Auguſt an unuſual number of perſons ſuffered from drinking cold water, and ſome fell down and died in the ſtreets; but the Doctor ſuppoſes this to have happened rather through the exceſſive heat of the ſun than the drinking of water. As the diſeaſe came on, all others gave way to it, even "*the common remitting bilious fever*;"† and in the month of July ſome caſes occurred. We have already had occaſion to take notice of the death of Dr. Treat, who was taken ill on the 22d of July; but before that time, on the 6th of the ſame month, Dr. Seaman ſays that, in conjunction with this gentleman, he had viſited a patient "affected with "all the full-marked and decided ſymptoms of an highly "malignant

* Med. Repoſ. vol. i, p. 316. † Webſter's Collection.

" malignant yellow fever."* The diſeaſe continued to gain ground in Auguſt, and became extremely violent in that and the following month; but, according to our author, the low ground in the ſoutheaſt part of the city was the " grand centre of the calamity, diffuſing its " effects like diverging rays, aiding, by its moſt power- " ful influence, different ſecondary centres, already ſmok- " ing hot, to flame out its peſtiferous *operations*." In this part of the town five hundred died in three months.

The attack at this time did not arouſe the people to a proper ſenſe of their danger. As formerly, the origin of the diſeaſe in 1795 had been attributed to the filth of the city. Next year it was attributed to the ſame, and ſo in 1797 and 1798. This laſt year, particularly, it is ſaid to have originated partly from great quantities of putrid beef and fiſh, collected for exportation, and which could not be exported. In Mr. Hardy's account of this fever, it is calculated that there died in 1798 two thouſand and eighty-ſix; but that, if it were taken into the account how many left the town and died in the country, the number would amount to between two thouſand four hundred, and two thouſand five hundred.

It is not in Philadelphia and New York alone that this diſtemper has prevailed. Boſton, Newburyport, Portſmouth, Portland, and even detached ſpots in the country, to which it is not poſſible to trace any infection, have felt its ravages. At Salem alſo, where the diſeaſe was never known before, twenty-one caſes including ſome doubtful ones appeared in 1798; and of theſe, eleven proved fatal. In 1796, when it prevailed in Newburyport, it was ſuppoſed to have been introduced by a veſſel from the Weſt Indies; and, according to Dr. Coffin, the opinion would have been incontrovertible, had not a large quantity of fiſh-garbage been collected at the place where the veſſel landed; ſo that, though the diſeaſe ſpread from that place, it could not be known whether it proceeded from the

* This proves that Dr. Treat *was not* the firſt perſon who ſuffered by this diſeaſe, but it will not prove that the diſeaſe was not imported by Capt. Bird's veſſel; for the fever ſpread in the vicinity of the veſſel, not of the Almſhouſe, where the firſt patient was carried.

the veſſel, or the fiſh, or both. It ſeems now unfortunately to be the caſe, that where this diſeaſe once gets footing it cannot eaſily be eradicated. If we ſuppoſe it always to be imported, the continual intercourſe with the Weſt India iſlands will account for this; but the extreme difficulty, or rather impoſſibility, of procuring an account of facts or even a ſingle fact which cannot be controverted, renders every thing that can be ſaid upon the ſubject uncertain and precarious. In the caſe of New London particularly, where 81 perſons were deſtroyed by it laſt year, neither importation nor collections of filth could be aſſigned as the cauſe; nevertheleſs it began near a *wharf*; but Mr. Holt, in his account of the diſeaſe, thinks it was moſt probably owing to the mere heat and dryneſs of the ſeaſon. On the other ſide of the queſtion, however, we muſt ſtill inſert Dr. Brackett's account of the origin of the diſeaſe at Portſmouth, in anſwer to a letter from Dr. Oliver of this place.

"The yellow or peſtilential fever made its firſt appear-
" ance at Portſmouth, about the firſt of Auguſt laſt.
" Eight or ten days before that time a veſſel arrived here
" from Martinico, and brought a French family (four
" or five in number.) This veſſel, before ſhe left the
" Weſt Indies, had two ſailors taken ſick (as the cap-
" tain informed me) one of whom died on the paſſage
" home; the other was on the recovery when the veſſel
" came into this port.

" There was not, nor had not been for a long time
" before, any fever in this town. Two or three days
" after, I heard that one or two men, who were labourers
" (and probably had been on board, as they lived nigh
" where the veſſel lay at the wharf) died ſuddenly with
" fever, but am uncertain whether with yellow fever, as
" I never ſaw them. The firſt of Auguſt, the owner,
" whoſe houſe was about four or five rods diſtant from
" the veſſel, had a child of four or five years of age ta-
" ken ſick; the next day I viſited it, and two days af-
" ter he died. The ſymptoms appeared like a cholera
" morbus—ſick ſtomach, and frequent puking of black

" bile. The day before he died a brother of his, fifteen " years old, was taken ill, and had much the ſame ſymp- " toms, only greater inflammation and diſtreſs. He was " blooded freely, took calomel, bark, &c. He died " five days after he ſickened. Between the 8th and the " 20th of Auguſt, four or five of the other children and " ſervants were taken with the ſame ſymptoms, and re- " covered. On the ſixteenth day, a daughter, ſeventeen " years of age, was taken down with the ſame diſeaſe ; " ſhe was treated in the ſame manner, with bleeding, " mercury, warm bath, bark, &c. and died on the 9th " day. This patient had a great diſcharge of blood " from her mouth and gums for three days before ſhe " died. One or two more of the family had it after- " wards, and recovered. All theſe patients took the in- " fection, I believe, about the ſame time. Many others " in that neighbourhood had the fever during this " time, about one half of whom died : out of forty-ſix " patients I loſt fifteen. If I could procure a ſoreneſs of " the fauces, by adminiſtering calomel in ſmall doſes, " and rubbing it in the gums, or by frictions on the legs " and arms with mercurial ointment, the third or fourth " day, I was ſure of their recovery.

" How many died of this diſeaſe in the whole, I have " forgotten ; as, through fatigue, and debility of body " and mind, I kept no notes ; I think rather more than " half of thoſe who had it. The fever agreed in every " ſymptom, almoſt, with that deſcribed by Dr. Ruſh and " others. The contagion did not appear to be propa- " gated, as the largeſt number who had the diſeaſe were " ſeized in the month of Auguſt, and lived in the ſtreets " only which communicated with the wharf where the " veſſel lay, and the beach where ſhe was graved. Theſe " ſtreets are in the higheſt part of the town, and always " eſteemed the moſt healthy, and as free of putrid ſub- " ſtances as any in it. In the months of September and " October the fever was followed by dyſentery, and " ſpread through almoſt every part of the town and its " environs. There has been no caſe of fever or dyſen- " tery ſince laſt fall ; this place, during the winter, and

" ſummer

" ſummer thus far, has been uncommonly healthy; and " it appears likely to continue ſo, if the committee of " health ſhould not be remiſs in their duty. Thus, " without any comments, I have endeavoured to give " you a ſhort hiſtory of the peſtilential fever, as it ap- " peared here laſt ſummer. The ideas, you may com- " municate to the author of the book intended to be " publiſhed."

The following letter from Dr. Warren, which he obligingly ſent to two phyſicians in Salem, gives an accurate account of the diſtemper which prevailed in Boſton laſt year:

" I ſhould immediately have anſwered your favour of " laſt month, but for a wiſh to give you as complete an " account of the cauſes and mortality of the late epi- " demic as could be collected.

" There were a number of ſuſpected cauſes, which, " though concealed during the prevalence of the diſeaſe, " it was hoped would be developed after the agitation of " the public mind had entirely ſubſided; and I was in ex- " pectation that ſome regular returns would have been " made of the numbers who had paſſed through the diſ- " eaſe, and of thoſe who had died with it, ſo that ſome " eſtimate might be formed of its malignity and morta- " lity; but ſuch returns have not yet been made, and it " is therefore impoſſible to obtain any ſatisfactory evi- " dence on thoſe heads. I ſuppoſe the number of " deaths to have been rather ſhort of two hundred; " but this is only a rude gueſs, and ſhould not be " relied on in forming any conſequential deductions " on the ſubject. I ſhall, however, now offer ſuch an " account of the diſorder as my preſent materials have " enabled me to prepare.

" The firſt unequivocal appearance of the malignant " fever, in the town of Boſton, was on the 20th of July " 1798 (though one family had been attacked with a " fever, attended with unuſual ſymptoms, as early as the " middle of June; but, as no other inſtances occurred " for ſo long a time, of an alarming nature, ſome doubts " may perhaps be juſtly entertained of the identity of the " affection.)

" affection.) Three or four caſes only, I believe, hap-
" pened between this and the latter end of the month.
" The two firſt of theſe were young men employed in
" ſtores directly oppoſite to each other, on Green's
" wharf, near the Town-dock. A few days after, three
" or four perſons were ſeized with the ſame complaint,
" whilſt following their reſpective occupation in Mar-
" ket ſquare, on the eaſt and ſouth ſides of Faneuil Hall,
" or the Market-houſe. In the beginning of the
" month of Auguſt ſeveral perſons were taken ſick in
" the ſame neighbourhood, chiefly young men between
" 16 and 24 years of age, whilſt employed in ſtores and
" counting houſes there ſituated. The ſtores in Mer-
" chant's row, extending from the Market to State-
" ſtreet, were more eſpecially viſited with the diſeaſe,
" and, in the courſe of the ſame month, a family at the
" bottom of State-ſtreet, and ſeveral perſons at Oliver's
" dock, were taken ſick. At this place a kind of baſon
" is formed between a point of the town projecting from
" Fort hill, and the Long wharf, which is conſtantly re-
" ceiving the offals of fiſh, and other animal ſubſtances,
" which from its ſituation could not be waſhed off by
" the waters contained in it. This ſpot is remarkable
" for having been the reſidence of moſt of the perſons
" firſt attacked with the bilious remittent fever of 1796.
" To the latter end of this month the number of ſick
" continued to be increaſing; but the attacks were prin-
" cipally confined to the above-mentioned quarters, till
" at length the diſeaſe appeared on the ſouth ſide of
" Fort hill, at ſome diſtance to the ſouthward of Oli-
" ver's dock, leaping, as it were, over the ſummit of the
" hill, without lighting upon the inhabitants on the
" north of that eminence. The fatality of the diſeaſe
" was here probably greater than in any part of the town
" of equal population; and it was nearly the laſt place
" in which it diſappeared. Very few families who re-
" mained in their own houſes upon the hill eſcaped its
" attack; and the progreſs of the diſeaſe, in all the pla-
" ces above mentioned, ſeemed to have been arreſted
" only by means of the evacuation of the buildings by
" the

" the people who inhabited them. In the latter end of " Auguſt, and through the month of September, many " perſons were taken ſick in Fore-ſtreet, which runs " northerly from Market or Dock ſquare, along the " heads of the wharves, on the eaſtern ſide of the town.

" Through the whole period of the ſickneſs ſcarcely a " perſon was taken ill who had not reſided, or been in " daily employment, in the vicinity of theſe places. The " ſubjects of the diſeaſe were generally natives of the town, " chiefly in the prime of life, and in the vigour of health. " I recollect no inſtance of any French inhabitants be- " ing aſſailed by it, and have heard of only one or two " inſtances of the blacks being affected with it.

" That the fever was in a degree contagious, I cannot " entertain a doubt; but that it was not ſo in a very " high degree, I am as fully perſuaded, from the number " of caſes in which there was reaſon to believe it could " not have been taken in that way. In moſt in- " ſtances, where contagion might have been ſuſpected, " the ſubjects were ſo ſituated that they might have re- " ceived it from the ſame ſource as thoſe with whom they " had communicated. I cannot learn that any evidence " has been furniſhed of infection from the ſick who had " been removed into the country, though there were " many inſtances of ſuch removals, under the moſt ma- " lignant forms which it aſſumed.

" The fever was generally uſhered in by a chill, but I " think by no means equal to that which commonly " precedes fevers of the ardent kind, nor in proportion " to the violence of its ſubſequent periods. In a ſhort " time the rigors were ſucceeded by exceſſive heat; the " pulſe, which had been ſmall and contracted, became " hard and full; the reſpiration laborious from violent " oppreſſion at the ſcrobiculus cordis; the tongue aſ- " ſumed a whitiſh caſt; the eyes became highly infla- " med, while the pains in the head, back, and legs, were " intolerably ſevere. To theſe ſymptoms ſucceeded " naufea, and vomiting ſometimes of a highly bilious " matter, ſeldom attended with diarrhœa, but often " with a burning at the ſtomach, tenderneſs of the ab-

" domen,

" domen, parcity of urine ; and, in one inſtance, a dy-
" ſuria, with a great proportion of blood at each evacu-
" ation of that fluid.

" Theſe appearances uſually continued about 48
" hours, after which they often ſuddenly gave place to a
" very different train of ſymptoms. The pulſe ſunk
" aſtoniſhingly, and became intermittent ; the heat and
" pains entirely ſubſided ; and the patient ſuppoſed
" himſelf to be out of danger. From a perfect poſſeſſion
" of all his intellectual faculties, with a ſerenity of mind,
" which in no other diſeaſe, I believe, is ſo generally ob-
" ſerved to accompany its laſt ſtages, on or about the 5th
" day from the acceſſion of the fever, he fell into a ſtate
" of inſenſibility, and thence ſunk gently into the arms
" of death. In others this change was leſs rapid ; the
" pulſe became gradually ſmaller, the diſtreſſing ſymp-
" toms ſlowly abated, a coldneſs of the extremities took
" place, and continued for ſeveral days before death, ac-
" companied with clammy ſweats, often without any
" perceptible pulſe in the wriſts, for ſeveral hours before
" the fatal termination. The tongue ſeldom became
" much coated, to the laſt. Delirium was by no means
" generally attendant ; and a yellowneſs of the ſkin was
" far from being univerſal ; ſometimes, however, this
" appearance was obſerved within the three firſt days ;
" often on the fourth and fifth ; and I was induced to
" conſider it as an accident, rather than a conſtituent
" character of the diſeaſe.

" The black vomit, as it has been uſually called,
" though in my opinion by no means to be conſidered as
" a pathognomic ſign of the diſeaſe (as I have frequently
" ſeen it take place in other acute fevers, eſpecially the
" puerperal) was very frequently attendant on the laſt ſta-
" ges of the diſorder ; very few recovered after this cir-
" cumſtance had taken place ; in one perſon, however, who
" had it in the moſt alarming form, together with an in-
" termittent pulſe, coldneſs of the extremities, ſingultus,
" and every uſual mark of immediate diſſolution, a moſt
" unexpected recovery happily diſappointed the poſitive
" prognoſtics of his phyſicians. As the cure advanced, the
" ſkin

" ſkin in this inſtance became extremely yellow, and con-
" tinued ſo for many weeks after the fever had ſubſided ;
" the biliary ducts having been completely obſtructed, and
" conſequently the alvine evacuations of a clayey colour,
" and with much difficulty procured. Frequent repeti-
" tions of rhubarb and calomel in large doſes, the conti-
" nuance of the mercurial medicine in ſmall doſes, ſo as
" to keep up a continual ptyaliſm, and a laxative diet,
" reſtored him to perfect health.

" For the diſcoveries which were made on diſſecting
" the bodies of ſome of thoſe who died with the diſeaſe,
" I beg leave to refer you to a publication in the Boſton
" Centinel, made during the prevalence of the diſorder
" in this place, and ſubſcribed by Dr. Iſaac Rand, ſen.
" Preſident of the M. Medical Society, and myſelf."
(For theſe diſcoveries ſee the table, facing p. 434.

" We had heretofore treated our patients agreeably
" to the method practiſed at Philadelphia in 1793, with
" bleeding in moſt inſtances, and active purges of jalap
" and calomel, or Rochelle ſalts. The diſeaſed ſtate of
" the liver, the known effects of mercury in hepatitis,
" and the recollection of the ſuggeſtions contained in
" Dr. Ruſh's publication on the yellow fever, together
" with thoſe of ſeveral other celebrated writers on the
" ſame ſubject, induced us to enter immediately on the
" uſe of calomel in ſmall doſes, as recommended in our
" paper above referred to.

" In my own practice I *now* uſually commenced the
" treatment by bleeding from ten to ſixteen ounces, and
" followed it by a doſe of between ten and fifteen grains
" of calomel with between twenty and twenty-five
" grains of jalap, or an ounce of Rochelle ſalts, or more,
" according to the conſtitution. Immediately after the
" operation of theſe medicines I began with the uſe of
" calomel in ſmall doſes, in pills of a grain, every hour,
" and ſometimes of 3 grains every two hours. Within
" the firſt twenty-four hours, but ſcarcely ever after, I
" found occaſion frequently to repeat the bleeding, and
" it is worthy of remark, that in ſcarcely a ſingle inſtance
" was this operation performed without almoſt inſtanta-
" neous

" neous relief; although in moſt caſes, a few hours af-
" ter, there was a recurrence of the ſymptoms. The
" blood for the moſt part was dark. In three caſes there
" was no ſeparation of ſerum from the coagulated maſs
" at the end of forty-eight hours. In two of theſe (and
" they were the only caſes in which I obſerved it) a firm
" buff was formed on its ſurface; and all three died of
" the diſeaſe.

" The calomel was often continued through the whole
" courſe of the fever; and ptyaliſm was uſually brought
" on within three or four days: though ſometimes up-
" wards of 200 grains were given, at the rate of a grain
" every hour, without any ſpecific effect on the ſalivary
" glands. In proportion as the ſoreneſs of the mouth ad-
" vanced, the ſymptoms univerſally gave way; and in
" every patient, two only excepted, this effect of the re-
" medy was a ſure pledge of recovery. In this exception
" were comprehended two perſons of the ſame family, a
" father and daughter, both of whom had ſurvived the
" 14th day of the diſeaſe, had copious hæmorrhages from
" the mouth (a circumſtance which alſo attended on ma-
" ny who recovered) and died in a ſtate of apparent pu-
" trefaction.

" The purgative medicines were generally repeated
" every ſecond day; or an enema of water gruel was ad-
" miniſtered occaſionally, if the bowels were conſtipa-
" ted; but if otherwiſe, and the calomel paſſed off by
" thoſe emunctories, opium was combined with it in
" ſufficient quantities to reſtrain the diſcharge. The
" evacuations which took place from the inteſtines, dur-
" ing the uſe of the mercury, were almoſt univerſally of
" a remarkably dark colour, generally approaching to a
" deep green, but by no means remarkably fœtid.
" When ſpontaneous, they were often obſerved to be of
" the colour and conſiſtence of water gruel.

" In caſes of very laborious reſpiration, which was fre-
" quently in an extreme degree diſtreſſing, eſpecially af-
" ter the firſt 36 or 48 hours had elapſed, bliſters, ap-
" plied either to the cheſt or extremities, had a favoura-
" ble effect; on the latter, they were moſt uſeful in the

" advanced

" advanced ſtages of the diſeaſe, by exciting to action " the debilitated veſſels, and by reſtoring circulation and " warmth to the parts. In the ſame intention, wine, " ſnake-root, and the bark, were ſometimes uſed with " advantage.

" The diet was generally of the lighteſt and moſt cool- " ing nature; barley-water, apple-water, and ſpruce- " beer, were generally both grateful and ſalutary. The " warm bath was often exhibited with apparent ſucceſs, " eſpecially in the beginning of the diſeaſe, and when a " copious ſweat had been induced by it. The cold bath " was alſo reſorted to by ſome reſpectable practitioners, " and perhaps, under ſome circumſtances, with good ef- " fects; but I have no reaſon to think it was generally " advantageous.

" Upon the whole, I believe that the moſt efficacious " remedy, and the only one to be relied on, is mercury. " It is certain that, as far as my obſervation has extend- " ed, under no other method of treatment did ſo many " recover; and there were but few inſtances of a fatal " termination, when it had been adminiſtered from the " commencement of the fever.

" Various have been the cauſes aſſigned to this diſeaſe. " That its origin was domeſtic, I have not a ſingle doubt. " No inſtance of the arrival of any veſſel from the warm- " er latitudes, with this ſickneſs on board, has been diſ- " covered; and it is believed that the local cauſes are " ſufficiently numerous to account for its exiſtence. At " moſt of the places, where its ravages have been made, " very large quantities of putrid ſubſtances had been for " ſome time accumulating. The offals from the fiſh " market, as well as damaged freſh and ſalted fiſh to an " immenſe amount, had been thrown into the dock. A " very great number of raw hides had been imported, " and ſtored in places contiguous to thoſe in which buſi- " neſs was conſtantly going on. The influence of a " continued heat through the ſummer, to a degree ſcarce- " ly before known in this country, had rendered theſe " articles highly putrid; and from the ſame cauſe ſe- " veral articles of proviſion, ſuch as barrelled beef, &c.

" which had been prepared for exportation, but, by rea-
" ſon of the reſtraints laid on our commerce, retained in
" ſtore, had become tainted. The effects of theſe were
" in ſome inſtances inconteſtibly evinced; three lads,
" who had been employed in repacking beef, were at
" about the ſame time ſeized with the diſeaſe in its moſt
" fatal form; and a perſon, who had purchaſed ſome of
" the hides at a low price, immediately after their remo-
" val fell a ſacrifice to his folly.

" Two or three thouſand of the inhabitants removed
" into the country, and began to return about the mid-
" dle of October, when the decline of the diſeaſe juſti-
" fied the meaſure."*

SECTION

* The following facts, in confirmation of the importation of the yellow fever, were communicated in a letter from an eminent practitioner in New Haven to a gentleman of the ſame profeſſion in this town. They came to hand too late to be inſerted otherwiſe than in a note, the ſheet being already prepared for preſs:

A child was reported to have died of worms, and the parents were indulged in the common ceremonies of burial: but the truth was, that the diſeaſe had been the black vomit. The conſequence was, a very extenſive ſpread of the contagion. In leſs than a week ſix out of eight of the bearers were taken with the fever, and theſe were young perſons from different parts of the town. " As to the ſuppoſitions (ſays the gentleman) with reſpect to local cauſes ori-
" ginating the diſeaſe, I conceive there is no occaſion to ſeek for any other
" than what was contained in the cheſt (p. 444) which was a blanket and
" clothing taken off the corpſe of one who had died of the fever in the Weſt
" Indies, and without the leaſt formality of cleanſing put down into a cloſe
" cheſt, and brought to New Haven, and lodged in Auſtin's ſtore. Now it
" appears to me (theſe facts well aſcertained) as idle to inquire after other
" cauſes, as it would, ſuppoſe it were the infection of the ſmall pox brought
" in a cheſt, and a number of perſons who had inſpected the cheſt to be taken
" down with it. Would, in ſuch a caſe, mankind have racked their inven-
" tions to have inveſtigated other inducing cauſes? Surely not. . . . . As to
" local putrefying ſubſtances, there was nothing but what has been common
" to the place, where the fever made its firſt appearance, for many years in dry
" ſummers.

" I might revert to the introduction of the fever by importation at Chatham
" on Connecticut river; at Providence, Rhode Iſland; in which the importa-
" tion was as evident as at New Haven. In ſhort, there is ſcarcely a place on
" the continent, where this fever has made its appearance, but what it may
" be traced to an imported origin. There have been but two or three excep-
" tions which I have heard of."

The following particulars relative to the diſeaſe at Portſmouth may likewiſe be deemed authentic, as communicated by a reſpectable gentleman (though not of the medical profeſſion) in that place: " Moſt men of judg-
" ment and information on the ſubject ſuppoſe it was imported laſt year in
" a ſhip of Mr. Sheafe, which arrived from Martinico about the 20th of July.
" One man had died on board this ſhip in the Weſt Indies: all the reſt arrived
" in health; but the diſorder made its appearance in a few days afterwards.
" Mr. Sheafe loſt three of his own family. He lived within a ſtone's
" throw of the wharf where his ſhip lay, and the fever ſpread in the neigh-
bourhood.

SECTION III.

Methods of Prevention and Cure.

IN the yellow fever, as in the plague, where an attack is frequenly made with ſuch violence as to bring on death in twenty-four hours, or even a ſtill ſhorter time, it is plain that much more dependence muſt be placed on prevention

" bourhood. Mr. Plummer, in the next houſe to Mr. Sheafe's, died about the " 10th of Auguſt; Miſs Parker, in the ſame houſe, four days afterwards; and " Miſs Smith, who had lived nearly oppoſite, removed to Berwick, and was " there ſeized and died about the ſame time. It is worthy of remark, that " this was always thought the moſt healthy part of the the town."

As a contraſt to theſe evidences, we ſubjoin the following epitome of part of Dr. Ruſh's addreſs to the citizens of Philadelphia on the origin of the yellow fever, &c.* In this addreſs, the Doctor conſiders it as indiſputable that the diſeaſe is, in all countries, the offſpring of putrid vegetable and animal exhalations; but it prevails only in hot climates and in hot ſeaſons. In Philadelphia it ariſes, 1. From the docks; and hence, in New York, it has got the name of the *dock fever*. 2. From the foul air of ſhips. 3. From the common ſewers. 4. From the gutters. 5. From dirty cellars and yards. 6. Privies. 7. Putrefying maſſes of matter lying in the neighbouring part of the city. 8. Impure pump water.

The diſeaſe is conſidered by the Doctor as an higher degree of bilious fever. He anſwers the objection by Dr. Chiſholm (ſee p. 467) where he ſpeaks of the fever not being produced in 1778, "when it was left in a more filthy ſtate by the Britiſh army than it has been at any time ſince." To this he anſwers that for the production of the diſeaſe three things are neceſſary. 1. Putrid exhalations. 2. An inflammatory conſtitution of the atmoſphere, and, 3. An exciting cauſe, ſuch as great heat, cold, fatigue, or intemperance. The conſtitution of the atmoſphere, however, he looks upon to be the principal cauſe; as without this conſtitution mild diſeaſes would be produced, but along with it they become very malignant. "The peſtilential conſtitution of the air " in the United States began in 1791. It prevailed in Charleſton in 1792, " and it has been epidemic in one or more of the cities or country towns of the " United States every year ſince. . . . It has not been confined to the ſea- " ports. It has prevailed ſince the year 1793 in many of the villages of New " England, and of the ſouthern ſtates. On the Geneſee river it has become " ſo prevalent as to acquire the name of the Geneſee fever. The bilious fevers " which prevailed in all the above places before the year 1793 were of a mild " nature, and ſeldom mortal. They have lately diſappeared, or are much di- " miniſhed; and have been ſucceeded by a fever which frequently terminates " in death in five days, with a yellow ſkin and black vomiting." Theſe circumſtances are ſupported by undeniable teſtimony.

In anſwer to the queſtion, "Can the yellow fever be imported?" Our author anſwers as follows: "I once thought it might; but the foregoing facts au- " thoriſe me to aſſert, that it cannot, ſo as to become *epidemic* in any city or " country. There are but two authorities on which the belief of this diſeaſe " being imported reſts. Theſe are Dr. Lining's and Dr. Lind's. The for- " mer ſays it was imported into Charleſton in 1732, 1739, 1745 and 1748. The " latter ſays it was conveyed into Philadelphia, where it afterwards became " epidemic, by means of the clothes of a young man who died in Barbadoes. " No circumſtances of ſhips or names are mentioned with theſe aſſertions to " entitle them to credit, and from the facility with which vague reports of

* *Printed in* 1799.

the

prevention than the efforts of the moſt ſkilful phyſician after the diſeaſe has once begun; for, in ſuch violent attacks, medicines, though ever ſo powerful, have not time to act. In countries therefore where this terrible diſeaſe exiſts, the firſt conſideration neceſſary for every individual is, whether he is one of thoſe likely to be attacked by it. Now, from the general teſtimony of thoſe who have ſeen this fever, it appears that ſuch as are newly arrived, the young, and in other reſpects the healthy and ſtrong, the laborious, and the intemperate, are moſt liable to be attacked. Dr. Naſſy of Philadelphia ſeems *alone* to afford an exception to the general teſtimony. Speaking of the cauſe of epidemics, after having aſcribed them to ſome conſtitution of the atmoſphere, he ſays, "If the air is "not infected, diſeaſes cannot be epidemic; and this is "ſo, *indeed*, though it only attacks the natives. What "can be the cauſe of that corruption of the air? For "what reaſon are the natives, and thoſe inured to the "climate of Philadelphia, *alone* infected with the prevail-"ing diſeaſe, while *foreigners* eſcape it?" Dr. Chiſholm particularly points out thoſe who, in 1793, were moſt liable to the Boullam fever. Theſe were, "1. Sai-"lors; more eſpecially the robuſt and young; thoſe "leaſt accuſtomed to the climate; and thoſe moſt given "to

"the foreign origin of this diſeaſe have been admitted and propagated by phy-"ſicians in other countries, there is reaſon to believe the aſſertions of thoſe "two phyſicians are altogether without foundation. The College of Phyſi-"cians of Philadelphia, after two weeks inveſtigation, were unable to diſcover "any ſhips, clothes, or ſick perſon, that could have introduced the diſeaſe in-"to Philadelphia in the year 1793. The Academy of Medicine have clearly "proved, by many documents, that the diſeaſe was not imported in the years "1797 and 1798. The origin of a few caſes, reported by Dr. Griffitts and "other members of the College of Phyſicians, which have lately appeared in "our city, has in vain been ſought for from a prize ſloop of the Ganges. Two "affidavits of Meſſieurs Hill and Ingerſol prove that ſhe had been healthy in "the Weſt Indies, and that no perſon had been ſick on board of her during "her voyage, nor after her arrival in our port. Equally unſucceſsful have "been the attemps to derive thoſe caſes from beds and blankets infected by "the fever of laſt year. In Boſton, Connecticut, New York, Baltimore, Nor-"folk and Charleſton, both phyſicians and citizens have long ago rejected the "opinion of the importation of the fever. Some phyſicians ſuppoſe it poſſible "for the contagion of this fever to adhere to the timbers of ſhips that have "ſailed from Weſt India ports, and that it may be propagated from them to a "whole neighbourhood, although houſes, and even ſtreets, interpoſe between "them. This opinion is too abſurd to ſtand in need of refutation. Indeed "every thing that relates to the importation of this fever is contrary to reaſon "and facts—It is an error, ſubſtituted in the room of a belief that all peſtilen-"tial diſeaſes were derived from the planets."

" to drink new rum. 2. Soldiers; more eſpecially " recruits from Europe; and the moſt intemperate. " 3. White males in general lately arrived; more eſpecial- " ly young men from Europe. 4. All other white males; " more eſpecially the lower claſſes; and of them the " moſt intemperate; thoſe debilitated by recent ſickneſs. " 5. White, females, more eſpecially thoſe connect- " ed with the ſhipping; and thoſe lately from Europe. " 6. People of colour, from *Muſtees* to *Cabres*. 7. Ne- " gro men; more eſpecially ſailors and porters. 8. Ne- " gro women; more eſpecially houſe wenches. 9. Chil- " dren; more eſpecially thoſe of colour." It is certain, however, that, when the diſtemper rages with great violence, natives as well as foreigners are liable to be attacked. We cannot ſuppoſe that all who periſhed at Philadelphia in 1793 and 1798 were foreigners. Though the latter therefore have the greateſt occaſion to fear, the natives muſt not think themſelves abſolutely ſecure; neither are foreigners to be terrified in ſuch a manner as if they could not eſcape. With reſpect to the general modes of prevention, then, to which it is the buſineſs of every individual to attend, the following things are to be taken into conſideration:

1. Every one who comes from a cold to a warm climate may be aſſured that on his arrival the temperature of his body is higher by three or four degrees than that of the native inhabitants.

2. In this ſituation he muſt conſider himſelf as neceſſarily about to undergo a change of conſtitution; and ſuch change he may likewiſe be aſſured will beſt be made by the gradual operations of nature; concerning which we know ſo little, that it does not ſeem adviſeable to uſe any artificial method of promoting or accelerating it.

3. As the voyage from the Eaſtern continent muſt have taken up a conſiderable time, and as the mode of living on ſea muſt have been very different from that to which he was formerly accuſtomed, we muſt conſider the conſtitution as already in ſome degree altered from what it was when the perſon firſt went on board.

4. This

4. This alteration will be greater or leſs according to circumſtances. If the veſſel has been much crowded with paſſengers; if the weather has been ſtormy, ſo that he has been expoſed to damp; if they have had little water, or of bad quality; if their proviſions have been bad, or if there has not been a ſufficient ſupply of freſh air in the place where he ſlept; the body muſt be conſidered as already prediſpoſed to diſeaſe, which the new climate will ſcarcely fail of bringing to maturity.

5. Every one muſt conſider that mode of living to which he has been accuſtomed the greateſt part of his life as *natural* to him. Any conſiderable deviation from it, eſpecially if ſudden, would be of bad conſequence, even in his own country; much more muſt it be ſo in another. As much as poſſible therefore he ought to conform his mode of life in the new country to what it was in the old, adhering only to the rules of temperance.

6. It has already been obſerved, that we muſt take into account the time that the perſon has been at ſea, and the difference between his mode of life during his voyage, and that to which he was formerly accuſtomed. This difference conſiſts in one particular in having lived for ſome weeks entirely upon ſalt proviſions. To theſe he has been in ſome meaſure accuſtomed; and therefore it muſt be reckoned injudicious to give up the uſe of ſalted meat at once for ſuch as is freſh. In fact, this mode of abandoning ſalt meat for freſh has been reckoned by the beſt phyſicians one of the cauſes by which the diſeaſe is brought on. Drs. Taylor and Hansforth expreſs themſelves in the following manner on this ſubject: "It "has been noticed by ſeveral medical writers, that freſh "meats, and particularly beef, in ſouthern climates, ap- "parently generate fluxes and other malignant diſeaſes." Dr. Ramſay, alſo, ſays of thoſe who were moſtly affected with the yellow fever in Norfolk, that, "being *foreign-* "*ers*, they dealt laviſhly in beef, fiſh, and all kinds of "freſh food. Obſerve, this beef was driven perhaps from "one to two hundred miles before killed, then expoſed in "a hot market to vend; that, by one o'clock, their din- "ing hour, I always did, and do, believe it muſt have "been

" been tainted. Obſerve, the fiſh were all dead by break " of day, and brought by land from twenty to twelve " miles—hard drinkers of ſpirits moſtly. . . . . " One or two natural born citizens were the whole, out " of upwards of two hundred and twenty, who, in the " ſpace of ſix weeks, fell victims to this diſeaſe. The " natives live chiefly on ſalted meats and fowls, or other " kinds of poultry, which are killed but a little time " before dreſſing." It is unfortunate that among the emigrants from cold countries there is a general prejudice againſt ſalt, as highly inflammatory; and many diſeaſes are imputed to the uſe of it where it is undoubtedly entirely innocent. In very cold climates indeed it has with great reaſon been ſuppoſed to produce the ſcurvy; and the Tchutſki, who conducted capt. Billings through their frozen regions, informed him that ſalt was poiſon in their climate; throwing away, with marks of abhorrence, a quantity he had brought with him from his frigate. We cannot indeed argue from ſalt being pernicious in a cold climate that it is medicinal in a warm one, but we ſhall ſoon ſee that it has been recommended in the plague, and may not improbably be uſeful in the yellow fever. At any rate the practice of the natives ought in this reſpect to be a rule for emigrants, rather than any theories they may have laid down previous to their leaving their own country.

7. In like manner thoſe who newly arrive in a warm climate ought to avoid as much as poſſible the uſing of violent exerciſe in a heat greater than that to which they have been accuſtomed, and by all means to avoid intemperance in ſpiritous liquors. We are not however to imagine from this that ſuch as have been accuſtomed to drink ſpiritous liquors are all at once to give over the uſe of them, and live a life of abſtinence. On this ſubject Mr. Hardie, in his account of the malignant fever of 1795, has the following judicious obſervation: " It has often been ſaid, that temperance was the beſt " preſervative againſt infection. The obſervation, in " general, is certainly juſt; but it may, and during the " late calamity has, been carried too far. For my part,

" from

" from what has come under my own knowledge, I have " no heſitation in aſſerting, that to perſons who had " been accuſtomed to live freely, nothing could be more " dangerous than to become remarkably abſtemious " upon the appearance of this diſorder. Perſons of the " above deſcription ſhould, in my opinion, have conti- " nued to live in their uſual manner; by which means " they would have been more likely to repel infec- " tion, or if infected, they would have more ſtrength to " reſiſt the attack. But, whilſt I conſider abſtinence in " ſuch a ſituation as highly improper, a ſtate of intem- " perance is certainly more ſo; for, were it neceſſary, I " could mention the names of ſeveral individuals, who " whilſt in a ſtate of intoxication were attacked with the " fever, and in two days after were tenants of the grave. " The fate of ſuch people might be pronounced almoſt " with certainty: they were ſeized with ſymptoms of a " peculiarly malignant nature, and their death ſeemed " unavoidable."

On the ſubject of vegetables much declamation has been uſed. If we give heed to ſome, it might almoſt be ſuppoſed that all diſeaſes incident to human nature are owing to the uſe of animal food. The following paragraphs from Webſter's Collection may ſerve as a ſpecimen: " We ſhall not repeat the obſervations which we " have heretofore made, upon the averſeneſs the Ame- " ricans feel for ſoup and reſtorative broths, on their eating " their meat running with blood, with ſcarcely any bread, " and plenty of heavy potatoes, the only vegetables which " are ſeen on their tables; whilſt the French always give " the preference to vegetables, and eſpecially to thoſe " which are light and wholeſome. But we cannot help " obſerving, that, in the months of May, June and July, " the ſtreets and markets were ſeen in the morning fur- " niſhed with an immenſe quantity of fruits, the moſt " part of which are either green or unripe. In the even- " ing all thoſe fruits have diſappeared and have been " eaten; hence bloody fluxes, dyſenteries and bad " chyles, which unwholſome food muſt undoubtedly " produce.

" The

" The city of Naples contains about four hundred " thouſand inhabitants; of whom thirty or forty thou- " ſand are ſaid to belong to the claſs of beggars. In that " climate the rains prevail, with little intermiſſion, for " three months, from February to May. From May to " September, a drought, equally ſevere, and ſcarcely allay- " ed in many years by a ſingle plentiful rain, renders " the heat almoſt intolerable. The wages of a labourer " not exceeding eight pence this currency a day, and " meat being rarely had in their markets for leſs than " four pence the pound, and vinous liquors in the ſame " proportion, the maſs of population is excluded from " any ſhare of theſe luxuries; of conſequence they ſup- " port themſelves on vegetables, roots, ſallads, fruits, &c. " and dilute their food, and animate their ſpirits, with " water and lemonade. Yet this city has, for a great " number of years, known no general diſeaſe. And for " ten years no febrile diſeaſe, of any ſort, was common " among them. They alſo pay great attention to per- " ſonal cleanlineſs. Facts of this ſort are very important, " and form the beſt comment on the diſcordant opinions " of our phyſicians."

As a contraſt to theſe the reader may take the following quotation from the Medical Extracts:

" One gentleman excepted, ſays Dr. Shebbeare, and I " never ſaw a gentleman or lady who wholly abſtained " from animal food look like other people; nothing is " ſo eaſy to diſtinguiſh as a *vegetable man* by his phyſi- " ognomy, the fitteſt appellation by which they can be " diſtinguiſhed; he neither moves, talks nor looks like " other people; his face conveys a declaration of his " whole body being out of order, by the lifeleſs inſipidi- " ty which is in it, as his converſation does of his mind " being diſturbed, his whole time being taken up in " recounting to the world his manner of living, his feel- " ings, his weak ſtomach, his diſturbed ſleep, &c. . . . " If he pretends to have ſpirits, it is no more than a cer- " tain equability of a lifeleſs, inanimate ſtate, like that " of the dormouſe among animals, or the yew tree in " winter among vegetables," &c. (Medical Extracts, vol. x. p. 234.)

On the subject of vegetable and animal food we find the following observations in Willich's Lectures on diet, &c. "In the primitive ages, people subsisted chiefly on "plants and fruits. Even to this day many nations, the "Bramins, for instance, abstain from the use of animal "food. The ancient Germans also, who were so renown-"ed for their bodily strength, lived upon acorns, wood-"apples, sour milk, and other productions of their then "uncultivated soil. In the present mode of life, here (in "England) as well as on the continent, a great propor-"tion of the poorer class of country people almost en-"tirely subsist on vegetables. Although these people "duly digest their vegetable aliment, and become vi-"gorous, yet it is certain that animal food would answer "these purposes much better. Hence, in countries "where the labouring class of people live principally up-"on animal food, they far excel in strength and dura-"bility."

On the subject of diet we shall take notice only of one article more, and that is, the use of warm diluting liquors. These are commonly three in number, viz. tea, coffee and chocolate. Abundance of declamations have been published against the use of these, particularly the first; but the daily experience of multitudes shows that its use, in moderation, is perfectly innocent. Indeed when people go to excess with this, as well as any thing else, bad effects must certainly ensue. Zimmerman* mentions a Dutch physician (Bontikoe) who maintained that tea *ought* to be drank in the quantity of *one* or *two hundred* cups a day! But such ridiculous excesses must make any thing destructive to health; and accordingly this practice, being opposed by Boerhaave, soon fell into disuse. Coffee has the same exhilarating virtue as tea, but must be considerably different in its qualities,

* This author relates the following curious anecdote concerning tea-drinking: "We had a gentleman in Switzerland, who in every respect knew how "to assume the tone of majesty. He was told one day that nothing elevated "the dignity of a king so much as when every thing around him had a pale "look. This intimation was sufficient for him. He directed all his servants "to be blooded once a month, and obliged each of them to swallow fifty dishes "of tea every day." Tea is said to produce a cadaverous hue in the person who drinks it after bloodletting.

qualities, as having in it a portion of empyreumatic oil extracted by the toaſting, and therefore a change from tea to coffee in ſuch as come into a warm country ſeems to be improper. Chocolate differs conſiderably from both, poſſeſſing no exhilarating virtue, or only in a ſmall degree, but is more nutritive, and in South America conſtitutes a conſiderable part of the food. On coming into warm climates it is obvious that the increaſed perſpiration muſt be ſupplied by a conſiderable quantity of diluting liquids; and ſuch of theſe as the perſon has been moſt accuſtomed to ought to be preferred. For the reſt, diluted malt liquors ſeem preferable to ſpirits and water. Cyder, though very agreeable when freſh, is apt to become vapid, and even get a putreſcent taint. Perhaps a plain infuſion of malt, of late found ſo uſeful at ſea, might alſo prove beneficial at land, where proper fermented liquors cannot be had.

Theſe modes of prevention are obviouſly derived from the circumſtances which attend every emigrant from a cold to a warm country. The indication muſt be, to keep themſelves as cool as poſſible, without debilitating the body. It was formerly a cuſtom to uſe bleeding and purging when people arrived in warm latitudes; but this practice fell into diſuſe, perhaps without ſufficient reaſon. Dr. Ruſh atteſts the efficacy of theſe remedies as preventives when ſigns of the diſeaſe appeared. "During the exiſtence of the "premonitory ſymptoms (ſays he) and before patients "were confined to their rooms, a gentle purge, or the "loſs of a few ounces of blood, in many hundred in-"ſtances prevented the formation of the fever. I did "not meet with a ſingle exception to this remark." As mercury is found to be one of the beſt remedies, if not the only one, that can be depended upon for curing the diſeaſe after it is once formed, it is natural to think that it would act as a preventive; and accordingly we find, in Dr. Walker's account of the yellow fever in Jamaica, an inſtance to our purpoſe. When the fort of Omoa was taken from the Spaniards, a great quantity of quickſilver was carried off by the Engliſh. One ſhip

was

was loaded with it, and, the veſſels containing it being broken by the ſhot of the ſhip which captured her, a number of men were employed in collecting it with their hands into buckets. Not one of theſe men was in the leaſt affected with ſickneſs, though a moſt malignant fever raged among the reſt. Preventives of ſuch a powerful nature, however, could not well be adopted without the advice of a phyſician; it being evidently dangerous for any perſon unacquainted with medicine to tamper with himſelf in this way.

When the diſeaſe happens to get into a town, it then becomes an object for every perſon to avoid the danger; and for this Dr. Chiſholm has given ſuch inſtructions as ſeem to be quite ſufficient for any individual, and may be very eaſily reduced to practice. His obſervations may be ſummed up as follows: 1. To avoid going into infected houſes. 2. If this cannot be done, to avoid going into the chamber of the ſick. 3. If neither of theſe is practicable, to avoid a near approach to the ſick perſon. 4. To avoid drawing in his breath, or that peculiar ſmell which iſſues from the bodies of the ſick; and not to touch the bed-clothes. By neglecting this the perſon becomes affected with nauſea: ſlight rigors and head-ach ſucceed in a few hours by the diſeaſe. 5. Not to touch the patient's body or his wearing apparel, or ſuffer the effluvia from either to be blown upon the body. The diſtance at which the contagion acts is by Dr Chiſholm ſuppoſed not to exceed ten feet; but Dr. Lind thinks it may extend to fifty or ſixty feet; but this muſt depend very much upon circumſtances. The only thing that can be done in ſuch caſes is to keep at as great a diſtance as poſſible. As to the preventives commonly recommended, ſuch as vinegar, camphor, garlic, &c. we have no accounts of their having ever been efficacious in any caſe; and there is not the leaſt reaſon to think that they can be ſo.

To purify rooms or ſhips from the infection they have received, it has formerly been obſerved that fumigations with the acid of nitre have been recommended. According to the theory of Dr. Mitchill of New York, however,

however, this mode of prevention muſt not only be uſeleſs but pernicious. The reaſon is, that according to this gentleman the diſeaſe is produced by the very acid in queſtion. His reaſoning is ſhortly this: Putrid ſubſtances evolve various ſorts of air, two of which by combination form the acid of nitre. Neither of theſe by themſelves are capable of producing fever, though in conjunction they are. Their combination is the acid of nitre, which the Doctor thinks is always that which produces putrefaction. Dr. Girtanner has related an experiment which ſeems to confirm this opinion, viz. that, having injected ſome nitrous air into the jugular vein of a dog, the animal died in a ſhort time, and upon opening him his lungs were found of a greeniſh colour and partly putrid. Dr. Beddoes adds, in a note, that the green colour is a ſign of the exiſtence of nitrous acid, not of putridity; but, notwithſtanding this, Dr. Girtanner might ſtill have been in the right, as we cannot ſay that the exiſtence of nitrous acid is incompatible with putridity. But there is not any occaſion to enter into a diſcuſſion of the queſtion, as the matter ſeems to be determined by facts which cannot be overthrown. Dr. Carmichael Smyth, in a treatiſe on the jail fever, conſiders the diſeaſe as proceeding from putrefaction, and "particularly the putrefaction of the *perſpirable matter*,* when there is not a renewal of the application of air to carry it off." With regard to *ſpecific* contagions he thinks they can neither be carried off nor blunted, but by expoſure to the open air or to a ſtream of water; but with *putrid* contagions he believes that they may be deſtroyed by the mineral acids in a ſtate of vapour. The pernicious qualities of the fumes of ſulphur prevented him from making any trials with that ſubſtance; but to nitre there was no ſuch objection, and he therefore proceeded in the following manner; the ſubjects of his trial being the priſon wards at Wincheſter, where the Spaniſh priſoners were kept, and among whom a typhus fever was making rapid progreſs: Having divided the wards

* If this be chiefly compoſed of fixed air and azote, as has been ſaid in p. 146, it is difficult to ſee how putrefaction can take place in it.

wards into four parts, he removed the priſoners into three of them, took out of the fourth diviſion all the hammocks and bedding, and had them thoroughly cleaned out. The hammock poſts were well waſhed with diluted ſpirit of ſalt. The wards, when dry, were cloſely ſhut up, and pots placed in them at different diſtances, containing from half a pound to a pound of nitre, which was deflagrated by an iron heater put into each pot.* The wards were then ſhut up for ſome hours, and when opened, were expoſed to a free ventilation. The proceſs was repeated twice or thrice, after which the priſoners were likewiſe cleaned; their old clothes, bedding, &c. taken away, were replaced by others, and none of theſe were afterwards ſeized with the fever.

A much more deciſive experiment was afterwards made at Sheerneſs on board the Union hoſpital ſhip, where there were upwards of two hundred people ſick of a very malignant fever. Previous to the fumigation all the ports and ſcuttles were ſhut up. "Sand which had "been heated in an iron pot was then ſcooped into "earthen pipkins, into each of which was put a ſmall "tea-cup containing about half an ounce of vitriolic "acid; to which after it had acquired a proper degree "of heat an equal quantity of nitre in powder was "gradually added, and the mixture ſtirred with a glaſs "ſpatula, until vapour aroſe from it in conſiderable "quantity. The pipkins were then carried through "the wards by the nurſes and convaleſcents who kept "walking about with them in their hands, occaſionally "putting them under the cradles of the ſick, and in "every corner where any foul air was ſuſpected to lodge, "thus the fumigation was continued, until the whole "ſpace between decks, fore and aft, was filled with the "vapour, which appeared like a thick haze."

The firſt fumigation was performed in about three hours; the vapour ſubſided in about an hour, when the ports and ſcuttles were thrown open for the admiſſion of freſh

* It is not eaſy to underſtand this. Nitre cannot deflagrate or burn, unleſs it be mixed with charcoal, ſulphur, or ſome inflammable ſubſtance. The iron heater could only expel the water, with a ſmall proportion of acid.

freſh air. Mr. Menzies, the operator, perceived that even by this firſt fumigation the air was conſiderably ſweetened; and on repeating the operation next day, which (now that the people were more expert) took up only an hour, ſuch a change was made as the nurſes and attendants were very ſenſible of, and, beginning to put confidence in the remedy, approached the cradles of the ſick with leſs fear. The experiment was further carried on by Mr. Baſſan, to whom Mr. Menzies reſigned the office of conducting it; and from repeated trials it appeared that the fumigation effectually counteracted the influence of the contagion, though numbers of patients, labouring under the moſt malignant fevers, were received from the Ruſſian ſhips of war.

The good effects of nitrous vapour uſed in this way is alſo confirmed by Mr. David Paterſon, now ſurgeon in Montroſe in Scotland. The trial took place in the priſon wards at Forton. The operation was performed in the manner above related, and with ſuch ſucceſs, that a ward 57 feet long, 10 feet and an half high, and 20 feet broad, was filled in a quarter of an hour, only by means of three pipkins. The good effects were extremely obvious, and Mr. Paterſon obſerved that in the wards which had been fumigated at night there was an agreeable ſmell next morning; and by this ſmell he was able to diſcover whether the operation had been properly performed or not. The ſame author gives ſeveral caſes in which the good effects of the pure acid vapour of nitre in cleanſing putrid ulcers was manifeſt. A third teſtimony of the efficacy of this vapour is given in a letter to Dr. Garthſhore of London from Mr. James M'Gregor, ſurgeon to the 88th regiment, in the iſland of Jerſey. The diſeaſe was a typhus fever, which had formerly proved very deſtructive; but, while the acid vapour was uſed, only one out of *ſixty-ſix* caſes proved fatal. Mr. M'Gregor is not only of opinion that the nitrous fume prevented the contagion from acting fatally, but that it deſtroyed it altogether, ſo that no more caſes appeared. Mr. Paterſon made trial of different acids, but had not completed his experiments: we are informed, however,

in

in the Medical Extracts, that in the year 1795, near about the time that the laſt experiments were made upon the Union hoſpital ſhip, Morveau in France had employed, for the ſame purpoſe, oxygenated muriatic acid* in the form of air or vapour, with which he purified the infected hoſpital at Dijon; and the ſame method was afterwards extended to the different military hoſpitals by a decree of the National Aſſembly.

This mode of prevention ſeems to be eſtabliſhed on as ſure a teſtimony as any thing can be; but what can be ſaid that will not be diſputed? Dr. Trotter has argued in the moſt ſtrenuous manner that ſuch fumigation is not only uſeleſs, but pernicious. "The "whole preſervative means (ſays he) are compriſed in "the immediate removal of the ſick; cleanlineſs in per- "ſon and in clothing; fires to keep the people warm in "the winter ſeaſon; avoiding cold and moiſture, fatigue "and intoxication; and keeping the ſhip dry and pro- "perly ventilated." To theſe he alſo thinks it would be expedient to add a band of muſic in order to keep up the ſpirits of the people; but, with regard to any thing elſe, he thinks that "a phyſician of a fleet, though arm- "ed with a diploma, and with the chemiſtry of the ele- "ments at his fingers' ends, will find that very little has "been left for him to do; whether his doctrine of pro- "phylactics (preventives) be the *vinegar of the four thieves*, "or the fumigations of modern phyſicians, under the "ſcientific appellations of ſulphureous gas, muriatic acid "gas, or nitrous gas." The Doctor was ſo zealous againſt theſe noxious fumigations, that he wrote to Evan Nepean, eſq. at the Admiralty upon the ſubject. His argument was, that every poſſible method was taken on board of veſſels to expel *azote* or *mephitic air*, by opening ports, ſcuttles, &c. and putting down windſails, &c. "This azote is the baſe of the nitrous acid: they only "differ in the degrees of combination with oxygen, or "what was formerly called dephlogiſticated air: and in "proportion

* Perhaps this vapour may be as efficacious as the other in deſtroying contagion, but its ſmell is ſo extremely offenſive and diſagreeable to the lungs, that on this account nitrous vapour ſeems much preferable.

" proportion to the quantity it attracts of this principle " it is called azote, azotic gas, nitrous gas, nitrous acid, " nitric acid. In ſhort, Dr. Smyth's preventive is the " very ſubſtance that every intelligent officer is hourly " employed to drive from the decks of his Majeſty's " ſhips."* This letter was tranſmitted to the commiſſioners for the ſick and wounded for their report. The anſwer of the commiſſioners was to the full as learned as the Doctor's letter; but they conſidered the experiments of Dr. Smyth and others as quite deciſive upon the ſubject, ſo that Dr. Trotter was obliged to ſubmit. The matter therefore being determined by ſuch high authority, we muſt take leave of the ſubject, and proceed to conſider the mode of preventing the diſeaſe from getting entrance into any town, or of eradicating it when once it has got in.

Among theſe the enacting and ſtrictly enforcing quarantine laws certainly hold the firſt place. But theſe belonging entirely to the magiſtracy and police of the place cannot be the ſubject of any diſcuſſion here. The ſucceſs of theſe has been ſo great in other countries, that Dr. Willich informs us " that ſome of the moſt ingeni- " ous practitioners of Italy and Germany are, at this " moment, employed in a ſerious attempt wholly to ex- " tirpate this contagion (the ſmall pox) from the conti- " nent of Europe; an object which has formerly been " accompliſhed in the caſes of the plague and leproſy."† Perhaps, then, it is no improbable ſuppoſition, that, by a ſtrict obſervance of quarantine laws, and attention to cleanlineſs, the yellow fever may be eradicated at leaſt from the northern ſtates, whoſe climates are leſs congenial to it than the ſouthern.

Dr. Chiſholm informs us that the general plan of prevention made uſe of in Grenada conſiſts in the deſtruction of all ſmall wooden buildings; obliging the inhabitants to build with ſtone or brick; to make ſpacious ſtreets; to have the rooms of the houſes as large as poſſible; ſtables, neceſſaries, &c. at a diſtance; and certain places

* Medicina Nautica, p. 229. † Willich, p. 13.

places appointed as receptacles for filth, to which it muſt be carried every morning; ſlaughter-houſes at a diſtance from the town, &c. with a number of other particulars relative to cleanlineſs which it is needleſs to enumerate here; not forgetting the quarantines, lazarettos, &c. without which he does not think any activity on the part of the people can avail.

Dr. Ruſh, who is an enemy to quarantines, recommends to the people of Philadelphia the following particulars: "1. Let the docks be immediately cleaned, "and let the accumulation of filth in them be prevented in future, by conveying water into them by a paſ"ſage under the wharves, or by paving them with large "flag ſtones inclining in ſuch a manner towards the "channel of the river as that the filth of the ſtreets ſhall "deſcend from them (after it falls into the docks) into "the river. This method of paving docks has been "uſed with ſucceſs in the city of Breſt. 2. Let every "ſhip that belongs to our port be compelled by law to "carry a ventilator. Let all ſuch ſhips as are diſcovered "to contain foul air in their holds be compelled to diſ"charge their cargoes before they reach our city, and "let the ſhips in port be compelled to pump out their "bilge water every day. 3. Let the common ſewers be "waſhed frequently with ſtreams of water from our "pumps. Perhaps an advantage would ariſe from "opening them, and removing ſuch foul matters as "ſtreams of water are unable to waſh away. 4. Let "the gutters be waſhed every evening in warm weather. "By frequently waſhing the ſtreets and pavements the "heat of the city would be leſſened, and thereby one "of the prediſpoſing cauſes of the fever would in ſome "meaſure be obviated. 5. The utmoſt care ſhould be "taken to remove the filth from the yards and cellars of "every houſe in the city. Hog-ſties ſhould be forbid"den in yards, and the walls of cellars ſhould be white"waſhed two or three times a year, and their floors "ſhould be conſtantly covered with a thin layer of lime. "Whitewaſhing the outſide of houſes in ſickly ſtreets "would probably be uſeful. 6. Let the privies be emp-

"tied

" tied frequently; and let them be conſtructed in ſuch " a manner as to prevent their contents from oozing " through the earth ſo as to contaminate the water of " the pumps. 7. Let all the filth be removed from the " neighbourhood of the city, and let the brick kiln and " other ponds be filled up from time to time with the " earth which is obtained in digging cellars. 8. In the " future improvements of our city, let there be no more " dwelling houſes erected in alleys. They are often the " ſecret receptacles of every kind of filth. 9. The pre- " diſpoſition of our citizens to be affected by the remote " and exciting cauſes of the yellow fever would be very " much leſſened by their living ſparingly upon freſh " animal food, and chiefly upon broths and freſh vegeta- " bles, rendered ſavoury by ſpices and a ſmall quantity " of ſalted meat, during the ſummer and autumnal " months. A conſtant attention ſhould be paid at the " ſame time to bodily cleanlineſs."

Theſe are the modes of prevention which ſeem to be the moſt obvious and neceſſary, as well as approved by the beſt judges. It appears, however, that in certain caſes neither human ſkill nor care can prevent or cure the diſorder. The number of phyſicians who have fallen victims to this diſeaſe are too manifeſt proofs of this.* Indeed, when we conſider that it is the nature of the diſtemper firſt of all to attack the vital parts, and that this attack may commence with little or no pain, it

* Dr. Ruſh pathetically laments the loſs of Dr. Nicholas Way, who had been his intimate friend. In a poem called the *Political Greenhouſe* we find ſome account of the death of Drs. Smith, Cooper and Scandella, who alſo periſhed; and the fates of Drs. Smith and Scandella were connected with one another. Dr. Cooper of Philadelphia was ſeized with the diſeaſe in that city. A friend who attended him ſickened during his attendance, and Dr. Cooper, before he had thoroughly recovered, attended in his turn the friend who had taken care of him. A relapſe enſued, and the Doctor died. Dr. Smith was intimate with Dr. Scandella of Venice, who had come from thence to America, and was at New York during the time of the fever in 1798. Intending to return to Europe, he waited there for the Engliſh packet boat; but, being informed that a foreign lady in Philadelphia, for whoſe daughter he had an attachment, was ſick of the yellow fever, he returned to that city; but could not ſave either mother or daughter from the cruel diſeaſe. On Scandella's coming to New York the ſecond time he could find no body that would receive him as a lodger. In this forlorn ſituation he wrote to Dr. Smith, who inſtantly gave him an invitation to his houſe. Here he was ſeized with the fever, and was attended by Dr. Smith, until the latter alſo fell ſick. A friend who lived in the houſe attended firſt Dr. Scandella, and then Dr. Smith, until both died.

it is evident that an attack may be begun before we think of a preventive, and may, as it were in a moment, prevail in ſuch a manner as to be entirely beyond the reach of medicine, before even a medicine is thought neceſſary. In every caſe therefore, where the yellow fever prevails, an attention to health becomes as neceſſary as procuring the means of ſubſiſtence. Every precaution muſt be uſed, and when we have done ſo we are not even then ſecure. We are ignorant of the natural cauſes which produce it; they are inviſible to our ſenſes, and incomprehenſible by our underſtandings. Safety then can only be expected from the protection of that Being to whom all natural cauſes are known, and to whom all muſt yield obedience. In ſhort, we may ſum up the whole in the well known ſentence, "*He that will love life, and ſee good days, let him refrain his* TONGUE *from* EVIL, *and his* LIPS *that they ſpeak no* GUILE. *Let him eſchew* EVIL *and do* GOOD; *let him ſeek* PEACE, *and enſue it.*" A very ſtrange receipt indeed, we will ſay; but how often have we tried it?

The cure of the yellow fever hath been attempted in various ways, according to the theories laid down by different phyſicians concerning its nature. Dr. Cullen conſiders it as of the nature of *typhus* fever,* and of conſequence would have treated it with antimonials; moſt probably with his favourite remedy, tartar emetic. Dr. Ruſh, from his opinion that it is the higheſt degree of inflammatory fever, recommends powerful evacuants, and large blood-letting, in 1793, and 1797, though he ſeems to have altered his ſentiments in 1798. Dr. Brown, who would have conſidered it as a diſeaſe of debility, would of courſe have preſcribed opium and other ſtimulants; and laſtly, on the theory of Dr. Mitchill, that the diſeaſe proceeds from an *acid*, remedies of a nature directly oppoſite, viz. *alkalies*, ought to be uſeful. It is not the deſign of this treatiſe to enter into any conſideration or compariſon of the practice of different phyſicians, but to point out at once, to thoſe who are not phyſicians, the remedies which have been,

* Typhus Icteroides.

been, by general conſent, accounted moſt efficacious; and in this reſpect there is now a ſurpriſing unanimity among gentlemen of the medical profeſſion. Thoſe which hold the firſt rank are,

1. *Mercury.* In the uſe of this medicine the phyſicians of the Weſtern world have certainly excelled thoſe of the Eaſt. In a paper in the Medical Repoſitory, vol. i, p. 500, Dr. Holyoke of Salem ſays that the practice of giving mercury was firſt introduced into New England about 60 or 70 years ago,* by a phyſician from Scotland, a diſciple of the celebrated Pitcairn. In 1734 or 1735 it was uſed ſucceſsfully in a very malignant diſeaſe called the *throat diſtemper*, and which he thinks was of the ſame genus with the *malignant ulcerous ſore throat* treated of by Huxham. About 45 years ago it was commonly uſed in pleuriſies and other inflammatory diſorders; and, ever ſince the year 1751 or 1752, it has been uſed by Dr. Holyoke himſelf. In Europe, however, the caſe was exceedingly different; mercury being there generally reckoned pernicious in ſuch diſorders, from a notion of its being inflammatory, or diſſolving the blood. Thus, on the appearance of the Boullam fever in Grenada, Dr. Chiſholm found himſelf exceedingly at a loſs what to do, and he ſeems to have *invented*, rather than to have been previouſly *inſtructed* in, the mercurial practice. His ſucceſs, however, was very great, provided he could raiſe a ſalivation; but in order to do this he was frequently obliged to give much larger doſes than he had ever done before, or had any notion of doing. In p. 159 he mentions one patient who took 400 grains before the ſalivary glands were affected. He tells us, however, p. 271, that, on the re-appearance of the fever in 1794, he gave the medicine in much larger doſes than before; beginning with mercury without any previous evacuations which he had uſed the year before, and with ſuch ſucceſs that he did not loſe a ſingle patient; ſo that he profeſſes himſelf almoſt ready to pronounce it *infallible* in curing the diſeaſe. The practice of giving mercury is confirmed by Dr. Ruſh, and indeed by ſo many other

* The Doctor's letter is dated December, 1797.

other phyſicians, that it is ſuperfluous to quote them. Dr. Naſſy, formerly mentioned, again ſtands almoſt ſingular in condemning the medicine, becauſe it diſſolves the blood; but it is impoſſible that any theory, however plauſible, can ſtand againſt well atteſted facts. Dr. Ruſh is indeed very much of opinion that it is eaſily practicable for people to cure themſelves of this diſorder, dreadful as it is, provided they take it in time. But by this we muſt underſtand, that the very moment the perſons feels uneaſineſs he muſt apply a remedy, and not truſt to *nature* in any caſe whatever. When the yellow fever prevails, every one who feels the ſlighteſt diſorder may be aſſured that his diſorder partakes of its nature, and ought immediately to have recourſe to a mercurial purge. Dr. Ruſh ſays alſo that bleeding ſhould be firſt performed. The many diſputes, however, concerning the efficacy of this laſt remedy, muſt make any perſon heſitate at the application of it without medical advice, eſpecially as a mercurial purge may be ſafely taken without it.

2. *Blood-letting.* This was, by Dr. Ruſh, conſidered as the capital remedy in 1793; but Dr. Chiſholm, who made trial of it in the Boullam fever, found that it could not be uſed with any degree of ſafety. Dr. Jackſon ſays it is frequently neceſſary in the Jamaica fever, but it was ſeldom of uſe to repeat it. Dr. Walker ſays it increaſed the debility in the ſame fever of 1793, 94 and 95. Dr. Moſeley recommends it in the yellow fever of the Weſt Indies, but only in the firſt ſtage, and ſays that the injudicious performance of this operation, when the ſecond ſtage has come on, has given occaſion to the opinion that a patient cannot bear two bleedings. Dr. Coffin found it uſeful at Newburyport in 1796, in the beginning of the diſeaſe, and ſays it may ſometimes be repeated. Repeated bleedings are recommended by Dr. Ouviere of Philadelphia, who ſays they are not to be omitted even in fat and weak habits. This is confirmed by the editor of the Medical Repoſitory, vol. i, p. 92, who ſays it was uſed with ſucceſs at the hoſpital in New York in 1796, "at repeated times, to the amount of "from 24 to 175 ounces, and in ſome caſes ſeveral times

"performed

" performed after the ſixth day of the diſeaſe, to the " great relief of the ſick." Dr. Bruce recommends it in the iſland of Barbadoes in the robuſt and plethoric.* Dr. Hillary ſays that in the ſame iſland it is always abſolutely neceſſary, and that it may even be repeated once, but that a third bleeding was ſeldom neceſſary. Dr. Wright, in the ſame iſland, found the " lancet not only unneceſſary but dangerous in the extreme." Dr. Clarke, in Dominica, found it generally very pernicious, and aſſures us " that there was not a ſingle inſtance of an emi- " grant recovering who had been bled in this diſeaſe. In " the firſt 24 hours indeed it was admiſſible in the young " and athletic ſeized a ſhort time after their arrival, but " after that time, or at moſt after 36 hours, it will al- " ways be found prejudicial, if not fatal." It was not tried by Dr. Bryce on board the Buſbridge. It is recommended by Dr. Currie in his treatiſe on bilious fevers.

It is needleſs to take up time with a detail of more opinions. From thoſe already recited it is natural to conclude that the fever in ſome places, and at ſome times, differs very much from others. This is conformable to the opinion of Dr. Currie, who ſays, that the bilious fever " is amazingly influenced in its aſpect and " ſymptoms by the ſoil, ſituation, climate, ſeaſon, and " by the preceding and preſent ſtate of the atmoſphere, " and the cuſtomary mode of living of the inhabitants." The utility or even ſafety of blood letting then ſeems to depend on circumſtances which can be only known, and that perhaps with difficulty, at the time; nor can its ſucceſs in one ſeaſon be a ſufficient argument for the general practice of it in another.

3. *Vomits* have generally been found dangerous. Dr. Moſeley, Dr. Ruſh, and indeed almoſt all who have practiſed in this diſeaſe, ſay, that they cannot be ventured upon without extreme caution. Dr. Chiſholm, in imitation of the Ruſſian practice in the true plague, attempted the cure of the Boullam fever by vomits; but, as one half of thoſe to whom they were exhibited

* Lind on hot climates.

ed died of the diſeaſe, he did not think there was any encouragement to proceed. Perhaps as preventives they might be uſeful, as it ſeems probable indeed that any thing muſt be which tends to cleanſe the alimentary canal.

4. *Purgatives* are found extremely uſeful, both as preventives and medicines. There are innumerable inſtances where an incipient attack of the diſeaſe has been carried off by a briſk purge. Dr. Chiſholm was able to remove the ſlighter caſes of Boullam fever by purgatives. He uſed at firſt glauber ſalts with two grains of tartariſed antimony, which generally proved emetic as well as purgative; but he afterwards uſed with advantage the better purging ſalts, rendering the ſolution palatable by the addition of lime juice and ſugar. But in all violent caſes he would depend on nothing but mercury.

5. *Stimulating medicines.* The ſtimulants commonly uſed on the Brunonian plan, viz. opium, bark, &c. are univerſally owned to be pernicious. In a letter from Dr. Sayres to Dr. Currie,* the former ſays, that "bark, "wine, and a number of the common ſtimulants, were "given on the firſt appearance of debility taking place; "but with little ſucceſs. Finding the common round "of medicine ineffectual in the advanced ſtate of the "diſeaſe, I determined (ſays Dr. Sayres) to uſe a different "mode of treatment. In three caſes of adults, two of "which had the black vomiting, and the third was in a "gore of putrid blood from the mouth and noſe, I for-"bid medicine, and directed very cold water and bran-"dy mixed ſtrong, to be given as freely as poſſible. It "had the happy effect of checking the vomiting in two "caſes, when the ſtomach had rejected every kind of "mild drink, &c. and, by continuing that practice al-"moſt ſo as to produce high intoxication, for two or "three days, theſe two caſes were recovered almoſt from "a ſtate of death. The third was apparently much "benefited for three days; but, being in a high putreſcent "ſtate when I ſaw him, and having loſt a very conſider-"able quantity of blood from the mouth, noſe, &c. he "died

* Memoirs of Yellow Fever, p. 137.

" died on the ninth day." In the Boullam fever Dr. Chiſholm uſed the Anguſtura bark in twelve caſes, eight of whom recovered; but, though it was greatly ſuperior to the Peruvian bark, he did not think proper to truſt to it in violent caſes.

6. *Alkaline remedies.* Theſe have been recommended on the ſuppoſition that the yellow fever is occaſioned by an acid. Their efficacy is atteſted by Dr. Jeremiah Barker of Portland, who ſays that they afforded more relief than any others, and that all the caſes accompanied with yellowneſs ended favourably, but one. The alkaline remedies " would actually alleviate the diſtreſſing " pain and anguiſh at the ſtomach, which would not " yield to opiates. The morbid excitement too was *evi-* " *dently* under the controul of alkalies; the febrile diſ- " turbance appeared to be in a direct ratio to the degree " of virulence in the deleterious cauſe."* We have not any particular details of caſes, nor any form of exhibition pointed out. In a dyſenteric fever indeed he ſays that he uſed a mixture of a quarter of an ounce of ſalt of wormwood with a pound of lime water; the doſe from one to two ounces every hour, once in ſome caſes every half hour, or oftner, in an infuſion of camomile.† Calcined oyſter ſhells were ſometimes given from 40 to 60 grains.

7. *Cooling medicines, external and internal.* The good effects of cold water applied to the body in fevers has long been known. Dr. Jackſon obſerves that it was firſt introduced at Rome in the infancy of the Methodic ſect, and attained afterwards a high degree of celebrity. Its reputation was highly raiſed by a cure performed on the emperor Auguſtus; but ſoon after ſunk by the death of Marcellus, the preſumtive heir to the empire, to whom it had been improperly preſcribed. It was ſoon after preſcribed again, and greatly uſed by Galen; and after him was in ſtill greater favour with the Arabian phyſicians; but, ſince the revival of literature, has been much neglected

* Medical Repoſ. vol. ii, p. 149.

† In this mixture the fixed air in the alkaline ſalt would inſtantly deſtroy the virtues of the lime water by precipitating the lime. What is ſold for ſalt of wormwood is neither more nor leſs than common pearl aſh.

neglected till of late. In the fever of Jamaica, after the fatal ſymptoms were removed, Dr. Jackſon ſays, that the tone and vigour of the ſyſtem was beſt reſtored by cold bathing, "which (ſays he) I am induced to conſider as "the moſt important remedy in the cure of the fevers "of the Weſt Indies, and perhaps in the cure of the "fevers of all hot climates. Though it might not ab-"ſolutely cut ſhort the courſe of the diſeaſe, yet it ſel-"dom failed to change the fatal tendency of its nature." Even in the laſt ſtage of the yellow fever, where the patient ſeems at the utmoſt extremity, our author tells us that he has alternately employed warm and cold bathing with the greateſt ſucceſs. He has even wrapped the body in a blanket ſoaked in water in which a large portion of ſalt had been diſſolved, or which had been ſteeped in brandy or rum, enjoining the liberal uſe of wine, or more powerful cordials. Dr. Wright alſo mentions the cold bath with approbation; but, as it cannot be very generally depended upon, its uſe ought never to ſuperſede that of other remedies, eſpecially mercury; and indeed this may be ſaid of every thing elſe; for though by the uſe of the remedies already mentioned the diſeaſe has ſometimes been ſubdued, yet the ſucceſs has never been ſo great but that every one under an attack of the yellow fever muſt be conſidered as in very conſiderable danger.

In the uſe of cooling medicines, taken internally, we muſt have a particular regard to the ſtate of the ſtomach, which is exceſſively irritable; and it is ſurpriſing that this irritability is of ſuch a nature that, though it will certainly reject the mildeſt drinks or medicines, it may yet retain others ſeemingly much more acrid, as has already been obſerved in the caſe of Dr. Sayres's patients. As long ago as the time of Diemerbroeck a ſolution of common ſalt in vinegar was recommended in the plague. Since that time it has been found extremely uſeful in the dyſentery; and, as in this diſeaſe the bowels are likewiſe in an extremely irritable ſtate, it would ſeem from analogy that the ſame medicine might be uſeful alſo in the yellow fever. Dr. Wright of Jamaica (who atteſts the efficacy

efficacy of the medicine in dyſentery, belly-ach, remittent fever, and putrid ſore throat) gives the following improved method of preparing it: "Take of lime or "lemon juice three ounces; of marine ſalt as much as "the acid can diſſolve; of any ſimple diſtilled cordial "water one pint; and of loaf ſugar a ſufficient quan-"tity to ſweeten it. The doſe of this mixture muſt be "proportioned to the age and ſex of the patient, and to "the violence of the diſeaſe. A wine glaſsful may be "given to adults every two, four or ſix hours."

8. *Medicines proper for relieving the moſt urgent ſymptoms of the diſeaſe.* The moſt diſtreſſing ſymptoms attending the yellow fever are, head-ach, vomiting, pain in the ſtomach, and pains in the back, loins and limbs. Bliſters were tried by Dr. Chiſholm to mitigate the pain in the head. "I have (ſays he) bliſtered the whole head, "and the inſide of each thigh, at once, in ſeveral caſes, "without producing the leaſt change in that or any "other ſymptom. I have had recourſe to this remedy "to leſſen pain, to remove irritability of the ſtomach, "and to raiſe the vital powers in the low, comatoſe ſtage, "but always except in two caſes without ſucceſs." In one a bliſter to the ſcrobiculus cordis completely removed the irritability; the other caſe is related in the next ſection. Another practitioner found a bliſter applied to the forehead of remarkable uſe in four caſes; but Dr. Chiſholm ſuppoſes them to have been of the leſs violent kind. Others have alſo found them occaſionally uſeful; ſo that, though dependence cannot be placed upon theſe remedies, it ſeems improper to reject them entirely. But the moſt effectual method of allaying the irritability of the ſtomach was by the exhibition of vitriolic æther. Dr. Chiſholm adopted the medicine on the recommendation of M. Poiſſonier, and found it to anſwer the character given of it by him. Dr. Chiſholm gave about a tea ſpoonful in half a glaſsful of cool water, after which the patient continued undiſturbed about two hours, when the doſe was repeated. Sometimes, though ſeldom, the ſtomach was thus enabled to bear the bark, but otherwiſe the æther was given every three hours. If the

ſtomach

ſtomach retained the bark after the firſt doſe, æther was then given only once in five or ſix hours. Æther, ſays he, given in the manner I have mentioned, is extremely grateful to the patient; it occaſions an agreeable warmth along the oelophagus, and gently ſtimulates the ſtomach. This effect, however, does not continue long; but the frequent production of it at length gives it permanency. It appears to act as a tonic, an antiſeptic, and an agreeable ſtimulant; a warm glow overſpreads the ſurface; and thirſt, nauſea and oppreſſion, often have fled before it.

Theſe are the remedies moſt approved, and which may with moſt reaſon be expected to ſucceed in the cure of the diſeaſe, where it is *within the power of medicine*. But there are certain caſes in which medicines of the ordinary kind cannot act. Sometimes, at the very beginning of the diſeaſe, all the three ſtages of it ſeem to commence at once, or to be mingled in ſuch a manner that medicines have not time to exert their force. Again, in the laſt ſtage, Dr. Jackſon compares the attempts to overcome the torpor of the ſyſtem by medicine, to that of attempting to revive a dead corpſe. "I have, however (ſays he) "ſeen inſtances of ſuch unexpected recoveries from the "moſt hopeleſs ſtate in fevers, that I ſeldom totally deſ-"pair as long as life remains." It is evident, however, that the remedies employed muſt be different, according to the different times of the diſeaſe. In the beginning it is probable that by bleeding to an extreme degree, ſo that the greater part of the maſs of blood was taken away, the diſeaſe might be ſubdued at once, and the patient recover, as has been already mentioned of the plague, p. 363. But the idea of death ſeems to be ſo firmly connected in the human mind with the loſs of a great quantity of blood, that very little hopes can be entertained of any good being done in this way. It ſeems indeed owing to this invincible aſſociation of ideas that the enemies of Dr. Ruſh have found means to load him ſo much and ſo undeſervedly with reproach. Another method, leſs exceptionable, though probably alſo leſs efficacious, is by injections into the veins. But what are we

to

to inject? Here, to the disgrace of experimenters, let it be recorded, that such has been their innate propensity to cruelty, that though we know a number of substances which, injected into the veins of an animal, will *certainly* kill it, yet we scarce know one which can be injected with even a *probability* of doing good. In the Medical Extracts indeed we find it related that at Guadaloupe a physician had cured the most inveterate diseases by injecting *certain remedies* into the veins. But what these remedies were we know not. In the same paragraph indeed it is said that alarming symptoms from the bite of a viper were removed by injecting diluted *spirit of hartshorn* into the blood. As the bite of a viper is attended with a dissolution of the blood, and yellowness of the skin, we may thence derive some faint hope that such an injection might also be useful in desperate cases of the yellow fever; but, till further experiments are made, we can say nothing more on the subject.

Lastly, when the disease has proceeded so far that the blood flows out from all parts of the body, and it is evident that the patient must die were it only from the loss of that fluid, then, if ever, the once celebrated remedy of the transfusion of blood may be of use. An account of this remedy has been given in the former part of this work. It must be evident that human blood ought to be preferred to that of a brute creature; but the danger incurred by one who should lose a quantity of blood so near to a person capable of giving the febrile infection must certainly be very great. Nevertheless, there are cases in which the death of a beloved object inspires more horror than the thoughts of any personal danger, or even death itself, to the person who beholds it. In such cases no doubt there are many that would run all risks; and, should any case prove successful, no doubt the person who had the courage to make the experiment would find ample recompense in saving a person he loved from death, and in establishing a truth of such importance to the world in general.*

SECTION

* From the accounts of the most eminent practitioners it appears that the fever of 1798 differed considerably in its nature from that of 1793. In Philadelphia

SECTION IV.

Remarkable Caſes.

SO many caſes have been enumerated in the courſe of this work, that little more remains to be done in that way. The following are given, not merely on account of their ſingularity, or to give inſtances of ſurpriſing and unexpected recovery, but to elucidate ſome points of doctrine hinted at before, and not ſufficiently explained.

1. *Spontaneous*

delphia particularly there were many caſes that could not bear the ſtroke of a lancet. In Boſton it ſeems to have partaken more of the nature of the true plague than in other places and other years. The diſſections of Drs. Rand and Warren manifeſt a difference between the effects of it on the body at that time, and what they were in former years. Buboes, carbuncles, or what were thought to be ſo, and petechiæ, were obſerved here, as well as in New York. One remarkable caſe, related in the next ſection, ſhows a diſpoſition to *induration*, very uncommon in the yellow fever, though ſo common in the true plague that in the former part of this treatiſe it is taken for the characteriſtic mark of the diſeaſe. None of thoſe eſchars called *tokens*, however, were in any caſe obſerved. The diſeaſe here bore bleeding much better than at Philadelphia; but mercury was always the moſt efficacious remedy, where a ſalivation could be raiſed. The warm bath was uſed in ſome caſes with ſucceſs. Large evacuations were uſeful, and ſome patients bore three or four bleedings, with repeated doſes of jalap and calomel. The diſtemper is by one gentleman ſtyled a *novel* diſeaſe, and differing eſſentially from other bilious complaints. In one caſe the patient died of apoplexy; and another would probably have ſhared the ſame fate, had it not been for timely bleeding. The black vomit was almoſt inevitably attended with death. The matter evacuated was thought to be extravaſated blood from veſſels in ſome caſes mortified. The yellow colour was judged merely accidental; but Dr. Lind's opinion of its ariſing from a diſſolution of the blood ſeems now to be univerſally abandoned, and the colour is ſuppoſed to ariſe from a ſuffuſion of bile, owing either to the obſtruction of the ducts, or too great ſecretion.

The names of the gentlemen upon whoſe authority the above facts ſtand cannot be mentioned, as permiſſion for ſo doing has not been obtained. Their authenticity, however, can be proved by undeniable documents.

The origin of the fever at Boſton has, as uſual, been diſputed; but the common opinion is that it was generated. It now appears, however, that, though there are very ſtrong reaſons for ſuppoſing it to have originated in the place, there are others equally ſtrong for believing that it was imported. It is aſcertained that a veſſel on board which perſons had died with the yellow fever lay in the neighbourhood of the family firſt ſeized with the diſeaſe in 1798. On the other hand, there were inſtances of many that were ſeized with the diſtemper who had not even left their houſes for months previous to the contagious period. This year (1799) there have been unqueſtionable proofs of the importation of the fever from the Havana. The quarantine, however, has kept the infection from ſpreading; though the ſtate of the atmoſphere has been much leſs favourable to the diſeaſe than laſt year, and has therefore no doubt contributed to preſerve the health of the people.

We

1. *Spontaneous burning.* In the former part of this treatiſe ſeveral extraordinary inſtances of this kind are given; but a doubt was ſuggeſted whether the fire was produced

We have been favoured with the following liſt of thoſe affected with the diſeaſe this year at Newburyport:

	When taken.		*Remarks.*
	Oſſytaway	June 28.	A ſeaman on board the veſſel.
*	March	28.	do.
*	Sol. Haſkel	July 3.	On board while her cargo was diſcharging, &c.
*	His nephew	4.	do.
	Duggins	5.	Preſent when the ballaſt was thrown out, alſo on board.
	Tho's Norwood	6.	Worked in a hatter's ſhop about 16 rods from the veſſel when graving, the wind blowing all or moſt of the time from the veſſel towards the ſhop.
	Tho's Nor'd jun.	6	
*	Robert Lord	6.	
	Stephen Tilton	6.	Worked on the wharf where the veſſel was hauled in.
	Paine	7.	Loaded and ſtowed the veſſel for another outward bound voyage. Theſe men lived at Ameſbury.
	Herbert	7.	
*	Walleigh	7.	
*	Miſs Dole	9.	Worked in a tailor's ſhop, by Norwood's hatter's ſhop.
	Sally Wood	10.	do
	James Wood	11.	Along ſide the veſſel, and filled the old bread caſks for her outward voyage. He alſo lived near the wharf.
	Widow Waite	11.	Doubtful whether her diſorder was the fever. Lived at the bottom of the wharf.
*	Wm. Thompſon	11	Lived at the bottom of the wharf, & was along ſide of the veſſel.
	Jona. Pearſon	13.	Kept a ſtore near the wharf, & was along ſide the veſſel.
	Danl. Favour jun.	15.	Worked near the bottom of the wharf.
	Goodhue	15.	On board the ſchooner, and trimmed the ſugar caſks.
*	Rev. Mr. Milton	15.	Viſited the ſick at Norwood's.
*	Mary Dunn	15.	Lived at Norwood's.
	Giles Parſons	16.	Handled the bags of money that came in the veſſel, and counted it. Was along ſide of the veſſel.
*	Sol. Currier	16.	On board the ſchooner. Helped to haul her in.
*	Sam. Currier	18.	On board. Helped to diſcharge the ballaſt.
*	Greaty	18.	On board when the veſſel was diſcharging her cargo.
	Mrs. Wood	19.	Widow of James Wood, above mentioned.
*	Sally Edwards	19.	Lived with James Wood.
*	Her brother	19.	Lived oppoſite, & often in, Wood's houſe during the ſickneſs.

Thoſe marked with aſteriſks recovered.

"The fever unequivocally the ſame which prevailed in this town in 1796, "and in Boſton and Portſmouth the laſt ſummer.

"The veſſel ſuppoſed to have introduced the diſeaſe was the ſchooner "Sally, Joſeph Gunniſon maſter, which arrived at Bartlett's wharf on the "morning of the 29th of June laſt, after a paſſage of 18 days, from St. Tho- "mas's, where the yellow fever prevailed and was very mortal, with 17 "tierces of ſugar, and caſh in bags. She diſcharged her cargo before one "o'clock on the day of her arrival. In the ſame afternoon her ſtone ballaſt, "taken on board at St. Thomas's, was thrown on deck. On the firſt of July "ſhe was moved to a wharf 10 rods below, and her ballaſt was thrown on a "pier wholly covered with water. This ballaſt was covered with a viſcous "ſubſtance, which adhered to the fingers, and was very offenſive to the peo- "ple

produced *internally*, or *externally*. The following account, from the Medical Extracts, determines the matter. The circumſtance took place in England, in the year 1613. One Hitchill, a carpenter, came home from his work as uſual, without being ſenſible of any indiſpoſition, and went to bed. In the night time, or early in the morning, his wife awaked and found him dead by her ſide. His body was ſo hot that it could not be touched, and he continued burning internally for *three days*. No flame appeared on the outſide, only an hot ſteam iſſued from his body; and we are not told what was the ultimate effect of the fire, or whether his body was conſumed to aſhes or not. In the ſame work we are told of a woman who was found dead in her room in the morning, and conſumed to aſhes, her very bones being calcined to whiteneſs. The floor on which ſhe lay was very little burned. This laſt caſe, however, is not ſo directly in point as the former, which ſeems deciſive with regard to the internal origin of the fire.

2. *M.*

" ple working on the pier. On the ſame day ſhe was hauled in between the " two wharves, and graved, and removed back to Bartlett's wharf, where ſhe " was loaded with lumber for another voyage, on which ſhe ſailed the " 11th of July.

" It is ſtill queſtioned whether this fever was imported, or generated in the " town. You will find that all who have had it have been connected with that " veſſel, or lived or worked near where ſhe lay, or viſited the ſick near the place " where the veſſel was graved. And undoubtedly there were many perſons " alike connected and ſituated who did not take it, although the inhabitants " living near the wharf very ſoon moved away. It is ſaid that there is an old " diſtil-houſe near the bottom of the wharf, which has not been uſed for " many years, and that the tubs and ciſterns are replete with putrid exhala- " tions. I do not know that this fact has been verified. It is alſo ſaid that " back of the ſtore uſed by the deceaſed Jonathan Pearſon, were brewers', ſoap " boilers' and tallow-chandlers' works which had all been uſed in the laſt- " ſpring. This is true; but I do not know that it is evident that any putrid " ſubſtances were formed there. Dr. Vergnies informs me that there was one " caſe of the yellow fever 2 days before the veſſel arrived. In my mind the " weight of evidence in favour of the importation greatly preponderates. In " 1796 the evidence was very unequivocal that the fever was generated.

" Juſt before the veſſel arrived we had ſome very warm weather, and the " heat was oppreſſive to the feelings. The thermometer two afternoons was " at 90 deg. Perhaps it may not be unuſeful to mention that calomel was " given liberally. All who recovered were ſalivated. All who could not be " ſalivated died: and unfortunately ſome who were evidently ſalivated died. " Since forming my table I find that a Mrs. Plummer who lived near the " wharf will die.* Her caſe for the firſt ſeven days was ſuppoſed to be an " intermittent fever; then it aſſumed the ſymptoms of the yellow fever. She " was taken on the 11th July.

" * This patient is now dead."

2. *M. D'Obſonville's caſe of the plague.* In the former part of this treatiſe it has been ſaid that heat deſtroyed the plague; but, on the authority of the Ruſſian phyſicians, that the diſeaſe could not be treated in hot rooms. The following caſe, however, ſhows that even expoſure to a burning ſun in a deſert, to the cold air of night, and to the moſt injurious uſage, cannot always render fatal an attack even of the moſt dreadful diſtemper in the world. M. D'Obſonville had undertaken a journey over land to the Eaſt Indies, in order to execute an important commiſſion from the French government, in 1761, the very time when the plague raged violently in the eaſt. He deſcribes his caſe in the following words: "I felt the firſt ſymptoms of the plague two ſmall "days journey from Aleppo, when I had entered the "deſert; and at night, when going to reſt, complained "of a general uneaſineſs and heavineſs of the head. In "the morning the fever was known to be inflammato-"ry; and from that time I had no longer any ſleep. "The third, the fever and head-ach became more vio-"lent, two buboes began to riſe on my left ſide, my "tongue was ſwelled, and of a brown violet colour. The "fourth and fifth days, ſores began to appear on my "loins, the ſpine of my back, and the ſcrotum; ſome "of which were as large as the palm of my hand, and "their colour at firſt was a red purple. I was obliged, "however, to riſe, like other paſſengers, at two in the "morning, and travel on horſeback till eleven. Unable "to ſwallow any thing but a little water, abandoned by "my Chriſtian ſervant, who durſt not come near me, "and attended by an Arab, that I could not underſtand, "the violence even of my illneſs, and a little fortitude, "had hitherto contributed to ſupport me; but my "weakneſs increaſed hourly, and I could no longer ſit "my horſe, when an Armenian lady, named *Tcheremani*, "determined to ride him herſelf, and with the utmoſt "humanity gave up her camel to me, on which was a "kind of litter. On the ſixth day the ſymptoms all "appeared aggravated; at one moment my pulſe beat "with an aſtoniſhing quickneſs, and fire ſeemed to run

" through my veins; and the next, my blood was in-
" tercepted in its courſe, a moiſture covered my fore-
" head, and I felt myſelf fainting, though without being
" delirious, or loſing my ſenſes."

The caravan having arrived at a ſmall ruined village named *Soccun*, in the deſert, it was reſolved to leave M. D'Obſonville to his fate, his caſe being conſidered as deſperate; and indeed he ſays he was left alone at his own requeſt. A ſmall horde of Arabs reſided in that village, though ruined, and our patient was conſigned to the care of a religious perſon called a *moullah*. This gentleman, like too many others, did not chooſe to *ſerve God for nought*, and therefore demanded fifty piaſtres in ſilver, beſides ſome effects, in recompenſe for the charity which he was about to extend to the unhappy traveller. Having received thoſe, and the caravan being gone, the moullah and his wife in the night time laid M. D'Obſonville acroſs an aſs, and carried him about a mile into the deſert, where they left him to ſhift for himſelf. Happily, however, either through accident or deſign, theſe religious devils had depoſited their prey near ſome water, which undoubtedly, as he ſtill retained his ſenſes, was the means of preſerving his life. " It was there (ſays he) that, ex-
" tended upon the earth, with no other ſuccour than a
" little water, nature laboured to expel the poiſon by
" which I was oppreſſed. One of the buboes burſt of
" itſelf; the peſtilential ſores, which appeared firſt of a
" red purple, became yellowiſh, then brown, and laſtly
" black. Theſe parts then becoming gangrenous, form-
" ed hard and thick ſcabs, which, kernelling and falling
" away from the quick fleſh, left very deep ulcers. This
" was the firſt epocha of health; an abundant ſuppura-
" tion began, and the fever almoſt immediately left
" me."

Having remained alone in the deſert for eight or ten days, he was found by chance by ſome Arabian women, who brought him to their place of reſidence, waſhed his ſores with water, brought him dried herbs for his bed, and gave him barley bread, butter and curds for his food; endeavouring beſides by their ſongs to comfort him,

him, and alleviate his diſtreſs as much as poſſible. With theſe women he remained twenty days, reduced to an extremity of weakneſs by reaſon of the diſcharge from the ſores. At laſt, having learnt a few Arabic words, he prevailed upon two of the huſbands to conduct him to Aleppo, about ſeven days journey diſtant. He was now mounted aſtride on a camel (a very hard trotting animal) and by forced marches accompliſhed the journey in *ſix* days, when he appeared before the conſul, the European merchants, and a crowd of people, in a condition without example; almoſt naked, with five running buboes, the little covering he had foul, infected with ulcers as long as the palm of the hand, which had eaten away the fleſh, and in ſome places diſcovered the bones, having beſides two holes in the ſcrotum. From this miſerable condition he recovered in a month. It would ſeem that in ſome caſes the human body, as well as mind, riſes ſuperior to every indignity; and that in proportion to the degree of injury and oppreſſion is the tenacity of life, as well as energy of ſpirit.

3. *Remarkable cure of the plague by expoſure to cold and wet.* M. Savary relates that the captain of a veſſel informed him that, having touched at Conſtantinople when the plague was raging there, ſome of his ſailors caught the diſtemper; two died ſuddenly, and by aſſiſting them he was infected. "I felt exceſſive heat "(ſays he) which made my blood boil; the diſeaſe ſeized "my head, and I perceived that I had only a few mo- "ments to live. The little remaining reaſon I had "taught me to attempt an experiment. I laid myſelf, "quite naked, all night on the deck; the heavy dews "that fell penetrated to my very bones; in a few hours "I could breathe freer, and my head was better; my "agitated blood became calm, and, bathing the morning "after in the ſea, I was perfectly cured."

4. *Extraordinary effect of* FEAR *in rendering the contagion of the* SMALL POX *effectual.** "A very beauti- "ful girl, twenty-five years of age, ſervant to captain "Morton, had never had the ſmall pox, and had the "moſt

* Haygarth's Sketch, vol. ii, p. 405.

" moſt dreadful apprehenſions of that diſeaſe. On the " twentieth of January, 1791, about four in the after- " noon, ſhe was ſtanding near the kitchen fire, when " a joiner in the neighbourhood came to the door, which " is about ſixteen feet from the fire place where the girl " ſtood. Mrs. Morton found fault with the man for " not coming ſooner to finiſh ſome work, and he ex- " cuſed himſelf by ſaying his apprentice was ill of the " ſmall pox, which had delayed him. The girl imme- " diately claſped her hands, and exclaimed, God forgive " you, but I will lay my death to you. From that mo- " ment ſhe became chilly, then hot and reſtleſs. She " paſſed a very bad night, frequently exclaiming, God " forgive Calder, he has killed me; meaning he had " given her the ſmall pox. In the morning of the " twenty-firſt I was ſent for, and found her very hot, with " a quick pulſe, great ſickneſs and anxiety. I ordered her " an emetic, and aſſured her ſhe did not need to be in " the leaſt alarmed, as ſhe could not poſſibly have " caught the diſeaſe. She ſeemed to be convinced that " her fears were groundleſs; but next day, the twenty- " ſecond, a violent raſh appeared; on the twenty-third " the ſmall pox came out, of the worſt kind I had ever " ſeen, and ſhe died on the ninth day from the eruption."

5. *Inefficacy of* FEAR *to render the contagion of* YELLOW FEVER *effectual.* Dr. Ruſh mentions a young woman ſo exceedingly fearful of the diſeaſe, that ſhe was troubleſome to all around her. Afterwards ſhe happened to be under the neceſſity of attending *ſeven* perſons ill of the fever, and yet eſcaped unhurt. This ſhows that fear (and the ſame may be ſaid of any predisposing cauſe) is not always ſufficient to produce the diſeaſe. The foregoing caſe is ſo extraordinary that Dr. Haygarth is of opinion that the patient muſt have been previouſly infected; but of this there is no evidence; and it is bad reaſoning to endeavour to eſtabliſh a fact by our own ignorance. The only argument that is or can be uſed in ſuch caſes is, " I cannot underſtand how ſuch a thing could have happened, *therefore* it *has not* been ſo."

6. *Boullam*

6. *Boullam fever cured by a bliſter.** The patient was a tradeſman in St. George's, Grenada, and had "all the "ſymptoms of the diſeaſe except the febrile heat. A "bliſter was applied between the ſhoulders, without ad- "miniſtering any medicine previouſly except the ſolu- "tion (mentioned p. 530) which operated very mode- "rately. The effect was wonderful; the diſcharge was "uncommonly large, black, and fœtid in an intolerable "degree; and the inſtant this took place the patient "became better; and ſoon after, without the uſe of any "other remedy, recovered."

7. *Yellow fever of Barbadoes cured by vomiting.*† The patient was a young man, about twenty-four years of age, ſurgeon to a Guinea ſhip. Being a lover of ſpiritous liquors, he had been drunk three days and nights ſucceſſively, and in that condition had run races with the ſailors on the ſhore, in the heat of the mid day ſun. The laſt night he ſlept in the open air under a tamarind tree, and in the morning was ſeized with the fever, attended with the moſt violent reaching to vomit, inſomuch that he could ſcarcely anſwer yes or no to the queſtions aſked him by the Doctor. Sixteen ounces of blood were taken away, which was very florid, thin and diſſolved. He was directed then to drink warm water to cleanſe his ſtomach, which he did to the amount of three gallons, which he diſcharged, together with immenſe quantities of yellow and blackiſh bilious matter. He then took a grain and an half of opium, and ſlept ſome hours, after which a doſe of manna and tamarinds carried off by ſtool a good deal more of bilious matter, and, with the help of ſome elixir of vitriol, mint and ſnakeroot tea, he recovered in a ſhort time.

Dr. Ruſh, in a letter publiſhed in the newſpapers laſt year, after regretting the inefficacy of bleeding and purging, ſuſpects "that death occurred from the ſtagna- "tion of acrid bile in the gall-bladder, or its adherence "to the upper bowels, as mentioned by Dr. Mitchell "in 1741," which he propoſes to evacuate by ſtrong emetics

* Chiſholm's Eſſay, p. 169. † Hillary's Obſervations, p. 175.

emetics and purgatives, ſo as to occaſion an artificial cholera morbus; and he greatly commends this mode of practice. "Vomits (ſays he) are old remedies in the "yellow fever of the Weſt Indies. I gave them on the "firſt day of the diſeaſe in the year 1793, and always "without ſucceſs. They uniformly did harm when "given in the beginning of the fever in its worſt grade, "in 1797. The reaſon of this failure in their efficacy "I now perceive was becauſe they were given *before* the "violent morbid action in the ſyſtem was reduced or "moderated by bleeding and purging. After this "change is introduced in the diſeaſe they are perfectly "ſafe. The time for exhibiting them ſhould be regu-"lated by the pulſe and other ſymptoms. In moderate "caſes of the fever they are as proper in its firſt ſtage "as on the 4th day. As there is a bliſtering point in all "fevers, ſo there appears to be an *emetic point* in the "yellow fever. It may occur on the ſecond, and it "may be protracted to the ſixth or ſeventh day of the "diſeaſe. I have not given the medicine I have men-"tioned in any caſe where the patient complained of "pain or burning in the ſtomach; but I have conſidered "a nauſea, and a moderate degree of puking, as no ob-"ſtacle to its uſe; for Dr. Phyſic has taught me by his "diſſections that theſe ſymptoms may exiſt without the "leaſt inflammation in the ſtomach, and that they have "been abſent where the ſtomach has appeared after "death to have been highly inflamed.

"The cure of the fever ſhould not reſt upon a ſingle "doſe of the medicine. I have given two doſes of it in "a day in ſeveral caſes, and have given it in one caſe "every day for three ſucceſſive days.

"It has often been remarked, that no two epidemics "are exactly alike. They vary not only in different "climates, but in the ſame climate in different years. "They even vary with the changes of the weather in the "ſame ſeaſon. The fever of 1797 differed in ſeveral "particulars from the fever of 1793; and the preſent "epidemic differs materially from both. In many of "the caſes I have ſeen it exceeds the fever of laſt year in

"its

" its malignity. Theſe variations in diſeaſes call for " correſponding changes in our practice."

8. *Extraordinary caſe of yellow fever at Boſton in* 1798. " The ſubject of it* was a female of about 24 years of " age, in the 9th month of pregnancy. I ſaw her on " Monday the 17th of September. She had then a ſmall " but painful hardneſs on the left parotid gland, which " had commenced ſome days before, and ſoon extended " to the lips and neighbouring parts. The centre of the " tumour reſembled that of the inciſion of an arm " about the time of the eruption of the ſmall pox " after inoculation, exhibiting a hard, florid, ſhining " appearance. I recommended an emollient poul- " tice, hoping to procure ſuppuration; but, though " they were repeated ſteadily, not the leaſt evidence " of matter could be produced; and upon each vi- " ſit I found the tumour had extended in a rapid and " formidable degree. I was called up in the courſe of " the night to her, and found her almoſt ſuffocated from " the preſſure of the tumour on the trachea; for it had " now extended itſelf to all the muſcles and glands of " the neck and face. I changed the poultice for an em- " brocation of the ſaturnine preparations, which were re- " peated till about 10 o'clock of the following morning, " when ſhe was taken in travail, and ſoon delivered of " a healthy male child. For a few hours after her de- " livery ſhe appeared ſomething better, but in the night " ſhe grew worſe, and about 12 o'clock I was called to " her, when ſhe appeared to be expiring. At the requeſt " of her friends I entered my lancet into the tumour " the length of the inſtrument; but, as I had expect- " ed, not the leaſt particle of matter flowed, and the " parts were *as hard as a ſchirrus.* She continued how- " ever in agony till 3 o'clock of the day, and then " expired."

9. *Two caſes of ſpontaneous origin of yellow fever: from the Medical Repoſitory, vol.* ii, *p.* 333. " At Salem " (Maſſachuſetts) there was a general prevalence of " health

* The attending phyſician's name is not mentioned, having no permiſſion to do ſo.

" health at that ſeaſon; though ſeveral caſes of yellow " fever, and ſome of them fatal ones, occurred. Dr. " Oliver very judiciouſly inclines to the belief that the " exemption of this town from the ravages of yellow " fever is owing, 1ſt, to the remarkably clean ſtate of " the town; and, 2dly, to the houſes being placed at " ſuch diſtances as to admit of free ventilation. It was " obſervable that the yellow fever had a *ſpontaneous* " origin in two different places of the town, where putrid " matters had been ſuffered to accumulate, and proved " fatal to two perſons in different families; theſe unclean " ſpots forming exceptions to to the generally purified " ſtate of the town."

10. *Caſe of fever produced by the effluvia of putrid beef.* This took place in the federal garriſon on Governor's Iſland.* The ſubject was a ſoldier, who had been excuſed from duty on account of a violent and obſtinate gonorrhœa. On removing him into a lodging without the garriſon he was ſeized with ſymptoms of fever, and on the commencement of theſe the gonorrhœa ceaſed. For four days the fever increaſed, and was attended at laſt with vomiting, hiccup and delirium. From the firſt commencement of the diſeaſe the phyſician had been ſenſible of a very offenſive ſmell in the patient's room. Being aſſured that this was not owing to want of cleanlineſs, he cauſed ſearch to be made under it, and in the cellars found three barrels of beef ſo putrid that it was with difficulty they could be removed, on account of the ſtench. On removing them, however, the patient rapidly recovered, though till then he had conſtantly grown worſe.

* Medical Repoſitory, vol. i, p. 210.

END OF THE SECOND PART.

APPENDIX.

N° I.

Account of the Plague at Athens, in the time of the Peloponneſian War:—From THUCYDIDES.——SMITH's *Tranſlation.*

THE Peloponneſians and their allies, who had made an incurſion into Attica, with two thirds of their forces, had not been many days there before a ſickneſs began firſt to appear among the Athenians, ſuch as was reported to have raged before this in other parts, as about Lemnos and other places. Yet a plague ſo great as this, and ſo dreadful a mortality, in human memory could not be paralleled. The phyſicians at firſt could adminiſter no relief, through utter ignorance; nay, they died the faſter, the cloſer their attendance on the ſick; and all human art was totally unavailing. Whatever ſupplications were offered in the temples, whatever recourſe to oracles and religious rites, all were inſignificant: at laſt, expedients of this nature they totally relinquiſhed, overcome by calamity. It broke out firſt, as it is ſaid, in that part of Ethiopia which borders upon Egypt; it afterwards ſpread into Egypt and Libya; and at length, on a ſudden, fell on the city of the Athenians. The contagion ſhewed itſelf firſt in Piræus; which occaſioned a report, that the Peloponneſians had cauſed poiſon to be thrown into the wells; for, as yet, there were no fountains there. After this it ſpread into the upper city, and then the mortality very much increaſed. Let every one, phyſician or not, freely declare his own ſentiments about it; let him aſſign any credible account of its riſe, or the cauſes ſtrong enough, in his opinion, to introduce ſo terrible a ſcene. I ſhall only relate what it actually was, and as, from an information in all its ſymptoms, none may be quite at a loſs about it if ever it ſhould happen again, I ſhall give an exact detail of them; having been ſick of it myſelf, and ſeen many others afflicted with it.

This very year, (430 B. C.) as is univerſally allowed, had been, more than any other, remarkably free from common diſorders; or, whatever diſeaſes had already ſeized the body, they ended at length in this. But thoſe who enjoyed the moſt perfect health were ſuddenly, without any apparent cauſe, ſeized at firſt with head-achs extremely violent, with inflammations and fiery redneſs in the eyes. Within, the throat and tongue began inſtantly to be red as blood; the breath was drawn with difficulty, and had a noiſome ſmell. The ſymptoms that ſucceeded theſe were, ſneezing and hoarſeneſs; and, not long after, the malady deſcended to the breaſt, with a violent cough; but, when once ſettled in the ſtomach, it excited vomitings, in which was thrown up all that matter which phyſicians call diſcharges of bile, attended with exceſſive torture. A great part of the infected were ſubject to ſuch violent hiccups, without any diſcharge, as brought upon them ſtrong convulſions, to ſome but of a ſhort, to others of a very long continuance. The body, to the outward touch, was neither very hot nor of a pallid hue, but reddiſh, livid, marked all over with little puſtules and ſores; yet, inwardly, it was ſcorched with ſuch exceſſive heat that it would not bear the ſlighteſt covering of the fineſt linen upon it, but muſt be left quite naked. They longed for nothing ſo much as to be plunging in cold water; and many of thoſe who were not pro-

perly attended threw themſelves into wells, hurried by a thirſt not to be extinguiſhed; and, whether they drank much or little, their torment ſtill continued the ſame. The reſtleſſneſs of their bodies, and an utter inability of compoſing themſelves to ſleep, never abated for a moment. And the body, ſo long as the diſtemper continued in its height, had no viſible waſte, but withſtood its rage to a miracle; ſo that moſt of them periſhed within ſeven or nine days by the heat that ſcorched their vitals, though their ſtrength was not exhauſted; or, if they continued longer, the diſtemper fell into the belly, cauſing violent ulcerations of the bowels, accompanied with an inceſſant flux, by which many, reduced to an exceſſive weakneſs, were carried off. For the malady, beginning in the head, and ſettling firſt there, ſunk afterwards gradually down through the whole body. And whoever got ſafe through all its moſt dangerous ſtages, yet the extremities of their bodies ſtill retained the marks of its violence. For it ſhot down into their privy members, into their fingers and toes, by loſing which they eſcaped with life. Some there were who loſt their eyes, and ſome who, being quite recovered, had at once totally loſt all memory, and quite forgot not only their moſt intimate friends, but even their own ſelves. For, as this diſtemper was in general virulent beyond expreſſion, and its every part more grievous than had yet fallen to the lot of human nature; ſo, in one particular inſtance, it appeared to be none of the natural infirmities of man, ſince the birds and beaſts that prey on human fleſh either never approached the dead bodies, of which many lay about uninterred, or certainly periſhed if they taſted. One proof of this is then the total diſappearance of ſuch birds; for not one was to be ſeen, either in any other place, or about any of the carcaſes. But the dogs, becauſe of their conſtant familiarity with man, afforded a more notorious proof of this event.

The nature of this peſtilential diſorder was in general (for I have purpoſely omitted many of its varied appearances, or the circumſtances particular to ſome of the infected in contradiſtinction to others) ſuch as hath been deſcribed. None of the common maladies incident to human nature prevailed at that time; or, whatever diſorder any where appeared, it ended in this. Some died merely for want of care; and ſome with all the care that could poſſibly be taken; nor was any one medicine diſcovered from whence could be promiſed any certain relief; ſince that which gave eaſe to one was prejudicial to another. Whatever difference there was in bodies in point of ſtrength, or in point of weakneſs, it availed nothing; all were equally ſwept away before it, in ſpite of regular diet, and ſtudied preſcriptions. Yet the moſt affecting circumſtances of this calamity were, that dejection of mind which conſtantly attended the firſt attack; for the mind ſinking at once into deſpair, they ſoon gave themſelves up without a ſtruggle; and that mutual tenderneſs in taking care of one another which communicated the infection, and made them drop like ſheep. This latter caſe cauſed the mortality to be ſo great. For, if fear withheld them from going near one another, they died for want of help; ſo that many houſes became deſolate for want of needful attendance; and if they ventured, they were gone. This was moſt frequently the caſe of the kind and compaſſionate. Such perſons were aſhamed, out of a ſelfiſh concern for themſelves, entirely to abandon their friends, when their menial ſervants, no longer able to endure the groans and lamentations of the dying, had been compelled to fly from ſuch a weight of calamity. But thoſe, eſpecially, who had ſafely gone through it, took pity on the dying and the ſick, becauſe they knew by themſelves what it really was, and were now ſecure in themſelves; for it never ſeized one a ſecond time ſo as to be mortal. Such were looked upon as quite happy by others, and were themſelves at firſt overjoyed in their late eſcape, and the groundleſs hope that hereafter no diſtemper would prove fatal to them. Beſides this reigning calamity, the general removal from the country into the city was a heavy grievance, more particularly to thoſe who had been neceſſitated to come thither. For, as they had no houſes, but dwelled all the ſummer time in booths, where there was ſcarce room to breathe, the peſtilence deſtroyed them with the utmoſt diſorder, ſo that they lay together in heaps, the dying upon the dead, and the dead upon the dying. Some were tumbling over one another in the public ſtreets, or lay expiring about every fountain, whither they had crept to aſſuage their extraordinary thirſt. The temples,

in

in which they had erected tents for their reception, were full of the bodies which had expired there. For, in a calamity ſo outrageouſly violent, and univerſal deſpair, things ſacred and holy had quite loſt their diſtinction. Nay, all regulations obſerved before in matters of ſepulture were quite confounded, ſince every one buried where he could find a place. Some, whoſe ſepulchres were already filled by the numbers which had periſhed in their own families, were ſhamefully compelled to ſeize thoſe of others. They ſurpriſed on a ſudden the piles which others had built for their own friends, and burned their dead upon them; and ſome, whilſt one body was burning on a pile, toſſed another body they had dragged thither upon it, and went their way.

Thus did the peſtilence firſt give riſe to thoſe iniquitous acts which prevailed more and more in Athens. For every one was now more eaſily induced openly to do what for decency they did only covertly before. They ſaw the ſtrange mutability of outward condition; the rich entirely cut off, and their wealth pouring ſuddenly on the indigent and neceſſitous; ſo that they thought it prudent to catch hold of ſpeedy enjoyments and quick guſts of pleaſure; perſuaded that their bodies and their wealth might be their own merely for the day. Not any one continued reſolute enough to form any honeſt or generous deſign, when ſo uncertain whether he ſhould live to effect it. Whatever he knew could improve the pleaſure or ſatisfaction of the preſent moment, that he determined to be honour and intereſt. Reverence of the gods, or of the laws of ſociety, laid no reſtraints upon them; either judging that piety or impiety were things indifferent, ſince they ſaw that all men periſhed alike; or, throwing away every apprehenſion of being called to account for their enormities, ſince juſtice might be prevented by death; or rather, as the heavieſt judgment to which man could be doomed was already hanging over their heads, ſnatching this interval of pleaſure before it fell.

N° II.

Account of the Great Plague in the time of JUSTINIAN:— *By* PROCOPIUS.

THIS was a plague which almoſt conſumed mankind; of which Procopius concludes there was no other cauſe than the immediate hand of God himſelf. For it neither came upon one part of the world alone, nor in one ſeaſon of the year; whence ſubtile wits (as he ſaith) might make pretenſions. It afflicted the whole world, and all conditions of men, though of never ſo contrary a nature and diſpoſition; ſparing no conſtitution nor age. The difference of men as to their places of dwelling, diet, complexions, inclinations, &c. did no good in this diſeaſe. Some it took in ſummer, ſome in winter, and others in other ſeaſons. It began among the Egyptians in Peluſium, and ſpread to Alexandria, with the reſt of Egypt, one way, and the other to thoſe parts of Paleſtine which border upon Egypt. From thence it travelled to the utmoſt bounds of the world, as by ſet journies and ſtages, making deſtruction its only buſineſs, and ſparing neither iſland, cave, nor top of mountain, where mankind inhabited; for, if it leaped over a country, returning afterwards, it left it no cauſe to rejoice above its fellows. It began ſtill at the ſea coaſt, and thence went to the inland parts. In the ſecond year of its progreſs it arrived at Conſtantinople, about the middle of the ſpring, where it was the fortune of Procopius then to reſide. Apparitions of ſpirits, in all ſhapes human, were ſeen by many, who thought the man they met ſtruck them in ſome part of the body; and ſo ſoon as they ſaw the ſpirit they were ſeized with the diſeaſe. At firſt when they met them they repeated divine names, and fled into churches, to no purpoſe. Afterwards they were afraid to hear their friends call them, locking themſelves up in their chambers, and ſtopping their ears. Some dreamed they ſaw ſuch ſights; others that they heard a voice tell them they were enrolled among the number of thoſe appointed to die.

But

But moſt, without warning, became feveriſh ſuddenly: their bodies changed not colour, nor were hot; the fever being ſo remiſs till evening, that neither the patient nor phyſician, by his pulſe, could apprehend any danger. Yet to ſome the ſame day, to others the next, or many days after, aroſe a bubo, either in the groin, the armpit, under the ear, or in other parts. Theſe were the general ſymptoms which happened alike to all the viſited perſons.

There were others different; whether made ſo by the diverſity of bodies, or by the will and pleaſure of him that ſent the diſtemper, our author cannot ſay. Some were ſeized with drowſineſs and ſlumbering, others with a ſharp diſtraction. The ſlumberers forgot all things: if they were looked to, ſome would eat; ſome, that were neglected, ſtarved to death. Thoſe who were diſtracted were vexed with apparitions; crying there were men to kill them; and running away; being ſo troubleſome and unruly that their keepers were pitied as much as they themſelves. No phyſician or other caught the diſeaſe by touching ſick or dead bodies; many ſtrangely continuing free, though they tended and buried infected perſons, and many catching it they knew not how, and dying inſtantly. Many leapt into the water, though not from thirſt; and ſome into the ſea. Some, without ſlumbering or madneſs, had their bubo gangrened, and died with extreme pain; which doubtleſs alſo happened to thoſe who had the phrenſy, though, being not themſelves, they underſtood it not. Some phyſicians hereupon, conceiving the venom and head of the diſeaſe to lie in thoſe plague ſores, opened the dead bodies, and, ſearching the ſores, found an huge carbuncle growing inward. Such whoſe bodies were ſpotted with black pimples, the bigneſs of a lentile, lived not a day. Many died vomiting blood. Some that were given over by the moſt eminent phyſicians unexpectedly recovered; others, of whoſe recovery they thought themſelves perfectly ſecure, ſuddenly periſhed. No cauſe of this ſickneſs could be reached by man's reaſon. Some received benefit by bathing, others it hurt. Many died for want of relief, others eſcaped without it. In a word, no way could there be found of preſervation, either by preventing the ſickneſs, or of maſtering the diſeaſe, no cauſe appearing either of their falling ſick or recovery. Women with child, who were viſited, certainly died; ſome miſcarrying, ſome fairly delivered, and periſhing with their children. Three women only were ſafely brought to bed and recovered, their children dying; and one died whoſe child had the hap to live. Such as had their ſores great, and running plentifully, eſcaped; the violence of the carbuncles being thereby aſſuaged; and this was the moſt certain ſign of health. Such whoſe ſores ſtaid as they firſt aroſe, underwent the miſerable accident formerly mentioned. Some had their thighs withered, when the ſores roſe upon them and did not run. Some eſcaped with diminiſhed tongues, and lived ſtammering, or uttering ſounds without diſtinction, all their days. In Conſtantinople the peſtilence laſted four months; raging three months with all extremity. In the beginning few died more than uſual. Then, growing hotter and hotter, it came to five, and at laſt to ten thouſand every day. At firſt they buried their dead carefully; but at length all came to confuſion, and many lay long unburied; ſervants were without maſters; rich men had none to attend them. In the afflicted city little was to be ſeen but empty houſes, no trade going, or ſhops open.

N° III.

Account of the Plague at London in 1665:—*From Dr.* HODGES *and others.*

IN the beginning of September 1664 the people of London firſt became alarmed by a report of the plague being broke out in Holland, where it raged violently the former year. The United Provinces had received it from ſome place in the Levant, and, certain accounts having been received of the diſtemper

diſtemper being in Holland, ſeveral councils were held by government with a view of concerting means for preventing its introduction into Britain These were held privately, and it does not appear that any thing was poſitively determined upon; but thus the knowledge that ſuch a diſtemper exiſted in Holland was ſuppreſſed, and the public fears diſſipated until the beginning of December; when two, ſuppoſed to be Frenchmen,* in Long-acre, or rather the upper end of Drury lane, died with ſuch ſuſpicious ſymptoms that the people of the houſe endeavoured to conceal the diſtemper of which they died. The ſecretaries of ſtate, however, having got intelligence of the matter, cauſed their bodies to be inſpected, when it became evident they had died of the plague. This produced a general alarm; Dr. Hodges ſays, that "hereupon "ſome timorous neighbours, under apprehenſions of a contagion, removed in-"to the city of London; who unfortunately carried along with them the peſti-"lential taint; whereby that diſeaſe, which was before in its infancy, in a fa-"mily or two, ſuddenly got ſtrength, and ſpread abroad its fatal poiſon; and, "merely for want of confining the perſons firſt ſeized with it, the whole city "was irrecoverably infected." The author of the Journal, however, ſays that the public fear again ſubſided, though it had been ſtill farther raiſed by the death of another perſon in the ſame houſe about the latter end of December; but, as no more died for ſix weeks, no farther notice was taken of it until the 12th of February, when one died in another houſe, but in the ſame pariſh. Soon after this an increaſe was obſerved in the weekly liſt of burials at St. Giles's pariſh, which augmented the general alarm ſo much that few cared to paſs through Drury lane or the ſuſpected ſtreets, unleſs upon very urgent buſineſs. In a ſhort time a like augmentation was perceived in the bills of the adjoining pariſhes, and indeed all over the town. The Journal informs us that the uſual number of burials within the bill of mortality was from 240 to 300; but from the 20th of December to January 24th they had gradually ariſen from 291 to 474. This ſeems inconſiſtent with what he had before ſaid of the alarm having ceaſed till the 12th of February; but we ſhall take his own words. "This laſt bill (474) was really frightful; being a "greater number than had been known to have been buried in one week ſince "the preceding viſitation of 1656. However, all this went off again, and the "weather proving cold, and the froſt, which began in December, continuing "very ſevere, even till near the end of February, attended with ſharp though "moderate winds, the bills decreaſed again, and the city grew healthy, and "every body began to look upon the danger as good as over; only that ſtill "the burials in St. Giles's continued high. From the beginning of April eſpe-"cially, they ſtood at 25 each week, till the week from the 18th to the "25th, when there were buried in St. Giles's pariſh 30; whereof were two "of the plague, and eight of the ſpotted fever, which was looked upon as the "ſame thing; likewiſe the number that died of the ſpotted fever on the "whole increaſed; being eight the week before, and twelve the week above "named."

Thus a new and ſtill greater alarm was produced, which was yet farther augmented by the ſpreading of the diſtemper. The journaliſt ſays indeed that only a few were ſet down in the liſts as having died of the plague; the remainder of the deaths being charged to other diſtempers; and accordingly one week, when the mortality bill was high, and only 14 charged to the plague, he ſays, "this was all knavery and colluſion; for in St. Giles's pariſh they "buried 40 in all; whereof it was certain that moſt of them died of the "plague, though they were ſet down of other diſtempers; and though the "number of all the burials was not increaſed above 32, and the whole bill "being but 385, yet there were 14 of the ſpotted fever, as well as 14 of the "plague; and we took it for granted upon the whole that there were 50 died "of the plague that week. The next bill was from the 23d of May to the "30th, when the number of the plague was 17; but the burials in St. Giles's "were 53; a frightful number, of whom they ſet down but nine of the "plague; but, on examination more ſtrictly by the juſtices of the peace, and "at

* *Journal of the Plague Year.*

" at the lord mayor's requeſt, it was found there were 20 more who were really " dead of the plague in that pariſh, but had been ſet down of the ſpotted fe- " ver, or other diſtempers, beſides others concealed."

The account given by Dr. Hodges is ſomewhat different from the above. He informs us that " a very hard froſt began in December, and continued " three months, which ſeemed greatly to diminiſh the contagion, and very " few died during that ſeaſon; though even then it was not totally extinguiſh- " ed." The journaliſt ſays that in this intermiſſion of the plague there was a difficulty which he could not well get over. The firſt perſon who died of the plague he ſays (p. 234) was on December 20th, or thereabouts, 1664, though he had told us before (p. 2) that it was the end of November, or *beginning* of December the ſame year. " But after this (continues he) we heard no more " of any perſon dying of the plague, or the diſtemper being in that place, till " the 9th of February, which was about ſeven weeks after; and then one more " was buried out of the ſame houſe: then it was huſhed, and we were per- " fectly eaſy as to the public for a great while, for there were no more enter- " ed in the weekly bill to be dead of the plague, till the 22d of April. Now " the queſtion ſeems to be thus: Where lay the ſeeds of the infection all " this while? How came it to ſtop ſo long, and not to ſtop any longer? Either " the diſtemper did not immediately come by contagion from body to body, " or, if it did, then a body may continue to be infected without the diſeaſe " diſcovering itſelf many days, nay, weeks together. It is true there " was a very cold winter, and long froſt, which continued three months; and " this, the Doctors ſay, might check the infection; but then the learned muſt " allow me to ſay that if, according to their notion, the diſeaſe was, as I " may ſay, only frozen up, it would, like a frozen river, have returned to its uſu- " al force and current when it thawed; whereas the principal receſs of the in- " fection, which was from February to April, was after the froſt was broken, " and the weather mild and warm. But there is another way of ſolving all " this difficulty, which I think my own remembrance of the thing will ſup- " ply; and that is, the fact is not granted, namely, that there died none in " thoſe long intervals, viz. from the 20th of December to the 9th of February, " and from thence to the 22d of April. The weekly bills are the only evi- " dence on the other ſide, and thoſe bills were not of credit enough, at leaſt " with me, to ſupport an hypotheſis, or determine a queſtion of ſuch impor- " tance as this: for it was our received opinion at that time, and I believe " upon very good grounds, that the fraud lay in the pariſh officers, ſearchers, " and perſons appointed to give account of the dead, and what diſeaſes they di- " ed of; and, as people were very loth at firſt to have the neighbours believe " their houſes were infected, ſo they gave money to procure, or otherwiſe pro- " cured, the dead perſons to be returned as dying of other diſtempers; and this, " I know, was practiſed afterwards in many places; I believe I might ſay in all " places where the diſtemper came; as might be ſeen by the vaſt increaſe of " the numbers placed in the weekly bills under other articles of diſeaſes, " during the time of the infection. For example, in the months of July and " Auguſt, when the plague was coming on to its higheſt pitch, it was very " ordinary to have from 1000 to 1200, nay to almoſt 1500, a week, of other " diſtempers: not that the numbers of thoſe diſtempers were really increaſed " to ſuch a degree; but the great number of families and houſes where really " the infection was, obtained the favour to have their dead returned of other " diſtempers, to prevent the ſhutting up of their houſes."

The diſeaſe continued to advance, but with ſuch intervals and remiſſions as frequently gave hopes of its diſappearing entirely. Nevertheleſs, about the beginning of May the inhabitants began to leave the city in great numbers. The journaliſt, for his own part, was irreſolute; and ſometimes would have left the city with the reſt, had it not been for the impoſſibility of finding an horſe; " for, (ſays he) though it is true that all the people did not go out of the city " of London, yet I may venture to ſay that in a manner all the horſes did; " for there was hardly a horſe to be bought or hired in the whole city for ſome " weeks." Many fled on foot, carrying with them ſoldiers' tents, in which they ſlept in the fields, it being then warm weather, and no danger of taking cold. This way of living was alſo familiar in ſome degree by reaſon of the

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wars which had preceded; multitudes of thoſe who had ſerved in them being at that time in London. This our author greatly approves of as a method of preventing the infection from ſpreading, and thinks that, had it been more generally practiſed, much leſs damage would have been done in the country than happened at the time from this dreadful diſtemper.

Early in June the court thought proper to remove to the city of Oxford, whither the infection did not reach. The people ſtill continued to remove during the whole month of July, though in ſmaller numbers than before; but in Auguſt the multitude of fugitives ſo increaſed that, ſays our author, "I began to think there would be none but magiſtrates and ſervants left." He informs us alſo that at the breaking out of this plague the city was unuſually full of people; vaſt numbers who had ſerved in the wars, or who, in times of trouble, had been friends to royalty, had flocked into it on the reſtoration of Charles II, in hopes of reaping ſome fruit of their former labours and ſufferings; ſo that on the whole he ſuppoſes there muſt have been upwards of an hundred thouſand people more than uſual in the city. Indeed, if we are to believe that, on a repreſentation of the ſtate of the poor to the lord mayor, it appeared that there were an hundred thouſand ribband weavers in Spittle-fields, we muſt look upon the population of London at that time to have been incredibly great; and when the journaliſt computes the number of thoſe who fled only at two hundred thouſand, we muſt certainly ſuppoſe it to have been greatly underrated.

As the plague continued to become more and more violent, the magiſtrates thought proper to take ſome means for ſeparating the infected from the healthy; but unhappily their mode of procedure was ſuch as inſpired both the infected and uninfected with the utmoſt terror. The houſes were marked with a red croſs, ſubſcribed with the words "LORD, HAVE MERCY UPON US!" in large letters. They were continually guarded, day and night; and none were allowed acceſs to the ſick, to give them either food or medicines, excepting thoſe who guarded them; nor were the ſick themſelves allowed to go abroad until forty days after their recovery. But, though the diſtemper continually advanced, it did not get to its full height until the months of Auguſt and September. Before this time it ſeemed to fly from place to place; ſo that great hopes were entertained, though always without foundation, of its total removal; but now it invaded the whole city. Four or five thouſand died in a week; once eight thouſand; and, in the month of September, for ſome time, twelve thouſand a week died. The city was reduced to the extremity of diſtreſs.

The author of this journal had the courage not only to remain in the city, during the whole time of the infection, but even took many ſolitary walks to the houſe of his brother, who had removed into the country, in order to preſerve his goods from being ſtolen. At firſt he went every day, but afterwards only once or twice a week. He tells us alſo that he took many walks out of curioſity; and, though he generally came home frighted and terrified, he could not reſtrain himſelf. "In thoſe walks (ſays he) I had many diſmal "ſcenes before my eyes; as particularly of perſons falling dead in the ſtreets, "terrible ſhrieks, and ſcreamings of women, who, in their agonies, would "throw open their chamber windows, and cry out in a diſmal, ſupriſing manner.

"It is ſcarce credible what dreadful caſes happened in particular families "every day; people in the rage of the diſtemper, or in the torment of their "ſwellings, which was indeed intolerable, running about raving and diſtracted; "and oftentimes laying violent hands upon themſelves, throwing themſelves "out at their windows, ſhooting themſelves, &c. mothers murdering their "own children, in their lunacy; ſome dying of mere grief as a paſſion; ſome of "fright and ſurpriſe, without any infection at all; others frighted into idio"tiſm and foolish diſtractions, ſome into deſpair and lunacy; others into me"lancholy madneſs."

The diſtemper was found to rage ſo violently among the poorer ſort, that we are told by Dr. Hodges, ſome gave it the name of the *poor's plague*. This is confirmed by the journaliſt, who informs us that "the miſery of that "time lay chiefly upon the poor, who, being infected, had neither food nor "phyſic; neither phyſician nor apothecary to aſſiſt them, nor nurſe to attend "them;

" them: many of thoſe died calling for help, and even for ſuſtenance, out of " their windows, in a moſt miſerable and deplorable manner; but it muſt be " added, that, whenever the caſes of ſuch perſons or families were repreſented " to the lord mayor, they were always relieved." Indeed the charity of the more opulent, upon this occaſion, almoſt exceeds belief. Dr. Hodges informs us, that " though the more opulent had left the town, and it was left almoſt " uninhabited, the commonalty who remained felt little of want; for their " neceſſities were relieved with a profuſion of good things from the wealthy, " and their poverty was ſupported with plenty." The probable reaſon of ſuch devaſtation among the poor, Dr. Hodges promiſes, p. 15, to give, and does not; at leaſt I have not been able to find it in his book; I muſt therefore content myſelf with what the journaliſt (though no phyſician) has delivered on this ſubject. He ſays, that when people began to uſe proper cautions, the danger of infection was the leſs. " But (ſays he) it was impoſſible to beat any " thing into the heads of the poor; they went on with the uſual impetuoſity " of their tempers; full of outcries and lamentations when taken, but madly " careleſs of themſelves, fool-hardy and obſtinate when well: where they " could get employment, they puſhed into any kind of buſineſs, the moſt dan- " gerous, and the moſt liable to infection; and, if they were ſpoken to, their " anſwer would be, I muſt truſt to GOD for that; if I am taken, then I am " provided for, and there is an end of me, or the like; or thus: Why, what " muſt I do? I cannot ſtarve; I had as good have the plague, as periſh for " want. I have no work, &c. This adventurous conduct of the poor was " what brought the plague among them in a moſt furious manner; and this, " joined to the diſtreſs of their circumſtances, when taken (with the diſtem- " per) was the reaſon why they died ſo in heaps: for I cannot ſay that I " could obſerve one jot of better huſbandry among them, I mean the labour- " ing poor, while they were well and getting money, than there was before; " but as laviſh, as extravagant, and as thoughtleſs of to morrow, as ever; ſo " that, when they came to be taken ſick, they were immediately in the ut- " moſt diſtreſs, as well for want as for ſickneſs, as well for lack of food as " lack of health."

In the time of ſo great a calamity, the magiſtrates exerted themſelves as far as their power and ſkill would permit, to leſſen the ſufferings of the people. It was natural alſo in ſuch a dreadful emergency to call upon the phyſicians to exert themſelves. Accordingly the king (Charles II) by his royal authority commanded the College of Phyſicians of London jointly to write ſomewhat in Engliſh, that might be a general directory in this calamitous exigence; nor was it ſatisfactory to this honoured ſociety to diſcharge their regards for the public in that only; but ſome were choſen out of their number, and appointed particularly to attend the infected on all occaſions; two alſo out of the court of aldermen were required to ſee this hazardous taſk executed.*

Our author then proceeds to mention the names of ſome who were employed in this laudable undertaking; particularly Dr. Gliſſon, regius profeſſor at Cambridge, Dr. Nathaniel Paget, Dr. Wharton, Dr. Berwick and Dr. Brookes; many others he ſays were employed; " but (he adds) eight or nine " fell in the work, who were too much loaded with the ſpoils of the enemy; " among whom was Dr. Conyers, &c. After, then, all endeavours to reſtrain " the contagion had proved of no effect, we applied ourſelves altogether to the " cure of the diſeaſed."

We ſhall not doubt of the good intentions of the phyſicians: of their ſucceſs we may judge from what Dr. Hodges himſelf ſays, that many died while preſcribing cures for others. To the ſame purpoſe the journaliſt, p. 43: " I " ſhall not be ſuppoſed to leſſen the authority or capacity of the phyſicians, " when I ſay that the violence of the diſtemper, when it came to its extremity, " was like the fire the next year (1666). The fire, which conſumed what the " plague could not touch, defied all the application of remedies; the fire-en- " gines were broken, the buckets thrown away, and the power of man was " baffled and brought to an end; ſo the plague defied all medicine; the " very phyſicians were ſeized with it, with their preſervatives in their mouths; " and

* *Hodges, p. 13, & ſeq.*

" and men went about preſcribing to others, and telling them what to do, " till the tokens were upon them, and they dropped down dead, deſtroyed by " that very enemy they directed others to oppoſe. This was the caſe of ſeveral " phyſicians, even ſome of the moſt eminent, and of ſeveral of the moſt ſkilful " ſurgeons; abundance of quacks too died, who had the folly to truſt to their " own medicines," &c.

Thus, in defiance of every effort of human ſkill, the calamity continued. " The contagion (ſays Dr. Hodges) ſpread its cruelties into the neighbouring " countries; for the citizens, who crowded in multitudes into the adjacent " towns, carried the infection along with them, where it raged with equal " fury; ſo that the plague, which at firſt crept from one ſtreet to another, now " reigned over whole counties, leaving hardly any place free from its inſult, " and the towns upon the Thames were more ſeverely handled; not, perhaps, " from a greater moiſture in the air from thence, but from the tainted goods " rather, that were carried upon it: moreover ſome cities and towns, of the " moſt advantageous ſituation for a wholeſome air, did, notwithſtanding, feel " the common ruin. Such was the riſe, and ſuch the progreſs, of this cruel " deſtroyer, which firſt began at London."*

But it is now time to turn from thoſe ſcenes of horror. The power of the peſtilential contagion was not abſolutely *immeaſurable*. It had its riſe, its progreſs, its ſtate and declenſion. Dr. Hodges tells us that, *when* " *the worſt* " *part of the year was over, and the height of the diſeaſe*, the plague by leiſurely " degrees declined, and before the number infected decreaſed, its malignity " began to relax, inſomuch that few died, and thoſe chiefly ſuch as were ill " managed; hereupon that dread which had been upon the minds of the " people wore off; and the ſick cheerfully *uſed all the means directed for their* " *recovery;* and even the nurſes grew either more cautious, or more faithful; " inſomuch that after ſome time a dawn of health appeared, as ſudden, and as " unexpected, as the ceſſation of the following conflagration; wherein, after " blowing up of houſes, and uſing all means for its extinction to little purpoſe, " the flames ſtopped as it were of themſelves for want of fuel, or, *out of ſhame*, " for having done ſo much miſchief. The peſtilence, however, did not ſtop for " want of ſubjects to act upon, (as then commonly rumoured) but from the " nature of the diſtemper. Its decreaſe was, like its beginnings, moderate, &c. " About the cloſe of the year, that is, on the beginning of November, people " grew more healthful," &c.

The numbers who periſhed in this violent plague are ſo variouſly reported that nothing certain can be ſaid concerning it. Dr. Morton ſays that upwards of forty thouſand died; but from the foregoing accounts it is evident that this calculation muſt be prodigiouſly underrated. The journaliſt indeed gives ſtrong reaſons for believing that all the accounts of the numbers who periſhed were much below the truth. He thinks that an hundred thouſand at leaſt muſt have fallen victims to it; and if his own aſſertion be true, that thirty thouſand died in the laſt three weeks, we cannot ſuppoſe but that three times that number died in the courſe of the twelvemonth that the diſeaſe laſted; which would fix the calculation at 120,000. This great mortality however was ſoon forgot; as ſoon as the danger was over, the ravages it had committed were no longer an object of terror. The diſeaſe had its uſual effect, viz. increaſing the deſire of the ſexes for each other. " They had the courage (ſays " Dr. Hodges) now to marry again, and betake to the means of repairing the " paſt mortality; and even women before deemed barren were ſaid to prove " prolific; ſo that, although the contagion had carried off, as ſome computed, " about one hundred thouſand, after a few months their loſs was hardly diſ- " cernible."

* *Hodges, p.* 25.

N° IV.

Account of the Plague at Marſeilles in 1720:—From the Periodical Publications of the time.

SO much hath been ſaid concerning this plague, in the firſt part of this treatiſe, that no particular detail is requiſite here. In its ſymptoms it differed little if any thing from the plague of London, deſcribed in the former number. Many died without any previous ſickneſs, and, while the diſtemper continued ſevere, few outlived the third day; and ſo infectious was its nature, that one perſon in a family was ſeldom attacked without its ſucceſſively attacking all the reſt. The bodies were ſaid to putrefy in 24 hours. Very conſiderable ſums of money were collected here, as well as in London. The conduct of the biſhop on this melancholy occaſion has been greatly celebrated by many; among others by Dr. Darwin, in his Botanic Garden, in the following lines:

" So when Contagion, with mephitic breath,
" And wither'd Famine, urg'd the work of death;
" * Marſeilles' good Biſhop, London's gen'rous Mayor,
" With food and faith, with med'cine and with prayer,
" Rais'd the weak head, and ſtay'd the parting ſigh,
" Or with new life relum'd the ſwimming eye.

" * The biſhop of Marſeilles, during the time of this miſerable calamity, " was indefatigable in the execution of his paſtoral office, viſiting, relieving, " encouraging and abſolving the ſick with extreme tenderneſs; and though " perpetually expoſed to the infection, like Sir John Lawrence, the lord mayor " of London in 1665, was never ſeized with the diſeaſe—This laſt gentleman, " with undaunted reſolution, continued in the city during the whole time of the " calamity, executing the duties of his office with the utmoſt punctuality. " The day after the diſeaſe was certainly known to be the plague, above " 40,000 ſervants were diſmiſſed, and turned into the ſtreets to periſh, for no " one would receive them into their houſes; and the villages near London " drove them away with pitchforks and fire-arms. Sir John Lawrence " ſupported *them all*, as well the needy as thoſe who were ſick; at firſt by " expending his own fortune, till ſubſcriptions could be ſolicited and " received from all parts of the nation." *(Darwin's Botanic Garden. Loves of the Plants, canto* ii, *p.* 61.)

N° V.

Account of the Plague in Syria, Cyprus &c.—From Dr. PATRICK RUSSEL'*s Treatiſe.*

THIS plague was preceded by violent cold, famine, and earthquakes. In 1759 it began in Egypt, having been imported in a veſſel from Conſtantinople. From Alexandria in Egypt it was brought by ſome Jews to Saffat, a village in Syria, near Aleppo, which had ſuffered much by the earthquake; which laſt was for ſome time thought to have been *the* cauſe of the diſtemper; but, when its nature was really diſcovered, they comforted themſelves with the thoughts that an *Egyptian* plague was leſs to be dreaded than one which came from the northward.

The diſtemper had been introduced into Cyprus as early as April 1759, by a veſſel from Conſtantinople, wrecked on the coaſt; and, having thus got a footing in Egypt, Syria and Cyprus, its progreſs was marked with the

uſual

uſual mortality. In Egypt the Europeans in Cairo remained in confinement till the middle of July; a ſpace conſiderably longer than uſual. Next year they ſhut up on the 9th of March, but were releaſed on the 24th of June. The diſtemper raged in the city with ſuch fury during 1759 and 1760, that in the two years four hundred and fifty thouſand were computed to have periſhed; a number, however, which Dr. Ruſſel thinks muſt have been exaggerated. Cairo had been free from plague during the whole of this century before, except in the year 1736, when the diſtemper raged with ſuch violence that ten thouſand were ſaid to have periſhed in one day. It was ſuppoſed to have been brought from Upper Egypt. In Cyprus it broke out at the village of Limſol, where it deſtroyed four hundred people. During the hot months of July, Auguſt and September the infection ſhowed itſelf ſo little that it was thought to have been extinguiſhed; but in October it not only reappeared in the places where it had before ſhowed itſelf, but invaded Nicoſia, the capital of the iſland. Endeavours were uſed, by burying the dead bodies in the night, to conceal the exiſtence of the diſtemper; but this ſoon became impracticable. Towards the end of January, 1760, it raged ſo dreadfully in this city that the Mahometans were enjoined to uſe prayers and proceſſions to avert the wrath of Heaven. The crowds brought together on this occaſion ſpread the diſtemper ſtill more wide, and in the following month its ravages began at Larnica, a ſmall town conſiderable for its trade, and which, though alarmed, had hitherto kept free, even though infected perſons had been freely admitted. Here it raged with uncommon malignity, inſomuch that few of thoſe recovered that were infected during the month of March. It continued to prevail till the month of April, when it ſpread to the very eaſtern extremity of the iſland, into the province of Carpaſs; a thing hitherto unknown.

Two examples of apparent infuſceptibility are related; one was a young Greek, whoſe conſtant employment was, to nurſe the ſick, and aſſiſt at the burials; the other, a Greek woman, who, having with great affection nurſed her huſband and two daughters who died of the plague, continued with admirable courage to expoſe herſelf in aſſiſting the ſick in the neighbourhood.

Towards the end of May the infection was rapidly decreaſing; the Europeans came out of their confinement in the month of July, and the plague at laſt ceaſed, after having deſtroyed 70,000 perſons; nearly one half of the whole population.

In Syria the plague appeared firſt in October, 1759, in the village of Saffat. From thence it proceeded to Tripoli, where it began about the middle of January, and did not decline till July; neither were the Europeans thoroughly releaſed from their confinement till towards the end of Auguſt. One half of thoſe infected are ſaid to have recovered; but five thouſand periſhed. The city remained free from any attack during the whole of 1761; but early in 1762 the diſtemper again made its appearance in the neighbouring villages, and again began its devouring ravages; but, though a free acceſs was granted to infected perſons in the city, it does not appear that any general infection took place.

In Latarkea the diſtemper appeared in March, 1760, made conſiderable progreſs during the month of April, increaſed from the 17th of that month to the 13th of May, raged with great violence from that time to the 27th of June, when it ſuddenly decreaſed, the funerals falling from 20 to 9. On the 4th and 5th of July they again roſe to more than 20, but preſently fell below ſix. Four thouſand were ſuppoſed to have died, though it was thought that as many recovered as periſhed. At Jeruſalem the contagion diſcovered itſelf in January or February, 1760, and about the middle of March reached Damaſcus. In both places it made great havock; but no accurate accounts were kept of thoſe who died.

N° VI.

Remarkable caſe of a Remitting Fever at Baſſorah in 1780.

IN the firſt part of this treatiſe we have given an account of the fever which prevailed at Baſſorah during the year we ſpeak of, and likewiſe of the journey of the gentleman from Baſſorah to Zebire, where he was taken ill on the 4th of June; but as the firſt attack went off for that day, we ſhall only begin the narrative from the day following, as he himſelf does in theſe words:

5th June. From this day I date the actual commencement of my fever. About 2 o'clock after dinner I was ſuddenly attacked with a violent glowing heat all over my body, uneaſineſs, anxiety and oppreſſion, but in a very inconſiderable degree to what I afterwards experienced; alſo a ſwelling in my tongue, which had been coming on ſome days, and is one of the firſt ſymptoms of the fever that prevailed. The fit continued about two hours; a ſlight perſpiration ſucceeded, which removed the fever, but left a head-ach, thirſt, and pains in my back and limbs. In the evening with aſſiſtance I got upon the terrace, when the moon and ſtars appeared of a bright yellow, and all objects had that colour through the whole of my diſeaſe; alſo the pain in making water, and acroſs my loins, became intolerable, like that felt in complaints of the ſtone in the bladder. I took ſome tartar emetic, which brought up a great deal of bile, and the next morning a purgative of Rochelle ſalts, manna, tamarinds and annifeeds.

6th June. In the forenoon a free, copious perſpiration, and a perfect intermiſſion of the fever; at night became very reſtleſs and uneaſy, could not ſleep, which I partly imputed to a draught of ſtrong muſtard whey, with ſome antimonial wine, which, inſtead of cauſing perſpiration, produced the oppoſite effect.

7th. By the advice of a phyſician I took ſome weak decoction of bark, 1 oz. to two pints boiled to one, in the quantity of three tea-cupfuls before dinner. At three in the afternoon I had another hot fit, but not very ſevere. In the evening grew worſe—heat and thirſt exceſſive—drank muſtard whey on going to bed, but had a very bad night—no ſleep, much oppreſſed, ſevere head-ach, and pain over my loins.

8th. Took a gentle purge of cream of tartar and manna, which operated, and gave me ſome eaſe. Left off the bark, as it ſeemed to increaſe the febrile ſymptoms, and drank ſage and apple tea, decoction of prunes, tamarinds, &c. At 10 o'clock in the forenoon a very ſevere hot fit; heat intenſe, oppreſſion in my ſtomach and breaſt almoſt inſufferable. Mr. ———, ſurgeon of the Eagle cruiſer, gave me a moſt naufeous ſaline mixture, which vomited and purged me ſeverely. The quantity of bile which came off my ſtomach was incredible, yet I felt no relief, and the agony of the hot fit continued till 4 o'clock in the afternoon, when it went off by a moſt profuſe perſpiration. During this fit my thirſt was conſtant and intenſe. In the evening my ſkin became dry, the thirſt returned, and I had a very bad, ſleepleſs night.

I now began to experience ſome of the dreadful ſymptoms which are, I believe, peculiar to fevers in Turky and Arabia; a ſenſation of dread and horror, totally unconnected with the fear of death; for, while the patient is moſt afflicted with this ſymptom, it is for the moſt part accompanied with a ſtrong deſire to put an end to his exiſtence. The agony from the heat of the body is beyond conception. I have heard ſome of my fellow ſufferers roar hideouſly under the violence of the pain.

9th Till noon tolerably well. About 1 o'clock the hot fit attacked me, and was full as ſevere as yeſterday; heat and thirſt rather greater, and but little relief for more than an hour after the perſpiration commenced. This attack left me very weak, much exhauſted, with cold, weakening ſweats, quick, unequal pulſe, ſevere head-ach, confuſion, anxiety and inceſſant thirſt; a ſleepleſs night, ſtartings, anxieties, and a conſtant wiſh to terminate my ſufferings by death.

10th. Forenoon.

10th. Forenoon, pretty free from fever. Attacked at the ſame hour as yeſterday. The fit more violent—delirium. The agony of the heat not to be expreſſed; the whole body as if on fire; unremitting thirſt, profuſe perſpiration, yet no relief till late in the evening; no ſleep, a dreadful night, &c. Pulſe about 120, unequal and fluttering.

A mere relation of facts can give but a faint idea of the wretched ſituation to which the factory was now reduced: by this time eleven twelfths of the inhabitants of Buſſorah were taken ill, numbers were daily dying, and the reports from Bagdad and Diarbekir, of the increaſing ravages of the plague, left the ſurvivors not a ray of hope that they could eſcape the calamity. On every countenance pain, ſickneſs and horror were ſtrongly painted; nor were we even left the comforts of ſympathy, as every mind was too much engroſſed with its own ſufferings to think of adminiſtering conſolation to others. Four of us lay under the portico of one of the ſquares of the factory, calling out for water in a frenzy of thirſt. We uſed to ſnatch it from each other, and to ſupplicate for a mouthful with as much fervour as a dying criminal for an hour of further life.

About this period of the fever my eyes became very weak, and every object I ſaw was quite yellow. This effect was moſt perceptible at night, in looking at the moon and ſtars. In the evenings we were ſometimes carried in our cots upon the terrace of the factory for air; but the wind was ſo heated by the burning ſands of the deſert, that we felt it more intolerable than even the lower apartments. We all remarked that the *ſhemaal*, or north winds, which blew without intermiſſion at that time, greatly increaſed our heat and thirſt.

The daily very evident increaſe of my fever, and its effects upon others becoming more fatal and alarming, determined me, while any ſtrength remained, to embrace the conſul's offer of flying from the ſeat of infection to Buſhire, in the Ranger cruiſer.

11th. After an exceeding bad night I was carried early in the morning on board the Ranger, and was not very ill until about 9 o'clock, when I felt the fever coming on, with new and more alarming ſymptoms—violent head-ach, giddineſs, dimneſs of ſight, approaching delirium, horror, and a moſt painful oppreſſion and burning heat in my ſtomach.

In deſpair, and to try to quench the unſufferable heat in my ſtomach and bowels, I took a pretty large doſe of nitre. The oppreſſion and pain increaſed; in my confuſion I took a paper of tartar emetic, which immediately began to operate. From that time, about ten o'clock, till half paſt two in the afternoon, I know but little of what paſſed: I was almoſt all that time either diſtracted with pain, or in a ſwoon; and had it not been for the extraordinary care and attention of the commander of the cruiſer, who ſupported me in his arms, and adminiſtered ſuch cordials as I, in the ſhort moments of recollection, could call for, I have not a doubt but I muſt have ſunk under this attack. He counted eight times that I fainted, and ſometimes an interval of ten minutes before he could perceive any ſymptoms of returning life. I was chiefly ſupported by wine, hartſhorn, and ſpirits of lavender. About three o'clock I had recovered my recollection: moſt copious and continued ſweats had carried off the violence of the fever; but faintings and total privation of ſtrength and ſpirits remained upon me till late in the evening, when I became to all appearance, for a ſhort time, perfectly well. A little ſtrength returned, every ſymptom of fever vaniſhed, and my feelings were almoſt the ſame as if in perfect health. Some circumſtances having prevented the Ranger's carrying me to Buſhire, I was taken aſhore in the evening. When I was brought to the factory I had an appetite, and ate ſome chicken broth for ſupper. Mr. Roſs, who had hitherto eſcaped the fever, adminiſtered a potion of laudanum, and, I believe, antimonial wine, on going to reſt. I ſlept pretty well, and awoke refreſhed in the morning. I, however, ſoon became ill, and at noon I had a ſevere attack, which continued three or four hours, and left me greatly weakened, my ſkin extremely dry, pulſe quick, fluttering and irregular, beating from 100 to 120, with an unquenchable thirſt, which no liquids could allay. We had no acids of any kind, which we had great reaſon to regret.

I did not know till late in the evening that Mr. Abraham, the vice-conſul, who for ſome days paſt had been ill of the ſame fever, had determined to embark

bark in the Eagle cruiſer next morning for Buſhire, as the only chance of ſaving his life; and a converſation which I overheard to this effect, that as I was ſo very ill, and no hopes of my recovery, it would be better to leave me to die at Buſſorah, made me ſtill more anxious to fly from the place, although I remember well I had not the moſt diſtant hope that I could live. I had ſuffered much at the factory, and in the peeviſhneſs of illneſs I thought (perhaps unjuſtly) that my living or dying ſeemed to be a matter of too little conſequence to thoſe whom in health I had treated with much kindneſs and affection.

About ten o'clock, as I was lying in my cot, on a terrace adjoining the ſtairs from whence the boat was to put off, I was ſeized with ſuch a fluttering, palpitation, ſtarting, difficulty of utterance from the ſwelling of my tongue, that I lay in momentary expectation of breathing my laſt. This was, however, probably the cauſe of my hearing the preparations for the departure of the boat. About midnight they were leaving the ſhore. I could not make myſelf heard, and I was too weak to get up without help. I made ſeveral efforts, and at laſt overſet the cot I was lying upon, and brought myſelf to the floor, from whence I crawled on my hands and knees to the ſide of the river. Humanity pleaded for me, and I was taken into the boat, in a ſituation of wretchedneſs I never can forget. We were, after being ſeveral hours on the Euphrates, carried on board the Eagle, oppoſite to Margil, a country houſe belonging to the factory, a few miles diſtant from Buſſorah.

12th. The day was uncommonly hot, and my fever came upon me about ten o'clock. The heat was intenſe. Mr. ———, a young unexperienced Frenchman, gave me tamarind water and cream of tartar, which had not a good effect. I now diſcerned the firſt ſymptom of a cold fit; but it was ſlight and of ſhort duration. This day, however, I ſupported the fever rather better than uſual, and in the evening had a ſhort intermiſſion, and ſlept a little during the night. The air on the river was this day cooler and more refreſhing than on ſhore.

13th. About eleven o'clock had a regular cold ſhivering fit, ſucceeded by a very ſevere hot fever, which continued till five in the evening, when I was ſomewhat relieved by perſpiration. This day the agony of the hot fit was inexpreſſible, with great pain in my loins, and a conſtant inclination to make water, which came from me in drops like blood. I had a very bad, ſleepleſs night.

14th. By Mr. ———'s advice I took a doſe of tartar emetic, which not working, he gave me ſome ipecacuanha. I brought up a great deal of bile, but the fever increaſing, my ſufferings under it were greatly increaſed by the operation of the emetic, which worked powerfully both upwards and downwards. This was a trying day indeed. I can give no idea of what I ſuffered, which muſt have been intolerable, attended with intervals of delirium and frequently ſwooning. About five the fever began to abate a little, and and at ſix Mr. ——— gave me a ſmall doſe of decoction of bark, which ſeemed inſtantly to cauſe a return of the fever, heat, thirſt, anxiety and pain.

My fellow-ſufferer, Mr. Abraham, was in violent agony this day; he cried out repeatedly that a fire was conſuming his bowels, and that he was in exquiſite torture. The captain of the cruiſer had been complaining; he, Mr. Abraham and myſelf lay in the ſame cabin. About 4 o'clock in the afternoon, when my pain was exceſſive, I crawled from my cot, with an intention to drop myſelf from a port-hole which was under the captain's bed, into the river. I had nearly accompliſhed my purpoſe, when the captain perceived me, and had me carried into my bed. I was not delirious; and, in ſpite of all my reſolution, the agony I ſuffered this day made me repeatedly ſcream out. One of our ſeamen died ſuddenly, and the blood, I was told, inſtantly flowed from all parts of his body.

This evening we arrived at Buſhire. On our coming to an anchor Mr. Abraham was immediately carried aſhore; but I was too ill to be moved, and accordingly followed in the morning with Capt. Sheriff, after a very ſevere, ſleepleſs night.

The heat was ſo exceſſive this day that even the natives we had on board ſunk under it, and many of them were ſtruck down with the ſun. By noon nobody could

could keep the deck; and about this time the veſſel ran aground on the bar at the mouth of the Euphrates, but fortunately beat over, and got into the gulf. Two more of our people died in the evening; and I ſhould have mentioned that, in ſailing down the river, we ſaw them throwing many dead bodies from the veſſels which were at anchor below Buſſorah, and many boats crowded with people from the Arabian ſhore, paſſing over to Perſia.

The Perſians at firſt oppoſed the landing of our ſick, and threatened to burn the ſhip; but they were prevailed upon by the company's agent at Buſhire, a moſt worthy man, to permit us to come aſhore.

15th. I was ſo weak that it was with difficulty they could carry me aſhore in my cot; my ſtrength was quite gone, and I was helpleſs as an infant. Some grapes, water-melon and ice had been got for Mr. Abraham: of the latter he had eaten freely; I was much preſſed to do the ſame, but was afraid of its increaſing my pain, and could hardly be prevailed upon to taſte it; I, however, ſwallowed a little, but by this time my tongue and throat were ſo ſwelled that I had difficulty in getting any thing down. About 10 o'clock I was attacked as uſual; but I was become ſo weak, and the fever running higher than uſual, that I appeared in the courſe of this day, more than once, to be in the agonies of death; perſpiration gave no relief to the violent pain and oppreſſion I laboured under.

The factory at Buſhire is a miſerable, wretched mud building, bearing more reſemblance to a ſtable than a human abode: the few rooms, or rather cells, are inſufferably hot, even to thoſe in health, and the reſt of the building has no cover from the ſun. In one of the beſt of theſe receſſes in the wall Mr. Abraham and I were placed, and on the ſame bed, as there was not room enough for two: our agonies were great, and our cries dreadful. About 7 o'clock in the evening I perceived my companion in the agonies of death. The company's agent, Mr. Beaumont, moſt humanely afforded him every aſſiſtance in his power; and when every other perſon was afraid to come near us, he himſelf attended, and adminiſtered ſuch cordials as he thought might give us relief. Mr. Abraham died in great pain; and, for fear of alarming the inhabitants, or rather commandant or ſheik of the town, Mr. Beaumont thought it neceſſary to conceal his death. It was ſome time before the dead body could be removed, which had become very putrid, and covered with purple ſpots. I have been ſince told that immediately after death a great quantity of blood or bile flowed from him as black as ink, and ſo highly offenſive as to be ſmelt at ſome diſtance from the factory. Paſt midnight we were both removed to the terrace, but, unfortunately for me, there was only one ſpot where we could lie, and the ſmell of the dead body became intolerable; I was, however, cleaned and put into another bed by the humane aſſiſtance of Mr. Beaumont, who ſat by me, and treated me with uncommon tenderneſs. I recovered a little, but paſſed a dreadful night indeed. I ſhuddered at the agony which I was to feel on the return of the ſun, and moſt anxiouſly wiſhed for death, as the only relief from pain that I could expect. I was unable at this time to move hand or foot, and at times could not ſpeak. I told Mr. Beaumont that I thought a gentle doſe of phyſic, if it could be got down, might alleviate the racking pain in my breaſt, ſtomach, bowels and loins; he accordingly prepared ſome ſalts, manna and tamarinds, and gave it to me in the morning.

16th. At eleven o'clock the violence of the fever came on; I grew delirious, ſwooned, and the ſymptoms of approaching death, I was afterwards told, grew evident to thoſe around me. My eyes were fixed, my tongue hung from my mouth, and my face grew quite black. I recovered from this fit about twelve o'clock, and felt excruciating pain, and a burning, ſuffocating heat. My ſtomach and bowels ſeemed all on fire, my lungs played with the utmoſt difficulty, and I felt a pain and ſenſation about my heart which I cannot deſcribe. I was unable to move; my ſervant lifted me; I fell into a ſwoon for a few minutes, and, when I came to myſelf, a great quantity of black putrid bile flowed from me. Relief was inſtantaneous, and I ſlept or ſwooned till about 5 o'clock, when I found myſelf free from fever, and able to ſpeak, my recollection clear, and my mind perfectly compoſed, but my body ſo weak that I had no power of moving, except one of my hands. They gave me

ſome

ſome ſuſtenance; I had a little ſleep; but about midnight I fell into a ſituation which I had all the reaſon to think indicated the immediate approach of death. My tongue cleft to my mouth, my extremities were as cold as ice, and the coldneſs alſo appeared to extend up my thigh; my arm was deſtitute of pulſe, nor was the ſmalleſt pulſation of the heart perceptible; I never had my recollection clearer, or perhaps ſo clear, in my life. My ſervant was lying by my bedſide; I was convulſed for ſome minutes; and, on recovering, I got out the word *boy*. Fortunately for me he was not aſleep, and heard me; I then got out the word *wine*; on which he brought me a glaſs of claret, which, with much difficulty, I got down; I felt myſelf much revived; I reflected on my ſituation; and, although I had not the moſt remote idea of ſurviving that night, I recollected that I had ſome fine powdered bark in my trunk, and it occurred to me that, if any thing could be done to preſerve my life, it would be that medicine taken in red wine; but, my ſpeech immediately failing me, I could not direct the ſervant to give it to me. Death ſeemed approaching; coldneſs had ſeized all my limbs; my ſight became confuſed, as I perceived from looking at the ſtars, which danced before me; and the rattle or noiſe in my throat was very perceptible to the ſervant, as he afterwards told me. I fainted and continued in a ſtate of inſenſibility, I believe, for about an hour. The loud lamentations of the ſervant, bewailing his own misfortune in loſing his maſter in a country ſo remote from his own, ſeemed to recal me to life; I felt as if refreſhed with a little ſleep, and got out the words *bark and wine*; it was inſtantly brought, and the man gave me two large tea-ſpoonfuls in a large glaſs of claret. The effect was inſtantaneous, and operated like a charm; the coldneſs left me, I could ſpeak intelligibly, and could move my hands. I told the ſervant to give me a tea-ſpoonful of the bark every hour, in a glaſs of claret. By 8 in the morning I had taken ſix doſes, and more than half a bottle of claret. I was conſiderably ſtrengthened, and could converſe with Mr. Beaumont, who encouraged me to perſevere in the bark, and treated me with uncommon attention. I had been ſadly neglected at Buſſorah, but this was amply made up to me by the humane and tender attentions of Mr. Beaumont, who was a great predeſtinarian, and who never ſhunned danger when he felt it a duty to aſſiſt a fellow creature. He waited upon me like a nurſe, conſoled me under pain and ſickneſs, and, when my fever was at its greateſt height, he has often held me in his arms, when I wanted to be removed, or my bed ſhifted. About this time my legs and thighs became covered with blotches of a duſky brown hue, ſome of them as broad as the palm of the hand, quite dry, and they itched intolerably. At the ſame time ſeveral little boils broke out in different parts of my body, but there was only one, over my eye, that came to ſuppuration; the others, and the eruption on my legs and thighs, all diſappeared.

I continued the bark till 12 o' clock, and then left it off till 4, when I took another doſe. The dreadful fever of the preceding days did not return on this, but I was ſtill extremely ill, had very great difficulty in ſpeaking and breathing; a ſwelling alſo in my throat, parched tongue, and unquenchable thirſt. I had not the moſt diſtant hope of living. I tried to take ſome broth, but the ſwelling in my throat prevented my ſwallowing. I paſſed a very bad night, with ſtartings, anxiety, and great pain over the kidnies; and what little ſleep I got ſeemed to make me worſe; I was fatigued with it, and under the conſtant dread of ſuffocation: towards morning my throat grew worſe, and my thirſt was exceſſive.

18th. Left off the bark, uncertain what I ought to do—no fever, but the ſame ſymptoms as the day before—drank a little chicken broth, which was the only ſuſtenance I had taken for four days before—great oppreſſion and heat in my ſtomach and bowels. Mr. Beaumont found out an Armenian who profeſſed phyſic. This man gave me a clyſter, which gave me great relief, and a water to drink, famous as a febrifuge among the Perſians; I drank of it freely, and found much benefit from it. But the moſt extraordinary of all the ſymptoms I experienced was this, that, the third day after the firſt intermiſſion of my fever, one of my teeth, and one of the nails of my hand, came out without the ſmalleſt pain, only a little ſwelling in the gum; and, on the nail falling off ſome matter flowed from the end of my finger. I never had the tooth-ach. At this time the boil on my eye ſuppurated.

From

From the 18th of June to the 5th of July, being ſeventeen days, my fever did not return. I recovered ſtrength ſlowly, and could walk a little, ſupported by two men. My food was chiefly chicken and veal broth, and about a glaſs and a half of Madeira wine a day. Yet I had many ſymptoms of diſeaſe hanging about me—reſtleſs, fatiguing nights—great thirſt—bad taſte in my mouth: every thing I took ſeemed bitter and ſalt—pains in my back, ſides and loins, and great difficulty in making water. In this time I paſſed much bile, naturally and by clyſter; and I had a purgative from the Armenian, which weakened me greatly.

The ſprings lifted, as ſeamen term it, three days before the change. The opinion is univerſal in thoſe countries, and alſo in India, particularly Bombay, where intermittents are prevalent, that the change and full of the moon has an effect upon all intermitting diſeaſes, of which afterwards I had many proofs in my own caſe. To prevent a relapſe, I took ſome decoction of bark, but in too ſmall quantities to anſwer the purpoſe.

4th July. My water, from being thick and muddy, became quite clear.

The 5th of July, after dinner, I was taken with a ſlight hot fit, which continued about two hours, and then went off by copious perſpiration; the remaining part of the evening I was entirely free from fever.

6th. I took decoction of bark—no fever.

7th. At 11 o' clock a regular cold and hot fit; the former continued three quarters of an hour, the latter two hours. Although much leſs ſevere than my former fever, yet I ſuffered a good deal from the hot fit. Left off the bark by the advice of the Armenian, who told me that it heated me and made me worſe. Much weakened by this day's illneſs; nor did the perſpiration entirely free me from the fever.

8th. Had a clyſter thrown up, and early in the morning took a draught from the Armenian, compoſed of fine vinegar, ſugar, and a country ſeed infuſed over night in water.—A ſlight hot fit, but of ſhort continuance.

9th. The draught of yeſterday repeated—at 10 a regular cold and hot fit, rather leſs violent than the laſt.

10th. No fever—tolerably well.

11th. Between 8 and 9 in the morning a cold and hot fit, much more ſevere than the laſt—great heat, thirſt and oppreſſion—much weakened. I now perceived I had got a regular tertian, and determined on the bark, but was prevailed on by the Armenian not to uſe it, he promiſing to cure me in a day or two. He gave me water-melon and his infuſion of vinegar and ſeeds.

12th. No fever—find the water-melon to diſagree greatly with my ſtomach.

13th. Had not as yet indulged much hopes of recovery. I felt ſtill, even in thoſe days previous to this laſt relapſe, many alarming ſymptoms of diſeaſe, which made me apprehend I could not recover; and this laſt attack had again reduced me ſo low, that it was evident that, unleſs I could get removed from thoſe ſcorching climates, a very ſhort time would put an end to my life. Except in the humanity and goodneſs of Mr. Beaumont, I was without a ſingle comfort or conveniency of life at Buſhire. The heat of the weather ſeemed daily to increaſe, and the houſe we were in hardly covered us from the direct rays of the ſun. My ſervant was taken ill, and appeared to be dying: it was with the greateſt pleaſure, therefore, I received the accounts this day of the Eagle cruiſer having arrived laſt night from Buſſorah, on her way to Bombay.

At half paſt ſeven o'clock I had a very ſevere fit; the hot fit was uncommonly violent, and continued about three hours. I was much reduced, and reſolved at all events to take the bark in powder, and in large doſes, and to diſmiſs the Armenian. In this I was confirmed by Mr. Puget, who informed me that the few ſurvivors at Buſſorah owed their lives entirely to the bark, which had at laſt been given in very large doſes.

14th. I took four doſes, or eight tea-ſpoonfuls, of powdered bark. It purged me, and carried off a great quantity of black putrid bile. This evening I was carried in my cot on board the Eagle, reſolved at all events, even if I had been certain of dying in the boat, to leave Buſhire, where I had hardly ſhelter from the ſun, and where the heat was ſo exceſſive, that Capt. Alderſon of

of the Eagle and two paſſengers were taken ill from it laſt night. I got on board very late, yet found myſelf refreſhed from the ſea air.

15th. The fever did not return. I continued to take the bark as yeſterday, and found myſelf ſurpriſingly ſtrengthened. I perſevered under this courſe till the 3d of Auguſt, when the veſſel arrived at Muſcat, and I was aſtoniſhingly recovered for the ſhortneſs of the time.

From the 14th of July to the 3d of Auguſt I had taken ſeven ounces of bark; and as the fever had returned upon me the laſt day of the ſprings at the preceding change of the moon, two days before this change I increaſed my daily doſe, and continued in this manner till the 4th, when the ſprings being over, and perceiving no ſymptoms of fever remaining, I left off the bark entirely. I had generally taken ſix tea-ſpoonfuls every day.

From the 15th of July till my arrival at Muſcat, a ſeaport on the coaſt of Arabia, my recovery was exceedingly rapid. I had a keen appetite, a pretty good digeſtion, ſound, refreſhing ſleep, and my daily increaſe of ſtrength was very perceptible. My diet, till this time, had been generally chicken broth, rice and boiled fowl, light pudding, &c. On leaving off the bark I obſerved no particular regimen, only abſtaining from ſalted and high-ſeaſoned meats, and confining myſelf to three or four glaſſes of Madeira. I found that an infuſion of prunes, with a ſmall quantity of cream of tartar, was of much ſervice to me during the courſe of the bark, as it kept me cool, and my body open. I was ſenſible, at times, during my recovery, of a ſlight but troubleſome pain under my fifth rib on the right ſide, eſpecially when I lay on that ſide; but from feeling and preſſing my hand over the region of the liver, and from other circumſtances, I had no reaſon to ſuſpect that my liver was affected; and, as it ſoon left me, the cauſe was probably trifling or accidental.

On my leaving Muſcat a large boil came upon the hip-bone, the ſize of a ſmall melon, extending ſome way up the ſide, and down the thigh, with a hard baſis. After arriving at Bombay, which we did in fourteen days, it broke, and in a few days healed up. I ſhall only add, that at Bombay I was detained four months before I had an opportunity of proceeding to Europe. In that time I had three returns of my ague, but on taking a few doſes of bark it left me. Thoſe attacks happened at the change of the moon. From Bombay to Europe I had three or four ſlight fits of the ague; the worſt on our making the coaſt of South Guinea, at the ſettlement of Benguela, where we found the wretched remains of a Portugueſe garriſon, the ſurvivors of a fatal putrid fever, which, as they told us, raged in thoſe parts for eighteen months before. The laſt attack I had was the day we made the Rock of Liſbon, ſince which time I have had no returns of the ague, although, when the wind continues long at eaſt, I am ſenſible of a tendency to that complaint.

I ſhall now give a brief account of the fate of my fellow ſufferers at Buſſorah. This unfortunate party conſiſted of capt. Sheriff, of the Eagle cruiſer; Mr. Brown, a Bengal merchant, carrying goods from India to Aleppo; Mr. Palmer, a gentleman returning with his fortune from Bengal to Europe; Mr. Robſon, ſurgeon to the factory; Mr. Abraham, the vice-conſul; Dr. Roſs, who had practiſed many years at Conſtantinople, ſome time in Bengal, and was then taking the opportunity of accompanying me acroſs the deſert; Mr. Smith, a merchant from India; and an Italian Carmelite, the vicar of Buſſorah, who came from Bombay. It is unneceſſary to ſay that the *ſeea dab* is a common ſymptom in the Turkiſh fever, or, in other words, a ſtrong deſire of ſelf-deſtruction. We had a fatal inſtance of it in our party. Mr. Brown, the ſecond day of his fever, being left alone, got to his piſtols, and, throwing in four or five balls, diſcharged them into his breaſt, and was found dead a few minutes afterwards. I believe every one of us at times would have done the ſame, had we been poſſeſſed of the means of accompliſhing it. Mr. Robſon died the third day of his fever, in great agonies, but perfectly ſenſible. His was a continued high fever, without any remiſſion. Mr. Palmer died the 4th day, under the ſame ſymptoms as the preceding. The Carmelite, the ſecond morning after he was taken ill, had opened a vein in his arm, and bled to death, moſt probably intentionally. Captain Sheriff was ſeized with the fever on his return from Buſſorah to Buſhire. He died the third day, in a manner which is even painful to relate. He was a man of ſingular

ſingular ſtrength of conſtitution, and ſuffered unuſual agonies before he died. His cries were heard all over the factory; he foamed at the mouth, gnaſhed with his teeth, and tore his arms with his teeth. Thoſe who heard him compared his cries to the bellowing of a mad bull. He was no ſooner dead but his body was covered with purple ſpots, and ſo offenſive that the people could hardly carry it out to be buried. Mr. Sheriff's was what they call the worſt kind of plague.

Mr. ————, formerly mentioned as having eſcaped the plague at Buſſorah by ſhutting himſelf up in a mud houſe, was ſeized on his voyage to Buſſorah with a kind of inſanity, imagining that people were conſpiring againſt his life, and that he was capable of overhearing, at a great diſtance, even a whiſper ſpoken to his diſadvantage. He, however, eſcaped the infection, and returned to England in health.

N° VII.

Set of Queries furniſhed by Doctors AIKIN *and* JEBB; *and by Mr.* HOWARD *put to ſeveral foreign Phyſicians, during his tour; with their Opinions concerning the Plague.*

1. IS the infection of the plague frequently received by the French?

Anſwer, by *Raymond*, phyſician at Marſeilles: Sometimes it is.——*Demollins*, ſurgeon do: In the lazaretto ſome have touched infected bodies and things with impunity. Attributed to the temperament of the body.——*Giovanelli*, phyſician to the Leghorn lazaretto: The plague cannot be communicated but by very near approach, or touch: air cannot be the vehicle.——*They*, phyſician to the Malta lazaretto: It may happen that one perſon may inhabit the ſame chamber, or even touch an infected perſon, with impunity; of which I have known inſtances; but all who approach the atmoſphere of an infected body may receive the infection by reſpiration. Contagion is almoſt always received before touching or approaching the infected perſon.——*Morandi*, phyſician at Venice: Contact is one of the moſt powerful and dangerous means of communicating the infection; but for the developement of its effects a prediſpoſition in the receiving body is neceſſary.——*Verdoni*, phyſician at Trieſte: It is moſt frequently communicated by the touch. It has been given by a flower held and ſmelt at, firſt by two perſons who remained free; and then by a third, who ſickened and died in 24 hours.——*Jew* phyſician at Smyrna: The infection is in reality communicated by the touch alone; for all who keep from contact of infected perſons or things remain free. To the effect of contact, however, a certain diſpoſition of the air is neceſſary; for we often ſee infected perſons arrive from other countries, yet the diſeaſe does not ſpread. But what this diſpoſition is can ſcarcely be conceived. Commonly in this climate, the diſeaſe appears at the end of ſpring, and continues to the middle of ſummer; with this particularity, that, in cloudy weather, and during the *ſirocco* winds, the attacks are more frequent. Alſo in the ſame diatheſis of the air ſome receive the infection, while others expoſed to the ſame dangers eſcape it. From obſervation it appears, that cacheſtic perſons, and thoſe of conſtitutions abounding in acid, do not readily take it. The contagious miaſmata may be dormant in the body for ſome time without doing the leaſt harm, till ſet in motion by ſudden fear, or the exceſſive heat of a bath.——*Fra. Luigi di Pavia*, prior of the hoſpital of San Antonio at Smyrna: The plague is communicated by contact, according to all the obſervations I have been able to make for eighteen years.

2. Does the plague ever riſe ſpontaneouſly?

Raymond: Inconteſtible experience ſhows that it only proceeds from contact.——*Demollins:* From all ages the plague has been brought to Marſeilles

feilles by merchandiſe or perſons beyond ſea.——*Giovanelli:* As the diſeaſe always appears with the ſame ſymptoms, it is not probably ſpontaneous, but the conſequence of a particular contagion.——*They:* Some contagious fevers come of themſelves; others proceed from the communication of contagion. The plague is thought to have originated in Egypt, and ſpread itſelf from thence.——*Morandi:* Contagious fevers do not ariſe of themſelves, but are always the product of a peculiar poiſon.——*Verdoni:* I know no fever that can properly be called contagious, and doubt if even the plague can be conſidered as ſuch. My reaſons are drawn from the very different manner in which the plague appears in different years, and the different degree in which it ſpreads. I therefore conclude that contagious fevers come of themſelves.—*Jew* phyſician: According to the moſt ancient authorities, the plague has always been brought to Smyrna by contagion, and was never produced here.—*Fra. Luigi:* Ancient and common obſervation in this city prove that the plague is derived *ſolely* from contagion.

3. To what diſtance is the air infected? How far does actual contact, wearing infected clothes, or touching other things, produce the diſeaſe?

Raymond: The infected are ſafely converſed with acroſs a barrier, which ſeparates them only a few paces.——*Demollins:* The air round the patient is infected more or leſs according to the degree of poiſon which exhales. Here in the lazaretto they are ſpoken with acroſs two barriers, a few paces from each other, without fear of contagion. Hence it would appear that the plague is communicated only by the touch, or ſtill more by wearing infected clothes.——*Giovanelli:* If one ſpeaks of an infected perſon ſhut up in an unventilated chamber, it may be ſaid that the whole chamber is dangerous; but if one ſpeaks of a patient expoſed to the open air, it has been proved that the infection does not extend beyond five geometrical paces from the body. Beyond this diſtance one is in ſafety. The actual touch of an infected perſon or thing is proved to be very dangerous by fatal experience; but to what degree, is not aſcertained.——*They:* The infection extends only ſome paces; and the miaſms, at the diſtance of about ten paces, are ſo corrected by the air as to loſe all their activity. It may be communicated by touching infected things, eſpecially of a porous nature, as cloth, wool, ſkins, &c.——*Verdoni:* From the moment of infection to the time when nature has entirely diſſipated the contagious principle, which uſually happens in forty days, there is always a capacity of communicating the infection. The degree of infection is in proportion to the volume of air ſurrounding the patient; the air being what abſorbs, diſſipates and communicates the contagious principle. Infected ſubſtances communicate the diſeaſe for many years, in proportion to the ventilation they have undergone, or of which they are ſuſceptible.——*Jew* phyſician: The degree of infection in the air about the ſick depends upon the greater or leſs malignity of the diſeaſe, and other circumſtances. The air about poor patients is more infectious than about the rich. Theſe things being eſtabliſhed, I am of opinion that, in the greateſt contagion, we may ſecurely ſee a patient at the diſtance of two ells, if the chamber windows be not all ſhut.——*Fra. Luigi:* The infection is greater or leſs in proportion to the virulence of the contagion; but I have made no obſervation as to the diſtance. The diſeaſe is communicated by contact of all infected things, and by cloſe inſpiration of the breath of the ſick.

4. What are the ſeaſons in which the plague chiefly appears; and what is the interval between the infection and the diſeaſe?

Raymond: The plague ſhows itſelf at all ſeaſons, but leſs at the two ſolſtices.——*Demollins:* Great ravages may be made in all ſeaſons, but principally in the greateſt heats of ſummer. From the infection to the diſeaſe is two or three days.——*Giovanelli:* The plague appears at all times, in the ſame manner as poiſons at all times produce their effects. But obſervations ſhow that its ravages are greater in hot ſeaſons than in cold; and it ſeems that ſummer and the firſt months of autumn are moſt to be dreaded. There is no certainty as to the interval between the infection and the diſeaſe, as it depends on the particular conſtitution of the patient.——*They:* Warm, moiſt ſeaſons contribute to the production of all infectious diſeaſes. The interval from the infection to the ſeizure is various, according to the virulence of the poiſon; and

and the conſtitution of the patient. Sometimes it acts ſlowly, ſometimes like a ſtroke of lightning.——*Verdoni:* The ſpring is the principal ſeaſon. Generally the diſeaſe ſhows itſelf at the inſtant of touch, like an electrical ſhock. Sometimes a perſon retains the contagious principle without any ſenſible effect, and then unknowingly communicates it to a third, in whom, if predifpoſed to the diſeaſe, it becomes active; or, otherwiſe, it may be communicated to others ſucceſſively in the ſame way, till it becomes diſſipated and annihilated, as happened at Smyrna in 1783. In bodies prediſpoſed it very rarely conceals itſelf till the third day.—*Jew* phyſician: Anſwered in the firſt. ——*Fra. Luigi:* The plague is moſt fatal in Smyrna from April to July; and it is conſtantly obſerved that great colds and heats much diminiſh it, and copious dews extinguiſh it. The infection ſhows itſelf in 24 hours, more or leſs, according to the difference of temperament.

5. What are the firſt ſymptoms of plague? Are they not frequently a ſwelling in the glands of the groin and armpit?

Raymond: The plague often conceals itſelf under the form of an inflammatory, ardent or malignant fever. Tumours of the glands are often its firſt ſymptom --*Demollins:* The firſt ſymptoms of the plague vary; but the moſt common are, buboes in the armpit and groin; parotids and carbuncles in various parts of the body.——*Giovanelli:* The firſt ſymptoms are, debility, fever, exceſſive thirſt, followed by great heat; after which carbuncles or buboes appear in the armpits, groin and parotids. The groin is ſooner attacked than the armpit.——*They:* Swellings in the armpits and groin are indeed the characteriſtics of the plague; yet they are not the ſole nor the firſt ſymptoms, and often are not ſeen at all; as when the plague diſguiſes itſelf under the form of other diſeaſes.——*Morandi:* Glandular ſwellings are properly the ſymptom of the ſecond ſtage, and are preceded by thoſe febrile ſymptoms which are immediately the conſequence of receiving the infection; ſuch as pain in the head, drowſineſs, great proſtration of ſtrength, dryneſs of the tongue, vomiting, hiccough, tremor, diarrhœa.——*Verdoni:* Its firſt ſymptoms are relative to the conſtitution of the year, and of the body ſeized, and the place where it was produced, or whence it came. In 1783 all the parts of Natolia were infected; and the diſeaſe tranſported to Smyrna, which is the centre, was extinguiſhed without the loſs of a ſingle perſon. Generally the plague of Conſtantinople, tranſported to Smyrna, does little harm. That of Egypt cauſes havock, as in every country. That of the Thebais is always cruel, and, carried to Lower Egypt, is fatal. The inguinal glands are moſt generally affected.——*Jew* phyſician: The ſwelling of the glands is ſeldom the firſt ſymptom. Patients are every day ſeen who, being ſuppoſed ill of another diſorder, in two, three or more days ſhow glandular ſwellings, or carbuncles, by which the plague is manifeſted. On the contrary, many, who from the uſual ſigns are ſuppoſed to have the plague, become well in a day or two, without any external ſwelling. The firſt ſymptoms are, horripilation, or actual ſhivering, naufea or vomiting, loſs of ſtrength, and fever. Theſe are common to many diſeaſes; but the pathognomic ſigns are, a difference in the pulſations of the two ſides, with this circumſtance, that from the diverſity a prognoſtic ariſes; it having been obſerved that if the pulſe on the ſide of the tumour or carbuncle be greater or more frequent, it bodes well; whereas, if it be ſmaller, it ſhows greater malignity, and more is to be feared. Further, there is obſerved among the firſt ſymptoms a viſible pulſation in the carotids, greateſt on the affected ſide; and alſo a cryſtalline vivacity in the eyes, with a kind of contraction or diminution of the eye on the affected ſide.——*Fra. Luigi:* The moſt remarkable ſymptoms of the plague are, turbidneſs and ſparkling of the eyes, the tongue furred with a white mucus, and very red at its tip, frequent biting of the lips, violent pain in the head, and inability to hold it up; a ſenſe of great cold in the loins, vomiting, debility. Swellings of the glands are not among the firſt ſymptoms.

6. Is it true that there are two diſtinct fevers with nearly the ſame ſymptoms, one of which is properly termed the plague, and is communicated from a diſtance by the air, and without contact; while the other, which is properly termed contagion, is only communicated by the touch, or at leaſt by near approach to infected perſons or things?

Morandi:

Morandi: It is certain, from multiplied obſervations, that there are two ſorts of peſtilential fevers, ſimilar in appearance; one of which proceeds from the contamination of the air alone, and is communicable to any diſtance; the other is produced alone by contact, or near approach. The former of theſe is properly termed a peſtilential fever, the latter a contagious one.—*Verdoni:* The diſtinction of theſe fevers is uſeleſs; ſince the ſame which is communicated by the touch, is that alſo conveyed by the air to a certain diſtance, eſpecially in a cloſe place.—*Jew* phyſician: That there are two kinds of plague is abſolutely to be denied; yet ſometimes it happens that perſons are attacked with the plague without knowing from whence it came.—*Fra. Luigi:* I hold it for certain that there is only one ſpecies of plague, though differing in malignity.

7. What is the method of treatment in the firſt ſtage; what in the more advanced periods? What is known concerning bark, ſnakeroot, opium, wine, pure air, the application of cold water?

Raymond: The diſeaſe is treated as inflammatory. No ſpecific has been diſcovered for it.—*Demollins:* At the beginning, bleeding, vomiting, purgatives, diluents, refrigerants and antiſeptics are uſed; afterwards antiſeptics and cordials, relatively to the temperament and ſymptoms.—*Giovanelli:* The plague cauſing always a diſpoſition to inflammation and putrefaction, it is always proper to bleed proportionally to the ſtrength, and to uſe a cooling regimen, with the vegetable acids. The repeated uſe of emetics is alſo proper, both to clean the firſt paſſages, and to diſpoſe the virus to paſs off by the ſkin. In the progreſs it is neceſſary to favour the evacuation of the virus by that iſſue which nature ſeems to point at. Thus either antiphlogiſtic purgatives are given, if nature points that way, or ſuppurative plaſters are to be applied to any tumours which may appear. Epiſpaſtics to the extremities are proper where nature wants rouſing. The vitriolic acid in large doſes has been found very ſerviceable in the plague at Moſcow, attended with carbuncles. When the inflammation is over, and marks of ſuppuration appear, the bark, with wine and other cordials, is proper. The ſurgeon's aſſiſtance is proper in the treatment of boils and anthraces, which laſt are ſeldom cured without the actual cautery.—*They:* In the beginning of peſtilential fevers bleeding is ſometimes proper, and vomits almoſt always. In their progreſs frequent ſubacid and cold drinks, the bark given liberally, and vitriolic acid, have been found powerful remedies when there was a diſſolution of the blood.—*Morandi:* In the firſt period, evacuations, according to the particular circumſtances of the caſe, are proper: in the ſecond, bark mixed with wine, and opium as a temporary ſedative. Pure air is very neceſſary; and fire as a corrective, with the burning of antiſeptic and aromatic ſubſtances.—*Verdoni:* As ſoon as a Chriſtian finds he has got the plague, he eats caviare, garlic and pork; drinks brandy, vinegar and the like, to raiſe the buboes. Upon theſe he applies greaſy wool, caviare, honey of roſes, dried figs, &c. to bring them to ſuppuration. The Turks and Arabs drink bezoar in powder with milk, and other ſudorifics, in order to expel the virus. They vomit, and poſſibly a ſecond time. At Cairo they take opium, and cover themſelves with mattreſſes in order to excite ſweat; and, though parched with heat and thirſt, they drink nothing. They open the immature buboes with a red hot iron. At Conſtantinople and Smyrna they eat nothing, and drink much water and lemonade. The Jews drink a decoction of citron ſeeds, lemon or Seville orange peel, and their own urine. They abſtain ſcrupulouſly from animal food. In 1700 a phyſician in Smyrna found bleeding very uſeful. Another, in another year, cured the plague by bleeding, and an antiphlogiſtic regimen. My brother in Cairo treated it like a biliary fever, with vomits, ſaponaceous attenuants, and antiphlogiſtics; and ſucceſsfully. Some ſailors at Conſtantinople in the frenzy of the plague have thrown themſelves into the ſea; and it is ſaid that on being taken out of it they have recovered. My opinion upon the whole is, that the treatment ought to be relative to the conſtitution of the year, and of the patient, by which the nature of the diſeaſe itſelf is greaty altered.—*Jew* phyſician: Bleeding in many caſes may be ſerviceable, as I have known patients, who were bled by miſtake, recover; and others recovered from a moſt deſperate condition by a ſpontaneous hemorrhage. On the other hand,

perſons

perſons have been apparently injured by both theſe circumſtances. The difference of effect ſeems to depend on the ſtate of the blood, whether it be diſpoſed to coagulation or diſſolution. In the former, bleeding is uſeful, in the latter, hurtful. Vomits, according to my experience, have not ſucceeded; yet I ſhould not heſitate to try ipecacuanha in ſubſtance, exhibiting half a ſcruple at two or three times, in the expectation that in this manner it would not run down. Bark may be uſeful in diſſolutions of the blood; and alſo ſmall doſes of opium, and other medicines prudently adminiſtered. In exceſſive watchfulneſs I have known relief procured by anointing the temples with ung. populeon. In a caſe of hiccough the liquor anod. miner. Hoffmanni ſucceeded with one. The Turks, in the violence of the fever, take handfuls of ſnow, and apply it all over their bodies, and alſo eat it; and ſometimes throw cold water on their feet. But whether this is of ſervice or not cannot be determined; as theſe people in other reſpects pay no regard to rules of diet.—*Fra. Luigi:* They who practiſe empirically in the plague uſe none of the recited methods, but only ſtrong ſudorifics, and ventilation of the air; and complete the cure by proper treatment of the ſores by ſuppuration.

8. When the plague prevails, do the phyſicians preſcribe to thoſe who have the diſorder a more generous, or a more abſtemious diet? and do they preſcribe any thing to the uninfected?

Jew phyſician: In times of the plague, many are accuſtomed to eat no fleſh; others, no fiſh; but I know not whether by the advice of phyſicians. For myſelf, I have been in many plague years, but have made no alteration in the management of myſelf.—*Fra. Luigi:* In Smyrna the plague is generally treated with a rigorous diet. They only uſe rice and vermicelli boiled in water; and ſometimes, when the patient is too coſtive, juices and herbs boiled without ſeaſoning. From time to time they give ſome acid preſerves, and raiſins, and, in great heats, ſome ſlender lemonade; and a diſh of good coffee with a biſcuit every day. For drink they only uſe toaſt and water; and they follow this abſtemious regimen till the fortieth day of the diſeaſe is completed, after which they take chicken broth, lamb, and other food of eaſy digeſtion.

9. Are convaleſcents ſubject to repeated attacks from the ſame infection?

Raymond: Not unleſs they touch ſomething infected.—*Demollins:* Convaleſcents are ſent to fumigated chambers, and there is no inſtance of relapſe.—*Giovanelli:* No inſtance of relapſe, after being well recovered from the firſt attack, have come to my knowledge; but they are liable to fall into other diſorders, ſuch as conſumption, hæmoptoe, &c.—*They:* Convaleſcents are without doubt liable to a relapſe, and authors are full of inſtances of it. In the plague of Meſſina M. Cotogno ſays that a man had ſucceſſively fourteen buboes, and was cured at laſt.—*Morandi:* All convaleſcents may relapſe.—*Verdoni:* They have it not twice in the ſame year.—*Jew* phyſician: Convaleſcents are often attacked anew, and die; but this does not uſually happen from a freſh infection taken elſewere, but from ſome remains of their own contagion, excited by intemperance in food, or the venereal act.—*Fra. Luigi:* From irregularities in eating and drinking, bodily fatigues, affections of the mind, eſpecially anger, they are liable to repeated and very dangerous relapſes.

10. What is the proportion of deaths, and the uſual length of the diſeaſe?

Raymond: The mortality is different in different ſeaſons and years.—*Demollins:* In the plague of Marſeilles in 1720, half the inhabitants periſhed. The uſual length of the diſeaſe is that of other acute diſorders; but longer when the tumours come to ſuppurate.—*Giovanelli:* The proportion of deaths is variable and uncertain. As to duration, when the diſeaſe is very acute and fatal, the patient generally dies within five days from the firſt invaſion of the fever, or firſt marks of the plague. When he recovers, no certain termination can be aſſigned. If the time of healing all the ſores be reckoned, it may be to three, four or five months, or more.—*They:* The mortality is very various. Of ten whom I treated in the lazaretto, three died. I have obſerved that the fever generally runs on to twenty or twenty-one days.—*Morandi:* The bills of mortality in places viſited by the plague uſually amount to thirty per cent, ſometimes to fifty. (He ſeems to mean of the whole number of inhabitants.)—*Verdoni:* The proportion of deaths varies

varies infinitely. It has been obſerved that the Jews in Conſtantinople and Smyrna loſe only one third; which is attributed to the care they take of their ſick. At Cairo, on the other hand, they are the firſt attacked, and loſe more than three fourths. The Turks loſe two thirds; other nations a little more or leſs. Europeans in Cairo loſe five ſixths. Sometimes it kills immediately; ſometimes in twenty-four hours; commonly in three days. When the patient gets over the ninth day there are great hopes of recovery, as the buboes are then ſuppurated. They may, however, die within the fortieth day, eſpecially if they commit any irregularity, the principal of which is eating fleſh, which inſtantly cauſes a return of fever, and death. It never paſſes beyond the fortieth day.—*Jew* phyſician: The mortality is various, as alſo the duration: ſome in two, three or four days; ſome hold out ſix, eight, or more.—*Fra. Luigi:* Generally more die than ſurvive; but in our hoſpital of San Antonio of Smyrna, from the care taken of the ſick, the number recovering has, for eighteen years paſt, exceeded that of the dead.

11. What are the means to prevent the plague, to ſtop its contagion, and to purify infected places?

Raymond: There is no other method of preſerving one's ſelf from the plague, than avoiding the contact of infected things. Goods are purified by expoſing them to the open air for forty days; and furniture by a ſtrong fumigation with aromatics and ſulphur.—*Demollins:* Here, in the lazaretto, infected goods and furniture are expoſed to a current of air for forty days. The air of infected places is purified by burning all ſorts of aromatics.—*Giovanelli:* The method of prevention is, to avoid all communication with infected perſons or goods. The means of ſtopping the contagion form a body of police, too extenſive to be here mentioned.—*They:* The means of prevention, beſides avoiding infected things and perſons, are ſobriety in living, the uſe of vinegar internally and externally, and an iſſue. Infected places are purified by fumigation and ventilation, by ſcraping the lime from the walls, (which is then thrown into the ſea) and whitewaſhing them anew with lime and ſea-water, by waſhing the floors, windows, doors, &c. firſt with ſea-water, and then with vinegar, taking great care to leave nothing that is infected. The bodies of the dead are buried in a place ſet apart for that purpoſe; and their beds and bedding are burned. As to other things not uſed during the illneſs, the linen is waſhed with ſoap and ley; the woollen clothes are put into ſea-water for two days, and then ventilated for twenty days. Thoſe which would be ſpoiled by water are hung on a line in the air for 40 days, and fumigated from time to time according to their quality.—*Morandi:* A fire is to be kept conſtantly in the ſick chamber in all ſeaſons. All fæces, &c. are to be immediately removed. Clean ſheets and ſhirts daily. The healthy muſt avoid commerce with the infected; muſt purge gently now and then, ſmoke tobacco, drink pure wine medicated with wormwood, gentian, zedoary, &c. and avoid fear and other paſſions, and exceſs of all kinds.—*Jew* phyſician: No means of prevention are uſed in the Turkiſh dominions.—*Fra. Luigi:* Fire, water and air are uſed for ſtopping the contagion, and purifying places.—*Verdoni:* The beſt preſervatives are ſuppoſed to be ſprinkling the room with vinegar and perfumes, ventilation and fumigation. The Greeks in Smyrna during lent, when they eat only vegetables, are ſeldom attacked; while among thoſe who eat fleſh the contagion makes great havock. Hence the beſt means of prevention are to eat moderately, and not at all of animal food; to drink water and vinegar; to ſprinkle the chamber with the latter; and uſe frequent ventilation; to change the clothes, eſpecially the linen, daily; hanging in the air ſuch as has been uſed, for 15 or 20 days. For ſuppreſſing the infection every thing is to be waſhed that can undergo the operation, and the walls of the chamber to be whitened with lime, but after the 24th of June no further care is taken.

FINIS.

ERRATA.

PAGE.	LINE.	
20.	23.	For 'deſtroying three or four thouſand,' read 'deſtroying ſixteen hundred out of three or four thouſand.'
39.	13.	from bottom, for 'Zabira,' read 'Zebire.'
86.	10.	for 'obſcured,' read 'obſcure.'
153.	20.	for 'acid other,' read 'acid in the other.'
202.	15.	from bottom, after 'the inhabitants,' add, 'Farther eaſt it does not go.'
280.	7.	from bottom, for 'flattering,' read fluttering.'
303.	8.	from bottom (in a few copies) for 'gout, fever,' read 'gaol-fever.'
309.	10.	for 'ſafety to,' read 'ſafety of.'
460.	2.	from bottom, for 'fluid,' read 'fluids.'
480.	12.	from bottom, for 'Black aſſizes,' read 'Black Hole.'
486.	5	for 'Hansforth,' read 'Hansford;' alſo in pages 489 & 510.
502.	1.	for 'parcity,' read 'paucity.'
513.	1.	bottom, for 'vol. x,' read 'vol. iii.'